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UNIVERSITY OF SOUTH CAROLINA  
BURSAR – REGISTRAR OFFICE EXPANSION-  
UTS RENOVATIONS

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STATE PROJECT #H27-Z052-A

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JULY 23, 2013  
CONSTRUCTION DOCUMENTS

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**University of South Carolina  
Bursar - Registrar Office  
Expansion - UTS Renovations  
Columbia, South Carolina**

**STATE PROJECT #H27-Z052-A  
PROJECT #08040.04**

**SECTION 00001 - PROJECT TITLE PAGE**

**OWNER:**

USC Campus Planning and Construction  
743 Greene Street  
Columbia, South Carolina 29208

**ARCHITECTS, MECHANICAL AND ELECTRICAL ENGINEERS:**

GMK Associates, Inc.

1201 Main Street, Suite 2100  
Columbia, South Carolina 29201

tel: 803.256.0000

fax: 803.255.7243

[www.gmka.com](http://www.gmka.com)

Architect: Jerome K. Simons [[jsimons@gmka.com](mailto:jsimons@gmka.com)]

Mechanical/ Plumbing: Jeff Bernagozzi [[jbernagozzi@gmka.com](mailto:jbernagozzi@gmka.com)]

Electrical: Brell Foster [[bfoster@gmka.com](mailto:bfoster@gmka.com)]

**END OF PROJECT TITLE PAGE**

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**PROJECT NAME:** Bursar – Registrar Office Expansion – UTS Renovations

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**SE-310  
REQUEST FOR ADVERTISEMENT**

**PROJECT NAME:** Bursar- Registrar Office Expansion – UTS Renovations

**PROJECT NUMBER:** H27-Z052-A

**PROJECT LOCATION:** University of South Carolina 1244 Blossom Street, Columbia, South Carolina 29201

Contractor may be subject to performance appraisal at close of project

**BID SECURITY REQUIRED?** Yes  No

**PERFORMANCE & PAYMENT BONDS REQUIRED?** Yes  No

**CONSTRUCTION COST RANGE:** \$350,000 - \$500,000

**DESCRIPTION OF PROJECT:** The project consist of HVAC modifications, ceiling replacement, minor reconfiguration of interior spaces, bathroom upgrades, and electrical upgrades.

**A/E NAME:** GMK Associates

**A/E CONTACT:** Jerome K. Simons

**A/E ADDRESS:** Street/PO Box:1201 Main Street, Suite 2100

City: Columbia

State: South Carolina ZIP: 29201

**EMAIL:** jsimons@gmka.com

**TELEPHONE:** 803.256.0000

**FAX:** 803.255.7243

All questions & correspondence concerning this Invitation shall be addressed to the A/E.

**BIDDING DOCUMENTS/PLANS MAY BE OBTAINED FROM:** purchasing.sc.ed

**PLAN DEPOSIT AMOUNT:** N/A **IS DEPOSIT REFUNDABLE:** Yes  No

Only those Bidding Documents/Plans obtained from the above listed source(s) are official. Bidders rely on copies of Bidding Documents/Plans obtained from any other source at their own risk.

**BIDDING DOCUMENTS/PLANS ARE ALSO ON FILE FOR VIEWING PURPOSES ONLY AT** *(list name and location for each plan room or other entity):*

purchasing.sc.edu. It is the contractor’s responsibility to download any documents from the purchasing website

**PRE-BID CONFERENCE?** Yes  No  **MANDATORY ATTENDANCE?** Yes  No

**DATE:** 8/21/13 **TIME:** 2:00 PM **PLACE:** 743 Greene Street, Conference Room 53, Columbia, SC 29208

**AGENCY:** University of South Carolina

**NAME OF AGENCY PROCUREMENT OFFICER:** Juaquana Brookins

**ADDRESS:** Street/PO Box:743 Greene Street

City: Columbia

State: South Carolina ZIP: 29208

**EMAIL:** jbrookins@fmc.sc.edu

**TELEPHONE:** 803.777.3596

**FAX:** 803.777.7344

**BID CLOSING DATE:** 9/4/13 **TIME:** 2:00 PM **LOCATION:** 743 Greene Street, Conference Room 53  
Columbia SC 29208

**BID DELIVERY ADDRESSES:**

**HAND-DELIVERY:**

Attn: Juaquana Brookins

USC Facilities Office

743 Greene Street

Columbia, South Carolina 29208

**MAIL SERVICE:**

Attn: Juaquana Brookins

USC Facilities Office

743 Greene Street

Columbia, South Carolina 29208

**IS PROJECT WITHIN AGENCY CONSTRUCTION CERTIFICATION? (Agency MUST check one)** Yes  No

**APPROVED BY** *(Office of State Engineer):* \_\_\_\_\_

**DATE:** \_\_\_\_\_



**SECTION 00200 - INSTRUCTIONS TO BIDDERS**

**FORM OF INSTRUCTIONS TO BIDDERS**

1.01 See AIA Document A701 (1997 Edition), Instructions to Bidders following this document.

- A. Copies of this document may be obtained from The American Institute of Architects, 1522 Richland Street, Columbia, SC 29201. Phone: 803-252-6050.

1.02 Refer to document 00201-OSE for modifications to this document.

**END OF INSTRUCTIONS TO BIDDERS**

**OSE FORM 00201****STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS****OWNER:** University of South Carolina**PROJECT NUMBER:** H27-Z052-A**PROJECT NAME:** Bursar- Registrar Office Expansion – UTS Renovations**PROJECT LOCATION:** University of South Carolina, Columbia, South Carolina**PROCUREMENT OFFICER:** Juaquana Brookins**1. STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

**1.1.** These Standard Supplemental Instructions To Bidders amend or supplement Instructions To Bidders (AIA Document A701-1997) and other provisions of Bidding and Contract Documents as indicated below.

**1.2.** Compliance with these Standard Supplemental Instructions is required by the Office of State Engineer (OSE) for all State projects when competitive sealed bidding is used as the method of procurement.

**1.3.** All provisions of A701-1997, which are not so amended or supplemented, remain in full force and effect.

**1.4.** Bidders are cautioned to carefully examine the Bidding and Contract Documents for additional instructions or requirements.

**2. MODIFICATIONS TO A701-1997**

**2.1.** *Delete Section 1.1 and insert the following:*

**1.1** Bidding Documents, collectively referred to as the **Invitation for Bids**, include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement, Instructions to Bidders (A-701), Supplementary Instructions to Bidders, the bid form (SE-330), the Intent to Award Notice (SE-370), and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda issued prior to execution of the Contract, and other documents set forth in the Bidding Documents. Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

**2.2.** *In Section 1.8, delete the words “and who meets the requirements set forth in the Bidding Documents”.*

**2.3.** *In Section 2.1, delete the word “making” and substitute the word “submitting.”*

**2.4.** *In Section 2.1.1:*

*After the words “Bidding Documents,” delete the word “or” and substitute the word “and.”*

*Insert the following at the end of this section:*

Bidders are expected to examine the Bidding Documents and Contract Documents thoroughly and should request an explanation of any ambiguities, discrepancies, errors, omissions, or conflicting statements. Failure to do so will be at the Bidder’s risk. Bidder assumes responsibility for any patent ambiguity that Bidder does not bring to the Owner’s attention prior to bid opening.

**2.5.** *In Section 2.1.3, insert the following after the term “Contract Documents” and before the period:*

and accepts full responsibility for any pre-bid existing conditions that would affect the Bid that could have been ascertained by a site visit. As provided in Regulation 19-445.2042(B), A bidder’s failure to attend an advertised pre-bid conference will not excuse its responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the State.

**OSE FORM 00201****STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

2.6. *Insert the following Sections 2.2 through 2.6:*

**2.2 CERTIFICATION OF INDEPENDENT PRICE DETERMINATION**

GIVING FALSE, MISLEADING, OR INCOMPLETE INFORMATION ON THIS CERTIFICATION MAY RENDER YOU SUBJECT TO PROSECUTION UNDER SECTION 16-9-10 OF THE SOUTH CAROLINA CODE OF LAWS AND OTHER APPLICABLE LAWS.

(a) By submitting an bid, the bidder certifies that—

(1) The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to—

- (i) Those prices;
- (ii) The intention to submit an bid; or
- (iii) The methods or factors used to calculate the prices offered.

(2) The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit an bid for the purpose of restricting competition.

(b) Each signature on the bid is considered to be a certification by the signatory that the signatory—

(1) Is the person in the bidder's organization responsible for determining the prices being offered in this bid, and that the signatory has not participated and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this certification; or

(2)(i) Has been authorized, in writing, to act as agent for the bidder's principals in certifying that those principals have not participated, and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this certification [As used in this subdivision (b)(2)(i), the term "principals" means the person(s) in the bidder's organization responsible for determining the prices offered in this bid];

(ii) As an authorized agent, does certify that the principals referenced in subdivision (b)(2)(i) of this certification have not participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this certification; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this certification.

(c) If the bidder deletes or modifies paragraph (a)(2) of this certification, the bidder must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

**2.3 DRUG FREE WORKPLACE**

By submitting a bid, the Bidder certifies that Bidder will maintain a drug free workplace in accordance with the requirements of Title 44, Chapter 107 of South Carolina Code of Laws, as amended.

**2.4 CERTIFICATION REGARDING DEBARMENT AND OTHER RESPONSIBILITY MATTERS**

(a) (1) By submitting an Bid, Bidder certifies, to the best of its knowledge and belief, that-

(i) Bidder and/or any of its Principals-

(A) Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any state or federal agency;

(B) Have not, within a three-year period preceding this bid, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in

**OSE FORM 00201****STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of bids; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) Bidder has not, within a three-year period preceding this bid, had one or more contracts terminated for default by any public (Federal, state, or local) entity.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

(b) Bidder shall provide immediate written notice to the Procurement Officer if, at any time prior to contract award, Bidder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) If Bidder is unable to certify the representations stated in paragraphs (a)(1), Bid must submit a written explanation regarding its inability to make the certification. The certification will be considered in connection with a review of the Bidder's responsibility. Failure of the Bidder to furnish additional information as requested by the Procurement Officer may render the Bidder nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Bidder is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Bidder knowingly or in bad faith rendered an erroneous certification, in addition to other remedies available to the State, the Procurement Officer may terminate the contract resulting from this solicitation for default.

**2.5 ETHICS CERTIFICATE**

By submitting a bid, the bidder certifies that the bidder has and will comply with, and has not, and will not, induce a person to violate Title 8, Chapter 13 of the South Carolina Code of Laws, as amended (ethics act). The following statutes require special attention: Section 8-13-700, regarding use of official position for financial gain; Section 8-13-705, regarding gifts to influence action of public official; Section 8-13-720, regarding offering money for advice or assistance of public official; Sections 8-13-755 and 8-13-760, regarding restrictions on employment by former public official; Section 8-13-775, prohibiting public official with economic interests from acting on contracts; Section 8-13-790, regarding recovery of kickbacks; Section 8-13-1150, regarding statements to be filed by consultants; and Section 8-13-1342, regarding restrictions on contributions by contractor to candidate who participated in awarding of contract. The state may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, contractor shall, if required by law to file such a statement, provide the statement required by Section 8-13-1150 to the procurement officer at the same time the law requires the statement to be filed.

**2.6 RESTRICTIONS APPLICABLE TO BIDDERS & GIFTS**

Violation of these restrictions may result in disqualification of your bid, suspension or debarment, and may constitute a violation of the state Ethics Act. (a) After issuance of the solicitation, ***bidder agrees not to discuss this procurement activity in any way with the Owner or its employees, agents or officials.*** All communications must be solely with the Procurement Officer. This restriction may be lifted by express written permission from the Procurement Officer. This restriction expires once a contract has been formed. (b) Unless otherwise approved in writing by the Procurement

**OSE FORM 00201****STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

Officer, *bidder agrees not to give anything to the Owner, any affiliated organizations, or the employees, agents or officials of either, prior to award.* (c) Bidder acknowledges that the policy of the State is that a governmental body should not accept or solicit a gift, directly or indirectly, from a donor if the governmental body has reason to believe the donor has or is seeking to obtain contractual or other business or financial relationships with the governmental body. Regulation 19-445.2165(C) broadly defines the term donor.

**2.7. Delete Section 3.1.1 and substitute the following:**

**3.1.1** Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement in the number and for the deposit sum, if any, stated therein. If so provided in the Advertisement, the deposit will be refunded to all plan holders who return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

**2.8. Delete the language of Section 3.1.2 and insert the word "Reserved."**

**2.9. In Section 3.1.4, delete the words "and Architect may make" and substitute the words "has made."**

**2.10. Insert the following Section 3.1.5**

**3.1.5** All persons obtaining Bidding Documents from the issuing office designated in the Advertisement shall provide that office with Bidder's contact information to include the Bidder's name, telephone number, mailing address, and email address.

**2.11. In Section 3.2.2:**

*Delete the words "and Sub-bidders"*

*Delete the word "seven" and substitute the word "ten"*

**2.12. In Section 3.2.3:**

*In the first Sentence, insert the word "written" before the word "Addendum."*

*Insert the following at the end of the section:*

As provided in Regulation 19-445.2042(B), nothing stated at the pre-bid conference shall change the Bidding Documents unless a change is made by written Addendum.

**2.13. Insert the following at the end of Section 3.3.1:**

Reference in the Bidding Documents to a designated material, product, thing, or service by specific brand or trade name followed by the words "or equal" and "or approved equal" shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.

**2.14. Delete Section 3.3.2 and substitute the following:**

**3.3.2** No request to substitute materials, products, or equipment for materials, products, or equipment described in the Bidding Documents and no request for addition of a manufacturer or supplier to a list of approved manufacturers or suppliers in the Bidding Documents will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids established in the Invitation for Bids. Any subsequent extension of the date for receipt of Bids by addendum shall not extend the date for receipt of such requests unless the addendum so specifies. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

**2.15. Delete Section 3.4.3 and substitute the following:**

**3.4.3** Addenda will be issued no later than 120 hours prior to the time for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

**OSE FORM 00201****STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS****2.16. Insert the following Sections 3.4.5 and 3.4.6:**

**3.4.5** When the date for receipt of Bids is to be postponed and there is insufficient time to issue a written Addendum prior to the original Bid Date, Owner will notify prospective Bidders by telephone or other appropriate means with immediate follow up with a written Addendum. This Addendum will verify the postponement of the original Bid Date and establish a new Bid Date. The new Bid Date will be no earlier than the fifth (5th) calendar day after the date of issuance of the Addendum postponing the original Bid Date.

**3.4.6.** If an emergency or unanticipated event interrupts normal government processes so that bids cannot be received at the government office designated for receipt of bids by the exact time specified in the solicitation, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal government processes resume. In lieu of an automatic extension, an Addendum may be issued to reschedule bid opening. If state offices are closed at the time a pre-bid or pre-proposal conference is scheduled, an Addendum will be issued to reschedule the conference. Useful information may be available at: [http://www.sce.md.org/scgovweb/weather\\_alert.html](http://www.sce.md.org/scgovweb/weather_alert.html)

**2.17. In Section 4.1.1, delete the word "forms" and substitute the words "SE-330 Bid Form."****2.18. Delete Section 4.1.2 and substitute the following:**

**4.1.2** Any blanks on the bid form to be filled in by the Bidder shall be legibly executed in a non-erasable medium. Bids shall be signed in ink or other indelible media.

**2.19. Delete Section 4.1.3 and substitute the following:**

**4.1.3** Sums shall be expressed in figures.

**2.20. Insert the following at the end of Section 4.1.4:**

Bidder shall not make stipulations or qualify his bid in any manner not permitted on the bid form. An incomplete Bid or information not requested that is written on or attached to the Bid Form that could be considered a qualification of the Bid, may be cause for rejection of the Bid.

**2.21. Delete Section 4.1.5 and substitute the following:**

**4.1.5** All requested Alternates shall be bid. The failure of the bidder to indicate a price for an Alternate shall render the Bid non-responsive. Indicate the change to the Base Bid by entering the dollar amount and marking, as appropriate, the box for "ADD TO" or "DEDUCT FROM". If no change in the Base Bid is required, enter "ZERO" or "No Change." For add alternates to the base bid, Subcontractor(s) listed on page BF-2 of the Bid Form to perform Alternate Work shall be used for both Alternates and Base Bid Work if Alternates are accepted.

**2.22. Delete Section 4.1.6 and substitute the following:**

**4.1.6** Pursuant to Title 11, Chapter 35, Section 3020(b)(i) of the South Carolina Code of Laws, as amended, Section 7 of the Bid Form sets forth a list of subcontractor specialties for which Bidder is required to list only the subcontractors Bidder will use to perform the work of each listed specialty. Bidder must follow the Instructions in the Bid Form for filling out this section of the Bid Form. Failure to properly fill out Section 7 may result in rejection of Bidder's bid as non-responsive.

**2.23. Delete Section 4.1.7 and substitute the following:**

**4.1.7** Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

**2.24. Delete Section 4.2.1 and substitute the following:**

**4.2.1** If required by the Invitation for Bids, each Bid shall be accompanied by a bid security in an amount of not less than five percent of the Base Bid. The bid security shall be a bid bond or a certified cashier's check. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

**OSE FORM 00201****STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS****2.25. Delete Section 4.2.2 and substitute the following:**

**4.2.2** If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney. The bid bond shall:

- .1** Be issued by a surety company licensed to do business in South Carolina;
- .2** Be issued by a surety company having, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty", which company shows a financial strength rating of at least five (5) times the contract price.
- .3** Be enclosed in the bid envelope at the time of Bid Opening, either in paper copy or as an electronic bid bond authorization number provided on the Bid Form and issued by a firm or organization authorized by the surety to receive, authenticate and issue binding electronic bid bonds on behalf the surety.

**2.26. Delete Section 4.2.3 and substitute the following:**

**4.2.3** By submitting a bid bond via an electronic bid bond authorization number on the Bid Form and signing the Bid Form, the Bidder certifies that an electronic bid bond has been executed by a Surety meeting the standards required by the Bidding Documents and the Bidder and Surety are firmly bound unto the State of South Carolina under the conditions provided in this Section 4.2.

**2.27. Insert the following Section 4.2.4:**

**4.2.4** The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and performance and payment bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

**2.28. Delete Section 4.3.1 and substitute the following:**

**4.3.1** All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall, unless hand delivered by the Bidder, be addressed to the Owner's designated purchasing office as shown in the Invitation for Bids. The envelope shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail or special delivery service (UPS, Federal Express, etc.), the envelope should be labeled "BID ENCLOSED" on the face thereof. Bidders hand delivering their Bids shall deliver Bids to the place of the Bid Opening as shown in the Invitation for Bids. Whether or not Bidders attend the Bid Opening, they shall give their Bids to the Owner's procurement officer or his/her designee as shown in the Invitation for Bids prior to the time of the Bid Opening.

**2.29. Insert the following Section 4.3.6 and substitute the following:**

**4.3.5** The official time for receipt of Bids will be determined by reference to the clock designated by the Owner's procurement officer or his/her designee. The procurement officer conducting the Bid Opening will determine and announce that the deadline has arrived and no further Bids or bid modifications will be accepted. All Bids and bid modifications in the possession of the procurement officer at the time the announcement is completed will be timely, whether or not the bid envelope has been date/time stamped or otherwise marked by the procurement officer.

**2.30. Delete Section 4.4.2 and substitute the following:**

**4.4.2** Prior to the time and date designated for receipt of Bids, a Bid submitted may be withdrawn in person or by written notice to the party receiving Bids at the place designated for receipt of Bids. Withdrawal by written notice shall be in writing over the signature of the Bidder.

**2.31. In Section 5.1, delete everything following the caption "OPENING OF BIDS" and substitute the following:**

**5.1.1** Bids received on time will be publicly opened and will be read aloud. Owner will not read aloud Bids that Owner determines, at the time of opening, to be non-responsive. .

**5.1.2** At bid opening, Owner will announce the date and location of the posting of the Notice of Intended Award.

**5.1.3** Owner will send a copy of the final Bid Tabulation to all Bidders within ten (10) working days of the Bid Opening.

**OSE FORM 00201****STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

**5.1.4** If Owner determines to award the Project, Owner will, after posting a Notice of Intended Award, send a copy of the Notice to all Bidders.

**5.1.5** If only one Bid is received, Owner will open and consider the Bid.

**2.32.** *In Section 5.2, insert the section number “5.2.1” before the words of the “The Owner” at the beginning of the sentence.*

**2.33.** *Insert the following Sections 5.2.2 and 5.2.3:*

**5.2.2** The reasons for which the Owner will reject Bids include, but are not limited to:

- .1** Failure by a Bidder to be represented at a Mandatory Pre-Bid Conference or site visit;
- .2** Failure to deliver the Bid on time;
- .3** Failure to comply with Bid Security requirements, except as expressly allowed by law;
- .4** Listing an invalid electronic Bid Bond authorization number on the bid form;
- .5** Failure to Bid an Alternate, except as expressly allowed by law;
- .6** Failure to list qualified Subcontractors as required by law;
- .7** Showing any material modification(s) or exception(s) qualifying the Bid;
- .8** Faxing a Bid directly to the Owner or their representative; or
- .9** Failure to include a properly executed Power-of-Attorney with the bid bond.

**5.2.3** The Owner may reject a Bid as nonresponsive if the prices bid are materially unbalanced between line items or sub-line items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Owner even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

**2.34.** *Delete Section 6.1 and substitute the following:*

**6.1 CONTRACTOR'S RESPONSIBILITY**

Owner will make a determination of Bidder's responsibility before awarding a contract. Bidder shall provide all information and documentation requested by the Owner to support the Owner's evaluation of responsibility. Failure of Bidder to provide requested information is cause for the Owner, at its option, to determine the Bidder to be non-responsible

**2.35.** *Delete the language of Section 6.2 and insert the word “Reserved.”*

**2.36.** *Delete the language of Sections 6.3.2, 6.3.3, and 6.3.4 and insert the word “Reserved” after each Section Number.*

**2.37.** *Insert the following Section 6.4*

**6.4 CLARIFICATION**

Pursuant to Section 11-35-1520(8), the Procurement Officer may elect to communicate with a Bidder after opening for the purpose of clarifying either the Bid or the requirements of the Invitation for Bids. Such communications may be conducted only with Bidders who have submitted a Bid which obviously conforms in all material aspects to the Invitation for Bids and only in accordance with Appendix D (Paragraph A(6)) to the Manual for Planning and Execution of State Permanent Improvement, Part II. Clarification of a Bid must be documented in writing and included with the Bid. Clarifications may not be used to revise a Bid or the Invitation for Bids. [Section 11-35-1520(8); R.19-445.2080]

**2.38.** *Delete Section 7.1.2 and substitute the following:*

**7.1.2** The performance and payment bonds shall conform to the requirements of Section 11.4 of the General Conditions of the Contract. If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid.

**2.39.** *Delete the language of Section 7.1.3 and insert the word “Reserved.”*

**2.40.** *In Section 7.2, insert the words “CONTRACT, CERTIFICATES OF INSURANCE” into the caption after the word “Delivery.”*



**OSE FORM 00201****STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS****2.41. Delete Section 7.2.1 and substitute the following:**

**7.2.1** After expiration of the protest period, the Owner will tender a signed Contract for Construction to the Bidder and the Bidder shall return the fully executed Contract for Construction to the Owner within seven days thereafter. The Bidder shall deliver the required bonds and certificate of insurance to the Owner not later than three days following the date of execution of the Contract. Failure to deliver these documents as required shall entitle the Owner to consider the Bidder's failure as a refusal to enter into a contract in accordance with the terms and conditions of the Bidder's Bid and to make claim on the Bid Security for re-procurement cost.

**2.42. Delete the language of Section 7.2.2 and insert the word "Reserved."****2.43. Delete the language of Article 8 and insert the following:**

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on South Carolina Modified AIA Document A101, 2007, Standard Form of Agreement Between Owner and Contractor as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor.

**2.44. Insert the following Article 9:****ARTICLE 9 MISCELLANEOUS****9.1 NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING  
IMPORTANT TAX NOTICE - NONRESIDENTS ONLY**

Withholding Requirements for Payments to Nonresidents: Section 12-8-550 of the South Carolina Code of Laws requires persons hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within South Carolina to withhold 2% of each payment made to the nonresident. The withholding requirement does not apply to (1) payments on purchase orders for tangible personal property when the payments are not accompanied by services to be performed in South Carolina, (2) nonresidents who are not conducting business in South Carolina, (3) nonresidents for contracts that do not exceed \$10,000 in a calendar year, or (4) payments to a nonresident who (a) registers with either the S.C. Department of Revenue or the S.C. Secretary of State and (b) submits a Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, Form I-312 to the person letting the contract.

For information about other withholding requirements (e.g., employee withholding), contact the Withholding Section at the South Carolina Department of Revenue at 803-898-5383 or visit the Department's website at: [www.sctax.org](http://www.sctax.org)

This notice is for informational purposes only. This Owner does not administer and has no authority over tax issues. All registration questions should be directed to the License and Registration Section at 803-898-5872 or to the South Carolina Department of Revenue, Registration Unit, Columbia, S.C. 29214-0140. All withholding questions should be directed to the Withholding Section at 803-898- 5383.

PLEASE SEE THE "NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING" FORM (FORM NUMBER I-312) LOCATED AT:  
<http://www.sctax.org/Forms+and+Instructions/withholding/default.htm>.

**9.2 CONTRACTOR LICENSING**

Contractors and Subcontractors listed in Section 7 of the Bid Form who are required by the South Carolina Code of Laws to be licensed, must be licensed at the time of bidding.

**9.3 SUBMITTING CONFIDENTIAL INFORMATION**

For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "CONFIDENTIAL" every page, or portion thereof, that Bidder contends contains information that is exempt from public disclosure because it is either (a) a trade secret as defined in Section 30-4-40(a)(1), or (b) privileged & confidential, as that phrase is used in Section 11-35-410. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the words "TRADE SECRET" every page, or portion thereof, that Bidder contends contains a trade secret as that term is defined by Section 39-8-20 of the Trade Secrets Act. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "PROTECTED" every page, or portion thereof, that Bidder contends is protected by Section 11-35-1810. All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark your entire bid as confidential, trade secret, or protected! If your bid, or any part thereof, is improperly marked as confidential or trade

**OSE FORM 00201****STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

secret or protected, the State may, in its sole discretion, determine it nonresponsive. If only portions of a page are subject to some protection, do not mark the entire page. By submitting a response to this solicitation, Bidder (1) agrees to the public disclosure of every page of every document regarding this solicitation or request that was submitted at any time prior to entering into a contract (including, but not limited to, documents contained in a response, documents submitted to clarify a response, & documents submitted during negotiations), unless the page is conspicuously marked "TRADE SECRET" or "CONFIDENTIAL" or "PROTECTED", (2) agrees that any information not marked, as required by these bidding instructions, as a "Trade Secret" is not a trade secret as defined by the Trade Secrets Act, & (3) agrees that, notwithstanding any claims or markings otherwise, any prices, commissions, discounts, or other financial figures used to determine the award, as well as the final contract amount, are subject to public disclosure. In determining whether to release documents, the State will detrimentally rely on Bidders's marking of documents, as required by these bidding instructions, as being either "Confidential" or "Trade Secret" or "PROTECTED". By submitting a response, Bidder agrees to defend, indemnify & hold harmless the State of South Carolina, its officers & employees, from every claim, demand, loss, expense, cost, damage or injury, including attorney's fees, arising out of or resulting from the State withholding information that Bidder marked as "confidential" or "trade secret" or "PROTECTED".

**9.4 POSTING OF INTENT TO AWARD**

Notice of Intent to Award, SE-370, will be posted at the following location:

**Room or Area of Posting:** Reception Area

**Building Where Posted:** Facilities Management Center

**Address of Building:** 743 Greene Street, Columbia, South Carolina 29208

**WEB site address (if applicable):** [purchasing.sc.edu](http://purchasing.sc.edu)

**Posting date will be announced at bid opening.** In addition to posting the notice, the Owner will promptly send all responsive bidders a copy of the notice of intent to award and the final bid tabulation

**9.5 PROTEST OF SOLICITATION OR AWARD**

Any prospective bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the solicitation of a contract shall protest within fifteen days of the date of issuance of the applicable solicitation document at issue. Any actual bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the intended award or award of a contract shall protest within ten days of the date notification of intent to award is posted in accordance with Title 11, Chapter 35, Section 4210 of the South Carolina Code of Laws, as amended. A protest shall be in writing, shall set forth the grounds of the protest and the relief requested with enough particularity to give notice of the issues to be decided, and must be received by the State Engineer within the time provided.

Any protest must be addressed to the CPO, Office of State Engineer, and submitted in writing:

(a) by email to [protest-ose@mmo.sc.gov](mailto:protest-ose@mmo.sc.gov),

(b) by facsimile at 803-737-0639, or

(c) by post or delivery to 1201 Main Street, Suite 600, Columbia, SC 29201.

By submitting a protest to the foregoing email address, you (and any person acting on your behalf) consent to receive communications regarding your protest (and any related protests) at the e-mail address from which you sent your protest.

**9.6 SOLICITATION INFORMATION FROM SOURCES OTHER THAN OFFICIAL SOURCE**

South Carolina Business Opportunities (SCBO) is the official state government publication for State of South Carolina solicitations. Any information on State agency solicitations obtained from any other source is unofficial and any reliance placed on such information is at the bidder's sole risk and is without recourse under the South Carolina Consolidated Procurement Code.

**9.7 BUILDER'S RISK INSURANCE**

Bidders are directed to Article 11.3 of the South Carolina Modified AIA Document A201, 2007 Edition, which, unless provided otherwise in the bid documents, requires the contractor to provide builder's risk insurance on the project.

**OSE FORM 00201**

**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS**

**9.8 TAX CREDIT FOR SUBCONTRACTING WITH MINORITY FIRMS**

Pursuant to Section 12-6-3350, taxpayers, who utilize certified minority subcontractors, may take a tax credit equal to 4% of the payments they make to said subcontractors. The payments claimed must be based on work performed directly for a South Carolina state contract. The credit is limited to a maximum of fifty thousand dollars annually. The taxpayer is eligible to claim the credit for 10 consecutive taxable years beginning with the taxable year in which the first payment is made to the subcontractor that qualifies for the credit. After the above ten consecutive taxable years, the taxpayer is no longer eligible for the credit. The credit may be claimed on Form TC-2, "Minority Business Credit." A copy of the subcontractor's certificate from the Governor's Office of Small and Minority Business (OSMBA) is to be attached to the contractor's income tax return. Taxpayers must maintain evidence of work performed for a State contract by the minority subcontractor. Questions regarding the tax credit and how to file are to be referred to: SC Department of Revenue, Research and Review, Phone: (803) 898-5786, Fax: (803) 898-5888. The subcontractor must be certified as to the criteria of a "Minority Firm" by the Governor's Office of Small and Minority Business Assistance (OSMBA). Certificates are issued to subcontractors upon successful completion of the certification process. Questions regarding subcontractor certification are to be referred to: Governor's Office of Small and Minority Business Assistance, Phone: (803) 734-0657, Fax: (803) 734-2498. Reference: SC §11-35-5010 – Definition for Minority Subcontractor & SC §11-35-5230 (B) – Regulations for Negotiating with State Minority Firms.

**§ 9.9 OTHER SPECIAL CONDITIONS OF THE WORK**

Section 00210 – Supplement A – Request for Information

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**END OF DOCUMENT**



**University of South Carolina  
Bursar - Registrar Office  
Expansion - UTS Renovations  
Columbia, South Carolina**

**STATE PROJECT #H27-Z052-A  
PROJECT #08040.04**

**SECTION 00300 - BID BOND**

**FORM OF BID BOND**

- 1.01 See AIA Document A310 (2010 Edition) , Bid Bond available at the office of GMK Associates, Inc., 1201 Main Street Suite 2100, Columbia, SC 29201. 803-256-0000 OR,
- A. Copies of this document may be obtained from The American Institute of Architects, 1522 Richland Street., Columbia, SC 29201. 803-252-6050.

**END OF SECTION**

**SE-330 – LUMP SUM BID  
BID FORM**

*Bidders shall submit bids on only Bid Form SE-330.*

**BID SUBMITTED BY:** \_\_\_\_\_  
(Bidder's Name)

**BID SUBMITTED TO:** University of South Carolina  
(Owner's Name)

**FOR PROJECT: PROJECT NAME** Bursar- Registrar Office Expansion – UTS Renovations  
**PROJECT NUMBER** H27-Z052-A

**OFFER**

§ 1. In response to the Invitation for Construction Bids and in compliance with the Instructions to Bidders for the above-named Project, the undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with the Owner on the terms included in the Bidding Documents, and to perform all Work as specified or indicated in the Bidding Documents, for the prices and within the time frames indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

§ 2. Pursuant to Section 11-32-3030(1) of the SC Code of Laws, as amended, Bidder has submitted Bid Security as follows in the amount and form required by the Bidding Documents:

Bid Bond with Power of Attorney     Electronic Bid Bond     Cashier's Check

(Bidder check one)

§ 3. Bidder acknowledges the receipt of the following Addenda to the Bidding Documents and has incorporated the effects of said Addenda into this Bid:

**ADDENDUM No:** \_\_\_\_\_

§ 4. Bidder accepts all terms and conditions of the Invitation for Bids, including, without limitation, those dealing with the disposition of Bid Security. Bidder agrees that this Bid, including all Bid Alternates, if any, may not be revoked or withdrawn after the opening of bids, and shall remain open for acceptance for a period of 60 Days following the Bid Date, or for such longer period of time that Bidder may agree to in writing upon request of the Owner.

§ 5. Bidder herewith offers to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fees, permits, licenses and applicable taxes necessary to complete the following items of construction work:

**§ 6.1 BASE BID WORK** (as indicated in the Bidding Documents and generally described as follows): The project consist of HVAC modifications, ceiling replacement, minor reconfiguration of interior spaces, bathroom upgrades, and electrical upgrades.,

\_\_\_\_\_, which sum is hereafter called the Base Bid.  
(Bidder - insert Base Bid Amount on line above)

**SE-330 – LUMP SUM BID  
BID FORM**

§ 6.2 BID ALTERNATES - as indicated in the Bidding Documents and generally described as follows:

**ALTERNATE # 1** (Brief Description): N/A

ADD TO or  DEDUCT FROM BASE BID: \_\_\_\_\_

(Bidder to Mark appropriate box to clearly indicate the price adjustment offered for each alternate)

**ALTERNATE # 2** (Brief Description): N/A

ADD TO or  DEDUCT FROM BASE BID: \_\_\_\_\_

(Bidder to Mark appropriate box to clearly indicate the price adjustment offered for each alternate)

**ALTERNATE # 3** (Brief Description): N/A

ADD TO or  DEDUCT FROM BASE BID: \_\_\_\_\_

(Bidder to Mark appropriate box to clearly indicate the price adjustment offered for each alternate)

**SE-330 – LUMP SUM BID  
 BID FORM**

**§ 7. LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED – (See Instructions on the following page BF-2A)**

Bidder shall use the below-listed Subcontractors in the performance of the Subcontractor Specialty work listed:

<b>SUBCONTRACTOR            SPECIALTY            By License Classification            and/or Subclassification            (Completed by Owner)</b>	<b>SUBCONTRACTOR'S            PRIME CONTRACTOR'S            NAME            (Must be completed by Bidder)            BASE BID</b>	<b>SUBCONTRACTOR'S            PRIME CONTRACTOR'S            SC LICENSE NUMBER</b>
<b>ALTERNATE 1</b>		
<b>ALTERNATE 2</b>		
<b>ALTERNATE 3</b>		

If a Bid Alternate is accepted, Subcontractors listed for the Bid Alternate shall be used for the work of both the Alternate and the Base Bid work.



## **INSTRUCTIONS FOR SUBCONTRACTOR LISTING**

1. Section 7 of the Bid Form sets forth a list of subcontractor specialties for which bidder is required to identify by name the subcontractor(s) Bidder will use to perform the work of each listed specialty. Bidder must identify only the subcontractor(s) who will perform the work and no others.
2. For purposes of subcontractor listing, a Subcontractor is an entity who will perform work or render service to the prime contractor to or about the construction site. Material suppliers, manufacturers, and fabricators that will not perform physical work at the site of the project but will only supply materials or equipment to the bidder or proposed subcontractor(s) are not subcontractors and Bidder should not insert their names in the spaces provided on the bid form. Likewise, Bidder should not insert the names of sub-subcontractors in the spaces provided on the bid form but only the names of those entities with which bidder will contract directly.
3. Bidder must only insert the names of subcontractors who are qualified to perform the work of the listed specialties as specified in the Bidding Documents and South Carolina Licensing Laws.
4. If under the terms of the Bidding Documents, Bidder is qualified to perform the work of a specialty listed and Bidder does not intend to subcontract such work but to use Bidder's own employees to perform such work, the Bidder must insert its own name in the space provided for that specialty.
5. If Bidder intends to use multiple subcontractors to perform the work of a single specialty listing, Bidder must insert the name of each subcontractor Bidder will use, preferably separating the name of each by the word **"and"**. If Bidder intends to use both his own employees to perform a part of the work of a single specialty listing and to use one or more subcontractors to perform the remaining work for that specialty listing, bidder must insert his own name and the name of each subcontractor, preferably separating the name of each with the word **"and"**.
6. Bidder may not list subcontractors in the alternative nor in a form that may be reasonably construed at the time of bid opening as a listing in the alternative. A listing that requires subsequent explanation to determine whether or not it is a listing in the alternative is non-responsive. If bidder intends to use multiple entities to perform the work for a single specialty listing, bidder must clearly set forth on the bid form such intent. Bidder may accomplish this by simply inserting the word **"and"** between the name of each entity listed for that specialty. Owner will reject as non-responsive a listing that contains the names of multiple subcontractors separated by a blank space, the word "or", a virgule (that is a /), or any separator that the Owner may reasonably interpret as a listing in the alternative.
7. If Bidder is awarded the contract, bidder must, except with the approval of the owner for good cause shown, use the listed entities to perform the work for which they are listed.
8. If bidder is awarded the contract, bidder will not be allowed to substitute another entity as subcontractor in place of a subcontractor listed in Section 7 of the Bid except for one or more of the reasons allowed by the SC Code of Laws.
9. Bidder's failure to insert a name for each listed specialty subcontractor will render the Bid non-responsive.

**SE-330 – LUMP SUM BID  
BID FORM**

**§ 8. LIST OF MANUFACTURERS, MATERIAL SUPPLIERS, AND SUBCONTRACTORS OTHER THAN SUBCONTRACTORS LISTED IN SECTION 7 ABOVE (FOR INFORMATION ONLY):** Pursuant to instructions in the Invitation for Bids, if any, Bidder will provide to Owner upon the Owner's request and within 24 hours of such request, a listing of manufacturers, material suppliers, and subcontractors, other than those listed in Section 7 above, that Bidder intends to use on the project. Bidder acknowledges and agrees that this list is provided for purposes of determining responsibility and not pursuant to the subcontractor listing requirements of SC Code Ann § 11-35-3020(b)(i).

**§ 9. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES**

a. **CONTRACT TIME:** Bidder agrees that the Date of Commencement of the Work shall be established in a Notice to Proceed to be issued by the Owner. Bidder agrees to substantially complete the Work within **180** calendar days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b. **LIQUIDATED DAMAGES:** Bidder further agrees that from the compensation to be paid, the Owner shall retain as Liquidated Damages the sum of **\$250.00** for each calendar day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This sum is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

**§ 10. AGREEMENTS**

- a. Bidder agrees that this bid is subject to the requirements of the law of the State of South Carolina.
- b. Bidder agrees that at any time prior to the issuance of the Notice to Proceed for this Project, this Project may be canceled for the convenience of, and without cost to, the State.
- c. Bidder agrees that neither the State of South Carolina nor any of its agencies, employees or agents shall be responsible for any bid preparation costs, or any costs or charges of any type, should all bids be rejected or the Project canceled for any reason prior to the issuance of the Notice to Proceed.

**§ 11. ELECTRONIC BID BOND**

By signing below, the Principal is affirming that the identified electronic bid bond has been executed and that the Principal and Surety are firmly bound unto the State of South Carolina under the terms and conditions of the AIA Document A310, Bid Bond, included in the Bidding Documents.

**Electronic Bid Bond Number:** \_\_\_\_\_

**Signature and Title:** \_\_\_\_\_

**SE-330 – LUMP SUM BID  
BID FORM**

**BIDDER'S TAXPAYER IDENTIFICATION**

FEDERAL EMPLOYER'S IDENTIFICATION NUMBER: \_\_\_\_\_

*OR*

SOCIAL SECURITY NUMBER: \_\_\_\_\_

**CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATIONS**

*Classification(s) & Limits:* \_\_\_\_\_

*Subclassification(s) & Limits:* \_\_\_\_\_

*SC Contractor's License Number(s):* \_\_\_\_\_

BY SIGNING THIS BID, THE PERSON SIGNING REAFFIRMS ALL REPRESENTATIONS AND CERTIFICATIONS MADE BY BOTH THE PERSON SIGNING AND THE BIDDER, INCLUDING WITHOUT LIMITATION, THOSE APPEARING IN ARTICLE 2 OF THE INSTRUCTIONS TO BIDDER. THE INVITATION FOR BIDS, AS DEFINED IN THE INSTRUCTIONS TO BIDDERS, IS EXPRESSLY INCORPORATE BY REFERENCE.

**SIGNATURE**

**BIDDER'S LEGAL NAME:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_  
\_\_\_\_\_

**BY:** \_\_\_\_\_  
*(Signature)*

**DATE:** \_\_\_\_\_

**TITLE:** \_\_\_\_\_

**TELEPHONE:** \_\_\_\_\_

**EMAIL:** \_\_\_\_\_

**SECTION 00500 - AGREEMENT**

PART 1 GENERAL

FORM OF AGREEMENT

2.01 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

AIA DOCUMENT A101-2007, STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR, FORMS THE BASIS OF CONTRACT BETWEEN THE OWNER AND CONTRACTOR.

5.01 This document is not bound within the project manual.

- A. Copies of this document may be obtained from The American Institute of Architects, 1522 Richland Street., Columbia, SC 29201. 803-252-6050.
- B. OR it can be viewed at the offices of GMK Associates, Inc., 1201 Main Street Suite 2100 Columbia, SC 29201 (803)256-0000

5.02 Refer to document 00501-OSE 2011 for modifications to this document.

END OF AGREEMENT

# OSE FORM 00501 STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

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**OWNER:** University of South Carolina

**PROJECT NUMBER:** H27-Z052-A

**PROJECT NAME:** Bursar- Registrar Office Expansion – UTS Renovations

## 1. STANDARD MODIFICATIONS TO AIA A101-2007

1.1. These Standard Modifications amend or supplement the *Standard Form of Agreement Between Owner and Contractor* (AIA Document A101-2007) and other provisions of Bidding and Contract Documents as indicated below.

1.2. All provisions of A101-2007, which are not so amended or supplemented, remain in full force and effect.

## 2. MODIFICATIONS TO A101

2.1. *Insert the following at the end of Article 1:*

Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

2.2. *Delete Section 3.1 and substitute the following:*

3.1 The Date of Commencement of the Work shall be the date fixed in a Notice to Proceed issued by the Owner. The Owner shall issue the Notice to Proceed to the Contractor in writing, no less than seven days prior to the Date of Commencement. Unless otherwise provided elsewhere in the contract documents, and provided the contractor has secured all required insurance and surety bonds, the contractor may commence work immediately after receipt of the Notice to Proceed.

2.3. *Delete Section 3.2 and substitute the following:*

3.2 The Contract Time shall be measured from the Date of Commencement as provided in Section 9(a) of the Bid Form (SE-330) for this Project. Contractor agrees that if the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, the Owner shall be entitled to withhold or recover from the Contractor liquidated damages in the amounts set forth in Section 9(b) of the Bid Form (SE-330), subject to adjustments of this Contract Time as provided in the Contract Documents.

2.4. *In Section 5.1.1, insert the words “and Owner” after the phrase “Payment submitted to the Architect.”*

2.5. *Delete Section 5.1.3 and substitute the following:*

5.1.3 The Owner shall make payment of the certified amount to the Contractor not later than 21 days after receipt of the Application for Payment.

2.6. *In Section 5.1.6, Insert the following after the phrase “Subject to other provisions of the Contract Documents”:*

and subject to Title 12, Chapter 8, Section 550 of the South Carolina Code of Laws, as amended (Withholding Requirements for Payments to Non-Residents)

*In the spaces provided in Sub-Sections 1 and 2 for inserting the retainage amount, insert “three and one-half percent (3.5%).”*

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**STANDARD MODIFICATIONS TO AGREEMENT BETWEEN**  
**OWNER AND CONTRACTOR**

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2.7. In Section 5.1.8, delete the word “follows” and the colon and substitute the following:

set forth in S.C. Code Ann. § 11-35-3030(4).

2.8. In Section 5.1.9, delete the words “Except with the Owner’s prior approval, the” before the word “Contractor.”

2.9. In Section 5.2.2, delete the number 30 and substitute the number 21, delete everything following the words “Certificate for Payment” and place a period at the end of the resulting sentence.

2.10. Delete the language of Sections 6.1 and 6.2 and substitute the word “Reserved” for the deleted language of each Section .

2.11. Delete the language of Section 8.2 and substitute the word “Reserved.”

2.12. In Section 8.3, make the word “Representative” in the title plural, delete everything following the title, and substitute the following:

**8.3.1** Owner designates the individual listed below as its Senior Representative (“Owner’s Senior Representative”), which individual has the responsibility for and, subject to Section 7.2.1 of the General Conditions, the authority to resolve disputes under Section 15.6 of the General Conditions:

**Name:** Tom Opal  
**Title:** USC Senior Project Manager  
**Address:** 743 Greene Street, Columbia, South Carolina 29208  
**Telephone:** 803-777-5996      **FAX:** 803-777-8739  
**Email:** topal@fmc.sc.edu

**8.3.2** Owner designates the individual listed below as its Owner’s Representative, which individual has the authority and responsibility set forth in Section 2.1.1 of the General Conditions:

**Name:** Ann Derrick  
**Title:** USC Project Manager  
**Address:** 743 Greene Street, Columbia, South Carolina 29208  
**Telephone:** (803) 777-5811      **FAX:** 803-777-8739  
**Email:** aderrick@fmc.sc.edu

2.13. In Section 8.4, make the word “Representative” in the title plural, delete everything following the title, and substitute the following:

**8.4.1** Contractor designates the individual listed below as its Senior Representative (“Contractor’s Senior Representative”), which individual has the responsibility for and authority to resolve disputes under Section 15.6 of the General Conditions:

**Name:** \_\_\_\_\_  
**Title:** \_\_\_\_\_  
**Address:** \_\_\_\_\_  
**Telephone:** \_\_\_\_\_      **FAX:** \_\_\_\_\_  
**Email:** \_\_\_\_\_

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**STANDARD MODIFICATIONS TO AGREEMENT BETWEEN**  
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**8.4.2** Contractor designates the individual listed below as its Contractor's Representative, which individual has the authority and responsibility set forth in Section 3.1.1 of the General Conditions:

**Name:** \_\_\_\_\_  
**Title:** \_\_\_\_\_  
**Address:** \_\_\_\_\_  
**Telephone:** \_\_\_\_\_ **FAX:** \_\_\_\_\_  
**Email:** \_\_\_\_\_

**2.14.** *Add the following Section 8.6.1:*

**8.6.1** The Architect's representative:

**Name:** Jerome K. Simons  
**Title:** Project Architect  
**Address:** 1201 Main Street, Suite 2100  
**Telephone:** 803-256-0000 **FAX:** 803-255-7243  
**Email:** jsimons@gmka.com

**2.15.** *In Section 9.1.7, Sub-Section 2, list the following documents in the space provided for listing documents:*

Invitation for Construction Bids (SE-310)  
Instructions to Bidders (AIA Document A701-1997)  
Standard Supplemental Instructions to Bidders (OSE Form 00201)  
Contractor's Bid (Completed SE-330)  
Notice of Intent to Award (Completed SE-370)  
Certificate of procurement authority issued by the SC Budget & Control Board

**2.16.** *In Article 10, delete everything after the first sentence.*

**END OF DOCUMENT**

**SECTION 00700 - GENERAL CONDITIONS**

FORM OF GENERAL CONDITIONS

AIA DOCUMENT A201, 2007 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, IS THE GENERAL CONDITIONS BETWEEN THE OWNER AND CONTRACTOR.

2.01 This document is not bound within the project manual.

- A. Copies of this document may be obtained from The American Institute of Architects, 1522 Richland Street., Columbia, SC 29201. 803-252-6050.
- B. OR it can be viewed at the offices of GMK Associates, Inc., 1201 Main Street Suite 2100 Columbia, SC 29201 (803)256-0000

SUPPLEMENTARY CONDITIONS

3.01 Refer to Document 00811-OSE 2011 for amendments to these General Conditions.

END OF DOCUMENT 00700



**SECTION 00800 - SUPPLEMENTARY CONDITIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

1.02 These Supplementary Conditions amend and supplement the General Conditions defined in Document 00700 and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

**1.03 MODIFICATIONS TO GENERAL CONDITIONS**

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF DOCUMENT**

# OSE FORM 00811

## STANDARD SUPPLEMENTARY CONDITIONS

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OWNER: University of South Carolina

PROJECT NUMBER: H27-Z052-A

PROJECT NAME: Bursar- Registrar Office Expansion – UTS Renovations

### 1 GENERAL CONDITIONS

The *General Conditions of the Contract for Construction*, AIA Document A201, 2007 Edition, Articles 1 through 15 inclusive, is a part of this Contract and is incorporated as fully as if herein set forth. For brevity, AIA Document A201 is also referred to in the Contract Documents collectively as the "General Conditions."

### 2 STANDARD SUPPLEMENTARY CONDITIONS

2.1 The following supplements modify, delete and/or add to the General Conditions. Where any portion of the General Conditions is modified or any paragraph, Section or clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of the General Conditions shall remain in effect.

2.2 Unless otherwise stated, the terms used in these Standard Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

### 3 MODIFICATIONS TO A201-2007

3.1 *Insert the following at the end of Section 1.1.1:*

Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

3.2 *Delete the language of Section 1.1.8 and substitute the word "Reserved."*

3.3 *Add the following Section 1.1.9:*

#### 1.1.9 NOTICE TO PROCEED

Notice to Proceed is a document issued by the Owner to the Contractor, with a copy to the Architect, directing the Contractor to begin prosecution of the Work in accordance with the requirements of the Contract Documents. The Notice to Proceed shall fix the date on which the Contract Time will commence.

3.4 *Insert the following at the end of Section 1.2.1:*

In the event of patent ambiguities within or between parts of the Contract Documents, the contractor shall 1) provide the better quality or greater quantity of Work, or 2) comply with the more stringent requirement, either or both in accordance with the Architect's interpretation.

3.5 *Delete Section 1.5.1 and substitute the following:*

1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as a violation of the Architect's or Architect's consultants' reserved rights.

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### STANDARD SUPPLEMENTARY CONDITIONS

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**3.6** *Delete Section 2.1.1 and substitute the following:*

**2.1.1** The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, except as provided in Section 7.1.2. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's Representative. [Reference § 8.2 of the Agreement.]

**3.7** *Delete Section 2.1.2 and substitute the following:*

**2.1.2** The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to post Notice of Project Commencement pursuant to Title 29, Chapter 5, Section 23 of the South Carolina Code of Laws, as amended..

**3.8** *Delete Section 2.2.3 and substitute the following:*

**2.2.3** The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. Subject to the Contractor's obligations, including those in Section 3.2, the Contractor shall be entitled to rely on the accuracy of information furnished by the Owner pursuant to this Section but shall exercise proper precautions relating to the safe performance of the Work.

**3.9** *Replace the period at the end of the last sentence of Section 2.2.4 with a semicolon and insert the following after the inserted semicolon:*

"however, the Owner does not warrant the accuracy of any such information requested by the Contractor that is not otherwise required of the Owner by the Contract Documents. Neither the Owner nor the Architect shall be required to conduct investigations or to furnish the Contractor with any information concerning subsurface characteristics or other conditions of the area where the Work is to be performed beyond that which is provide in the Contract Documents."

**3.10** *Delete Section 2.2.5 and substitute the following:*

**2.2.5** Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor with ten copies of the Contract Documents. The Contractor may make reproductions of the Contract Documents pursuant to Section 1.5.2. All copies of the drawings and specifications, except the Contractor's record set, shall be returned or suitably accounted for to the Owner, on request, upon completion of the Work.

**3.11** *Add the following Sections 2.2.6 and 2.2.7:*

**2.2.6** The Owner assumes no responsibility for any conclusions or interpretation made by the Contractor based on information made available by the Owner.

**2.2.7** The Owner shall obtain, at its own cost, general building and specialty inspection services as required by the Contract Documents. The Contractor shall be responsible for payment of any charges imposed for reinspections.

**3.12** *Delete Section 2.4 and substitute the following:*

**2.4** If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect, including but not limited to providing necessary resources, with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Directive shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

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**STANDARD SUPPLEMENTARY CONDITIONS**

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**3.13** *Insert the following at the end of Section 3.2.1:*

The Contractor acknowledges that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Owner.

**3.14** *In the third sentence of Section 3.2.4, insert the word “latent” before the word “errors.”*

**3.15** *In the last sentence of Section 3.3.1, insert the words “by the Owner in writing” after the word “instructed.”*

**3.16** *Delete the third sentence of Section 3.5 and substitute the following sentences:*

Work, materials, or equipment not conforming to these requirements shall be considered defective. Unless caused by the Contractor or a subcontractor at any tier, the Contractor’s warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage.

**3.17** *Insert the following at the end of Section 3.6:*

The Contractor shall comply with the requirements of Title 12, Chapter 9 of the South Carolina Code of Laws, as amended, regarding withholding tax for nonresidents, employees, contractors and subcontractors.

**3.18** *In Section 3.7.1, delete the words “the building permit as well as for other” and insert the following sentence at the end of this section:*

Pursuant to Title 10, Chapter 1, Section 180 of the South Carolina Code of Laws, as amended, no local general or specialty building permits are required for state buildings.

**3.19** *Delete the last sentence of Section 3.7.5 and substitute the following:*

Adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 7.3.3.

**3.20** *Delete the last sentence of Section 3.8.2.3 and substitute the following:*

The amount of the Change Order shall reflect the difference between actual costs, as documented by invoices, and the allowances under Section 3.8.2.1.

**3.21** *In Section 3.9.1, insert a comma after the word “superintendent” in the first sentence and insert the following after the inserted comma:*

acceptable to the Owner,

**3.22** *Delete Section 3.9.2 and substitute the following:*

**3.9.2** The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the name and qualifications of a proposed superintendent. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner has reasonable objection to the proposed superintendent or (2) that the

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Owner requires additional time to review. Failure of the Owner to reply within the 14-day period shall constitute notice of no reasonable objection.

**3.23** *After the first sentence in Section 3.9.3, insert the following sentence:*

The Contractor shall notify the Owner, in writing, of any proposed change in the superintendent, including the reason therefore, prior to making such change.

**3.24** *Delete Section 3.10.3 and substitute the following:*

**3.10.3** Additional requirements, if any, for the constructions schedule are as follows:  
(Check box if applicable to this Contract))

The construction schedule shall be in a detailed precedence-style critical path management (CPM) or primavera-type format satisfactory to the Owner and the Architect that shall also (1) provide a graphic representation of all activities and events that will occur during performance of the work; (2) identify each phase of construction and occupancy; and (3) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as "Milestone Dates"). Upon review and acceptance by the Owner and the Architect of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents and attached to the Agreement as Exhibit "A." If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted for acceptance. The Contactor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. Whenever the approved construction schedule no longer reflects actual conditions and progress of the work or the Contract Time is modified in accordance with the terms of the Contract Documents, the Contractor shall update the accepted construction schedule to reflect such conditions. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

**3.25** *Add the following Section 3.10.4:*

**3.10.4** Owner's review and acceptance of Contractor's schedule is not conducted for the purpose of either determining its accuracy and completeness or approving the construction means, methods, techniques, sequences or procedures. The Owner's approval shall not relieve the Contractor of any obligations. Unless expressly addressed in a Modification, the Owner's approval of a schedule shall not change the Contract Time.

**3.26** *Add the following Section 3.12.5.1:*

**3.12.5.1** The fire sprinkler shop drawings shall be prepared by a licensed fire sprinkler contractor and shall accurately reflect actual conditions affecting the required layout of the fire sprinkler system. The fire sprinkler contractor shall certify the accuracy of his shop drawings prior to submitting them for review and approval. The fire sprinkler shop drawings shall be reviewed and approved by the Architect's engineer of record who, upon approving the sprinkler shop drawings will submit them to the State Fire Marshal or other authorities having jurisdiction for review and approval. The Architect's engineer of record will submit a copy of the State Fire Marshal's approval letter to the Contractor, Architect, and OSE. Unless authorized in writing by OSE, neither the Contractor nor subcontractor at any tier shall submit the fire sprinkler shop drawings directly to the State Fire Marshal or other authorities having jurisdiction for approval.

**3.27** *In the fourth sentence of Section 3.12.10, after the comma following the words "licensed design professional," insert the following:*

who shall comply with reasonable requirements of the Owner regarding qualifications and insurance and

**3.28** *In Section 3.13, insert the section number "3.13.1" before the opening words "The Contractors shall."*

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**3.29** Add the following Sections 3.13.2 and 3.13.3:

**3.13.2** Protection of construction materials and equipment stored at the Project site from weather, theft, vandalism, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall perform the work in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions.

**3.13.3** The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner.

**3.30** *In the first sentence of Section 3.18.1, after the parenthetical “...(other than the Work itself),...” and before the word “...but...”, insert the following:*

including loss of use resulting therefrom,

**3.31** *Delete Section 4.1.1 and substitute the following:*

**4.1.1** The Architect is that person or entity identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

**3.32** *Insert the following at the end of Section 4.2.1:*

Any reference in the Contract Documents to the Architect taking action or rendering a decision with a “reasonable time” is understood to mean no more than fourteen days, unless otherwise specified in the Contract Documents or otherwise agreed to by the parties.

**3.33** *Delete the first sentence of Section 4.2.2 and substitute the following:*

The Architect will visit the site as necessary to fulfill its obligation to the Owner for inspection services, if any, and, at a minimum, to assure conformance with the Architect’s design as shown in the Contract Documents and to observe the progress and quality of the various components of the Contractor’s Work, and to determine if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents.

**3.34** *Delete the first sentence of Section 4.2.3 and substitute the following:*

On the basis of the site visits, the Architect will keep the Owner informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work.

**3.35** *In Section 4.2.5, after the words “evaluations of the” and before the word “Contractor’s,” insert the following:*

Work completed and correlated with the

**3.36** *Delete the first sentence of Section 4.2.11 and substitute the following:*

**4.2.11** The Architect will, in the first instance, interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. Upon receipt of such request, the Architect will promptly provide the non-requesting party with a copy of the request.

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**3.37** *Insert the following at the end of Section 4.2.12:*

If either party disputes the Architects interpretation or decision, that party may proceed as provided in Article 15. The Architect's interpretations and decisions may be, but need not be, accorded any deference in any review conducted pursuant to law or the Contract Documents.

**3.38** *Delete Section 4.2.14 and substitute the following:*

The Architect will review and respond to requests for information about the Contract Documents so as to avoid delay to the construction of the Project. The Architect's response to such requests will be made in writing with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. Any response to a request for information must be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. Unless issued pursuant to a Modification, supplemental Drawings or Specifications will not involve an adjustment to the Contract Sum or Contract Time.

**3.39** *Delete Section 5.2.1 and substitute the following:*

**5.2.1** Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, within fourteen days after posting of the Notice of Intent to Award the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (excluding Listed Subcontractors but including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner has reasonable objection to any such proposed person or entity. Failure of the Owner to reply within the 14 day period shall constitute notice of no reasonable objection.

**3.40** *Delete Section 5.2.2 and substitute the following:*

**5.2.2** The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection. The Owner shall not direct the Contractor to contract with any specific individual or entity for supplies or services unless such supplies and services are necessary for completion of the Work and the specified individual or entity is the only source of such supply or services.

**3.41** *In the first sentence of Section 5.2.3, delete the words "...or Architect..." in the two places they appear.*

**3.42** *Delete the words "...or Architect..." in the in the first sentence of Section 5.2.4 and insert the following sentence at the end of Section 5.2.4:*

The Contractor's request for substitution must be made to the Owner in writing accompanied by supporting information.

**3.43** *Add the following Section 5.2.5:*

**5.2.5** A Subcontractor identified in the Contractor's Bid in response the specialty subcontractor listing requirements of Section 7 of the Bid Form (SE-330) may only be substituted in accordance with and as permitted by the provisions of Title 11, Chapter 35, Section 3021 of the South Carolina Code of Laws, as amended. A proposed substitute for a Listed Subcontractor shall be subject to the Owner's approval as set forth is Section 5.2.3.

**3.44** *In Section 5.3, delete everything following the heading "SUBCONTRACTUAL RELATIONS" and insert the following Sections 5.3.1, 5.3.2, 5.3.3, and 5.3.4:*

**5.3.1** By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not

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prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise herein or in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 Without limitation on the generality of Section 5.3.1, each Subcontract agreement and each Sub-subcontract agreement shall include, and shall be deemed to include, the following Sections of these General Conditions: 3.2, 3.5, 3.18, 5.3, 5.4, 6.2.2, 7.3.3, 7.5, 7.6, 13.1, 13.12, 14.3, 14.4, and 15.1.6.

§ 5.3.3 Each Subcontract Agreement and each Sub-subcontract agreement shall exclude, and shall be deemed to exclude, Sections 13.2.1 and 13.6 and all of Article 15, except Section 15.1.6, of these General Conditions. In the place of these excluded sections of the General Conditions, each Subcontract Agreement and each Sub-subcontract may include Sections 13.2.1 and 13.6 and all of Article 15, except Section 15.1.6, of AIA Document A201-2007, Conditions of the Contract, as originally issued by the American Institute of Architects.

§ 5.3.4 The Contractor shall assure the Owner that all agreements between the Contractor and its Subcontractor incorporate the provisions of Subparagraph 5.3.1 as necessary to preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed by Subcontractors so that the subcontracting thereof will not prejudice such rights. The Contractor's assurance shall be in the form of an affidavit or in such other form as the Owner may approve. Upon request, the Contractor shall provide the Owner or Architect with copies of any or all subcontracts or purchase orders.

**3.45** *Delete the last sentence of Section 5.4.1.*

**3.46** *Add the following Sections 5.4.4, 5.4.5 and 5.4.6:*

§ 5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

§ 5.4.5 Each subcontract shall specifically provide that the Subcontractor agrees to perform portions of the Work assigned to the Owner in accordance with the Contract Documents.

§ 5.4.6 Nothing in this Section 5.4 shall act to reduce or discharge the Contractor's payment bond surety's obligations to claimants for claims arising prior to the Owner's exercise of any rights under this conditional assignment.

**3.47** *Delete the language of Section 6.1.4 and substitute the word "Reserved."*

**3.48** *Insert the following at the end of Section 7.1.2:*

If the amount of a Modification exceeds the limits of the Owner's Construction Change Order Certification (reference Section 9.1.7.2 of the Agreement), then the Owner's agreement is not effective, and Work may not proceed, until approved in writing by the Office of State Engineer.

**3.49** *Delete Section 7.2.1 and substitute the following:*

**7.2.1** A Change Order is a written instrument prepared by the Architect (using State Form SE-480 "Construction Change Order") and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;



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- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

**3.50** *Add the following Sections 7.2.2, 7.2.3, 7.2.4, and 7.2.5:*

**7.2.2** If a Change Order provides for an adjustment to the Contract Sum, the adjustment must be calculated in accordance with Section 7.3.3.

**7.2.3** At the Owner's request, the Contractor shall prepare a proposal to perform the work of a proposed Change Order setting forth the amount of the proposed adjustment, if any, in the Contract Sum; and the extent of the proposed adjustment, if any, in the Contract Time. Any proposed adjustment in the Contract sum shall be prepared in accordance with Section 7.2.2. The Owner's request shall include any revisions to the Drawings or Specifications necessary to define any changes in the Work. Within fifteen days of receiving the request, the Contractor shall submit the proposal to the Owner and Architect along with all documentation required by Section 7.6.

**7.2.4** If the Contractor requests a Change Order, the request shall set forth the proposed change in the Work and shall be prepared in accordance with Section 7.2.3. If the Contractor requests a change to the Work that involves a revision to either the Drawings or Specifications, the Contractor shall reimburse the Owner for any expenditures associated with the Architects' review of the proposed revisions, except to the extent the revisions are accepted by execution of a Change Order.

**7.2.5** Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, any adjustments to the Contract Sum or the Contract Time.

**3.51** *Delete 7.3.3 and substitute the following:*

**7.3.3 PRICE ADJUSTMENTS**

§ 7.3.3.1 If any Modification, including a Construction Change Directive, provides for an adjustment to the Contract Sum, the adjustment shall be based on whichever of the following methods is the most valid approximation of the actual cost to the contractor, with overhead and profit as allowed by Section 7.5:

- .1 Mutual acceptance of a lump sum;
- .2 Unit prices stated in the Contract Documents, except as provided in Section 7.3.4, or subsequently agreed upon;
- .3 Cost attributable to the events or situations under applicable clauses with adjustment of profits or fee, all as specified in the contract, or subsequently agreed upon by the parties, or by some other method as the parties may agree; or
- .4 As provided in Section 7.3.7.

§ 7.3.3.2 Consistent with Section 7.6, costs must be properly itemized and supported by substantiating data sufficient to permit evaluation before commencement of the pertinent performance or as soon after that as practicable. All costs incurred by the Contractor must be justifiably compared with prevailing industry standards. Except as provided in Section 7.5, all adjustments to the Contract Price shall be limited to job specific costs and shall not include indirect costs, overhead, home office overhead, or profit.

**3.52** *Delete Section 7.3.7 and substitute the following:*

**7.3.7** If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall make an initial determination, consistent with Section 7.3.3, of the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.5. In such case, and also under Section 7.3.3.1.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

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- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others; and
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work.

**3.53** *Delete Section 7.3.8 and substitute the following:*

**7.3.8** Using the percentages stated in Section 7.5, any adjustment to the Contract Sum for deleted work shall include any overhead and profit attributable to the cost for the deleted Work.

**3.54** *Add the following Sections 7.5 and 7.6:*

**7.5 AGREED OVERHEAD AND PROFIT RATES**

**7.5.1** For any adjustment to the Contract Sum for which overhead and profit may be recovered, other than those made pursuant to Unit Prices stated in the Contract Documents, the Contractor agrees to charge and accept, as full payment for overhead and profit, the following percentages of costs attributable to the change in the Work. The percentages cited below shall be considered to include all indirect costs including, but not limited to: field and office managers, supervisors and assistants, incidental job burdens, small tools, and general overhead allocations. The allowable percentages for overhead and profit are as follows:

- .1 To the Contractor for work performed by the Contractor's own forces, 17% of the Contractor's actual costs.
- .2 To each Subcontractor for work performed by the Subcontractor's own forces, 17% of the subcontractor's actual costs.
- .3 To the Contractor for work performed by a subcontractor, 10% of the subcontractor's actual costs (not including the subcontractor's overhead and profit).

**7.6 PRICING DATA AND AUDIT**

**§ 7.6.1 Cost or Pricing Data.**

Upon request of the Owner or Architect, Contractor shall submit cost or pricing data prior to execution of a Modification which exceeds \$500,000. Contractor shall certify that, to the best of its knowledge and belief, the cost or pricing data submitted is accurate, complete, and current as of a mutually determined specified date prior to the date of pricing the Modification. Contractor's price, including profit, shall be adjusted to exclude any significant sums by which such price was increased because Contractor furnished cost or pricing data that was inaccurate, incomplete, or not current as of the date specified by the parties. Notwithstanding Subparagraph 9.10.4, such adjustments may be made after final payment to the Contractor.

**§ 7.6.2** Cost or pricing data means all facts that, as of the date specified by the parties, prudent buyers and sellers would reasonably expect to affect price negotiations significantly. Cost or pricing data are factual, not judgmental; and are verifiable. While they do not indicate the accuracy of the prospective contractor's judgment about estimated future costs or projections, they do include the data forming the basis for that judgment. Cost or pricing data are more than historical accounting data; they are all the facts that can be reasonably expected to contribute to the soundness of estimates of future costs and to the validity of determinations of costs already incurred.

**§ 7.6.3 Records Retention.**

As used in Section 7.6, the term "records" means any books or records that relate to cost or pricing data that Contractor is required to submit pursuant to Section 7.6.1. Contractor shall maintain records for three years from the date of final payment, or longer if requested by the chief procurement officer. The Owner may audit Contractor's records at reasonable times and places.

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**3.55** Delete Section 8.2.2 and substitute the following:

**8.2.2** The Contractor shall not knowingly commence operations on the site or elsewhere prior to the effective date of surety bonds and insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such surety bonds or insurance.

**3.56** Delete Section 8.3.1 and substitute the following:

**8.3.1** If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the control of the Contractor and any subcontractor at any tier; or by delay authorized by the Owner pending dispute resolution; or by other causes that the Architect determines may justify delay, then to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and provided the delay (1) is not caused by the fault or negligence of the Contractor or a subcontractor at any tier and (2) is not due to unusual delay in the delivery of supplies, machinery, equipment, or services when such supplies, machinery, equipment, or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery, the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

**3.57** Insert the following at the end of Section 9.1:

All changes to the Contract Sum shall be adjusted in accordance with Section 7.3.3.

**3.58** Delete Section 9.2 and substitute the following:

**9.2 SCHEDULE OF VALUES**

**9.2.1** The Contractor shall submit to the Architect, within ten days of full execution of the Agreement, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. As requested by the Architect, the Contractor and each Subcontractor shall prepare a trade payment breakdown for the Work for which each is responsible, such breakdown being submitted on a uniform standardized format approved by the Architect and Owner. The breakdown shall be divided in detail, using convenient units, sufficient to accurately determine the value of completed Work during the course of the Project. The Contractor shall update the schedule of values as required by either the Architect or Owner as necessary to reflect:

- .1** the description of Work (listing labor and material separately);
- .2** the total value;
- .3** the percent and value of the Work completed to date;
- .4** the percent and value of previous amounts billed; and
- .5** the current percent completed and amount billed.

**9.2.2** Any schedule of values or trade breakdown that fails to include sufficient detail, is unbalanced, or exhibits "front-loading" of the value of the Work shall be rejected. If a schedule of values or trade breakdown is used as the basis for payment and later determined to be inaccurate, sufficient funds shall be withheld from future Applications for Payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Work.

**3.59** Delete Section 9.3.1 and substitute the following:

Monthly, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require (such as copies of requisitions from Subcontractors and material suppliers) and shall reflect retainage and any other adjustments provided in Section 5 of the Agreement. If required by the Owner or Architect, the Application for Payment shall be accompanied by a current construction schedule.

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**3.60** In Section 9.3.2, add the following words to the end of the second sentence:

provided such materials or equipment will be subsequently incorporated in the Work

*Insert the following at the end of Section 9.3.2:*

The Contractor shall 1) protect such materials from diversion, vandalism, theft, destruction, and damage, 2) mark such materials specifically for use on the Project, and 3) segregate such materials from other materials at the storage facility. The Architect and the Owner shall have the right to make inspections of the storage areas at any time.

**3.61** *In Section 9.4.2, in the first sentence, after the words “Work has progressed to the point indicated,” insert the following:*

in both the Application for Payment and, if required to be submitted by the Contractor, the accompanying current construction schedule

*In the last sentence, delete the third item starting with “(3) reviewed copies” and ending with “Contractor’s right to payment.”*

**3.62** *In Section 9.5.1, in the first sentence, delete the word “may” after the opening words “The Architect” and substitute the word “shall.”*

*In Section 9.5.1, insert the following sentence after the first sentence:*

The Architect shall withhold a Certificate of Payment if the Application for Payment is not accompanied by the current construction schedule required by Section 3.10.1.

**3.63** *In Section 9.6.2, delete the word “The...” at the beginning of the first sentence and substitute the following:*

Pursuant to Chapter 6 of Title 29 of the South Carolina Code of Laws, as amended, the

**3.64** *Delete Section 9.7 and substitute following:*

**9.7 FAILURE OF PAYMENT**

If the Architect does not issue a Certificate for Payment to the Owner, through no fault of the Contractor, within seven days after receipt of the Contractor’s Application for Payment, or if the Owner does not pay the Contractor within seven days after the time established in the Contract Documents the amount certified by the Architect or awarded by a final dispute resolution order, then the Contractor may, upon seven additional days’ written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased, in accordance with the provisions of Section 7.3.3, by the amount of the Contractor’s reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

**3.65** *Insert the following words at the end of the sentence in Section 9.8.1:*

and when all required occupancy permits, if any, have been issued and copies of same have been delivered to the Owner.

**3.66** *In Section 9.8.2, insert the word “written” after the word “comprehensive” and before the word “list.”*

**3.67** *Delete Section 9.8.3 and substitute the following:*

**9.8.3.1** Upon receipt of the Contractor’s list, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, to determine whether the Work or designated portion thereof is substantially complete. The Contractor shall furnish access for the inspection and testing as provided in this Contract. The inspection shall include a

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demonstration by the Contractor that all equipment, systems and operable components of the Work function properly and in accordance with the Contract Documents. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. If more than one Substantial Completion inspection is required, the Contractor shall reimburse the Owner for all costs of reinspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.

**9.8.3.2** If the Architect and Owner concur in the Contractor's assessment that the Work or a portion of the Work is safe to occupy, the Owner and Contractor may arrange for a Certificate of Occupancy Inspection by OSE. The Owner, Architect, and Contractor shall be present at OSE's inspection. Upon verifying that the Work or a portion of the Work is substantially complete and safe to occupy, OSE will issue, as appropriate, a Full or Partial Certificate of Occupancy.

**3.68** *In the second sentence of Section 9.8.5, delete the words "and consent of surety, if any."*

**3.69** *In the first sentence of Section 9.9.1, delete the words "Section 11.3.1.5" and substitute the words "Section 11.3.1.3."*

**3.70** *Delete Section 9.10.1 and substitute the following:*

**9.10.1** Unless the parties agree otherwise in the Certificate of Substantial Completion, the Contractor shall achieve Final Completion no later than thirty days after Substantial Completion. Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. If more than one Final Completion inspection is required, the Contractor shall reimburse the Owner for all costs of reinspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor. If the Contractor does not achieve final completion within thirty days after Substantial Completion or the timeframe agreed to by the parties in the Certificate of Substantial Completion, whichever is greater, the Contractor shall be responsible for any additional Architectural fees resulting from the delay.

**3.71** *Delete the first sentence of Section 9.10.2 and substitute the following:*

Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, (6) required Training Manuals, (7) equipment Operations and Maintenance Manuals, (8) any certificates of testing, inspection or approval required by the Contract Documents and not previously provided (9) all warranties and guarantees required under or pursuant to the Contract Documents, and (10) one copy of the Documents required by Section 3.11.

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**3.72** Delete the first sentence of Section 9.10.3 and substitute the following:

If, after Substantial Completion of the Work, final completion thereof is delayed 60 days through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted.

**3.73** Delete Section 9.10.5 and substitute the following:

**§9.10.5** Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those specific claims in stated amounts that have been previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

**3.74** Add the following Section 9.10.6:

**9.10.6** If OSE has not previously issued a Certificate of Occupancy for the entire Project, the Parties shall arrange for a representative of OSE to participate in the Final Completion Inspection. Representatives of the State Fire Marshal's Office and other authorities having jurisdiction may be present at the Final Completion Inspection or otherwise inspect the completed Work and advise the Owner whether the Work meets their respective requirements for the Project.

**3.75** Delete Section 10.3.1 and substitute the following:

**10.3.1** If the Contractor encounters a hazardous material or substance which was not discoverable as provided in Section 3.2.1 and not required by the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons or serious loss to real or personal property resulting from such material or substance encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing. Hazardous materials or substances are those hazardous, toxic, or radioactive materials or substances subject to regulations by applicable governmental authorities having jurisdiction, such as, but not limited to, the S.C. Department of Health and Environmental Control, the U.S. Environmental Protection Agency, and the U.S. Nuclear Regulatory Commission.

**3.76** Insert the following at the end of Section 10.3.2:

In the absence of agreement, the Architect will make an interim determination regarding any delay or impact on the Contractor's additional costs. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15. Any adjustment in the Contract Sum shall be determined in accordance with Section 7.3.3.

**3.77** Delete Section 10.3.3 and substitute the following:

**10.3.3** The Work in the affected area shall be resumed immediately following the occurrence of any one of the following events: (a) the Owner causes remedial work to be performed that results in the absence of hazardous materials or substances; (b) the Owner and the Contractor, by written agreement, decide to resume performance of the Work; or (c) the Work may safely and lawfully proceed, as determined by an appropriate governmental authority or as evidenced by a written report to both the Owner and the Contractor, which is prepared by an environmental engineer reasonably satisfactory to both the Owner and the Contractor.

**3.78** In Section 10.3.5, delete the word "The" at the beginning of the sentence and substitute the following:

In addition to its obligations under Section 3.18, the

**3.79** Delete the language of Section 10.3.6 and substitute the word "Reserved."

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**3.80** *Insert the following at the end of Section 10.4:*

The Contractor shall immediately give the Architect notice of the emergency. This initial notice may be oral followed within five days by a written notice setting forth the nature and scope of the emergency. Within fourteen days of the start of the emergency, the Contractor shall give the Architect a written estimate of the cost and probable effect of delay on the progress of the Work.

**3.81** *Delete 11.1.2 and substitute the following:*

**11.1.2** The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified below or required by law, whichever coverage is greater. Coverages shall be written on an occurrence basis and shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

**(1) COMMERCIAL GENERAL LIABILITY:**

(a) General Aggregate (per project) .....	<u>\$1,000,000</u>
(b) Products/Completed Operations .....	<u>\$1,000,000</u>
(c) Personal and Advertising Injury .....	<u>\$1,000,000</u>
(d) Each Occurrence .....	<u>\$1,000,000</u>
(e) Fire Damage (Any one fire) .....	<u>\$50,000</u>
(f) Medical Expense (Any one person) .....	<u>\$5,000</u>

**(2) BUSINESS AUTO LIABILITY (including All Owned, Non-owned, and Hired Vehicles):**

(a) Combined Single Limit .....	<u>\$1,000,000</u>
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**(3) WORKER'S COMPENSATION:**

(a) State Statutory	
(b) Employers Liability .....	<u>\$100,000</u> Per Acc.
	..... <u>\$500,000</u> Disease, Policy Limit
	..... <u>\$100,000</u> Disease, Each Employee

In lieu of separate insurance policies for Commercial General Liability, Business Auto Liability, and Employers Liability, the Contractor may provide an umbrella policy meeting or exceeding all coverage requirements set forth in this Section 11.1.2. The umbrella policy limits shall not be less than \$3,000,000.

**3.82** *Delete Section 11.1.3 and substitute the following:*

**11.1.3** Prior to commencement of the Work, and thereafter upon replacement of each required policy of insurance, Contractor shall provide to the Owner a written endorsement to the Contractor's general liability insurance policy that:

- (i) names the Owner as an additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations;
- (ii) provides that no material alteration, cancellation, non-renewal, or expiration of the coverage contained in such policy shall have effect unless all additional insureds have been given at least ten (10) days prior written notice of cancellation for non-payment of premiums and thirty (30) days prior written notice of cancellation for any other reason; and
- (iii) provides that the Contractor's liability insurance policy shall be primary, with any liability insurance of the Owner as secondary and noncontributory.

Prior to commencement of the Work, and thereafter upon renewal or replacement of each required policy of insurance, Contractor shall provide to the Owner a signed, original certificate of liability insurance (ACORD 25). Consistent with this Section 11.1, the certificate shall identify the types of insurance, state the limits of liability for each type of coverage, name the Owner a Consultants as Certificate Holder, provide that the general aggregate limit applies per project, and provide that coverage is written on an occurrence basis. Both the certificates and the

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endorsements must be received directly from either the Contractor's insurance agent or the insurance company. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, naming the Owner as an additional insured for claims made under the Contractor's completed operations, and otherwise meeting the above requirements, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

**3.83** *Delete Section 11.1.4 and substitute the following:*

**11.1.4** A failure by the Owner either (i) to demand a certificate of insurance or written endorsement required by Section 11.1, or (ii) to reject a certificate or endorsement on the grounds that it fails to comply with Section 11.1 shall not be considered a waiver of Contractor's obligations to obtain the required insurance.

**3.84** *In Section 11.3.1, delete the first sentence and substitute the following:*

Unless otherwise provided in the Contract Documents, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis.

**3.85** *Delete the language of Section 11.3.1.2 and substitute the word "Reserved."*

**3.86** *Delete the language of Section 11.3.1.3 and substitute the word "Reserved."*

**3.87** *Delete Section 11.3.2 and substitute the following:*

**11.3.2 BOILER AND MACHINERY INSURANCE**

The Contractor shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall both be named insureds.

**3.88** *Delete Section 11.3.3 and substitute the following:*

**11.3.3 LOSS OF USE INSURANCE**

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. To the extent any losses are covered and paid for by such insurance, the Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

**3.89** *Delete Section 11.3.4 and substitute the following:*

**11.3.4** If the Owner requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Contractor shall, if possible, include such insurance, and the cost thereof shall be charged to the Owner by appropriate Change Order.

**3.90** *Delete the language of Section 11.3.5 and substitute the word "Reserved."*

**3.91** *Delete Section 11.3.6 and substitute the following:*

**11.3.6** Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Owner.



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**3.92** Delete the first sentence of Section 11.3.7 and substitute the following:

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent the property insurance provided by the Contractor pursuant to this Section 11.3 covers and pays for the damage, except such rights as they have to proceeds of such insurance held by the Contractor as fiduciary.

**3.93** Delete the first sentence of Section 11.3.8 and substitute the following:

A loss insured under the Contractor's property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10.

**3.94** Delete Section 11.3.9 and substitute the following:

**11.3.9** If required in writing by a party in interest, the Contractor as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor.

**3.95** Delete Section 11.3.10 and substitute the following:

**11.3.10** The Contractor as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Contractor's exercise of this power; if such objection is made, the dispute shall be resolved in the manner provided in the contract between the parties in dispute as the method of binding dispute resolution. The Contractor as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with a final order or determination issued by the appropriate authority having jurisdiction over the dispute..

**3.96** Delete Section 11.4.1 and substitute the following:

**11.4.1** Before commencing any services hereunder, the Contractor shall provide the Owner with Performance and Payment Bonds, each in an amount not less than the Contract Price set forth in Article 4 of the Agreement. The Surety shall have, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty". In addition, the Surety shall have a minimum "Best Financial Strength Category" of "Class V", and in no case less than five (5) times the contract amount. The Performance Bond shall be written on Form SE-355, "Performance Bond" and the Payment Bond shall be written on Form SE-357, "Labor and Material Payment Bond", and both shall be made payable to the Owner.

**3.97** Delete Section 11.4.2 and substitute the following:

**11.4.2** The Performance and Labor and Material Payment Bonds shall:

- .1** be issued by a surety company licensed to do business in South Carolina;
- .2** be accompanied by a current power of attorney and certified by the attorney-in-fact who executes the bond on the behalf of the surety company; and
- .3** remain in effect for a period not less than one (1) year following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer.

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**3.98** *Add the following Sections 11.4.3 and 11.4.4:*

**11.4.3** Any bonds required by this Contract shall meet the requirements of the South Carolina Code of Laws and Regulations, as amended.

**11.4.4** Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

**3.99** *Delete Section 12.1.1 and substitute the following:*

**12.1.1** If a portion of the Work is covered contrary to the to requirements specifically expressed in the Contract Documents, including inspections of work-in-progress required by all authorities having jurisdiction over the Project, it must, upon demand of the Architect or authority having jurisdiction, be uncovered for observation and be replaced at the Contractor's expense without change in the Contract Time.

**3.100** *In Section 12.2.2.1, delete the words "and to make a claim for breach of warranty" at the end of the third sentence.*

**3.101** *In Section 12.2.2.3, add the following to the end of the sentence:*

unless otherwise provided in the Contract Documents.

**3.102** *Insert the following at the end of Section 12.2.4:*

If, prior to the date of Substantial Completion, the Contractor, a Subcontractor, or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

**3.103** *Delete Section 13.1 and substitute the following:*

**13.1 GOVERNING LAW**

The Contract, any dispute, claim, or controversy relating to the Contract, and all the rights and obligations of the parties shall, in all respects, be interpreted, construed, enforced and governed by and under the laws of the State of South Carolina, except its choice of law rules.

**3.104** *Delete Section 13.2, including its Sub-Sections 13.2.1 and 13.2.2, and substitute the following:*

**13.2 SUCCESSORS AND ASSIGNS**

The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole, or in part, without written consent of the other and then only in accordance with and as permitted by Regulation 19-445.2180 of the South Carolina Code of Regulations, as amended. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

**3.105** *Delete Section 13.3 and substitute the following:*

**13.3 WRITTEN NOTICE**

Unless otherwise permitted herein, all notices contemplated by the Contract Documents shall be in writing and shall be deemed given:

- .1** upon actual delivery, if delivery is by hand;
- .2** upon receipt by the transmitting party of confirmation or reply, if delivery is by electronic mail, facsimile, telex or telegram;
- .3** upon receipt, if delivery is by the United States mail.

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Notice to Contractor shall be to the address provided in Section 8.3.2 of the Agreement. Notice to Owner shall be to the address provided in Section 8.2.2 of the Agreement. Either party may designate a different address for notice by giving notice in accordance with this paragraph.

**3.106** *In Section 13.4.1, insert the following at the beginning of the sentence:*

Unless expressly provided otherwise,

**3.107** *Add the following Section 13.4.3:*

**13.4.3** Notwithstanding Section 9.10.4, the rights and obligations which, by their nature, would continue beyond the termination, cancellation, rejection, or expiration of this contract shall survive such termination, cancellation, rejection, or expiration, including, but not limited to, the rights and obligations created by the following clauses:

- 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service;
- 3.5 Warranty
- 3.17 Royalties, Patents and Copyrights
- 3.18 Indemnification
- 7.6 Cost or Pricing Data
- 11.1 Contractor's Liability Insurance
- 11.4 Performance and Payment Bond
- 15.1.6 Claims for Listed Damages
- 15.1.7 Waiver of Claims Against the Architect
- 15.6 Dispute Resolution
- 15.4 Service of Process

**3.108** *Delete Section 13.6 and substitute the following:*

**13.6 INTEREST**

Payments due to the Contractor and unpaid under the Contract Documents shall bear interest only if and to the extent allowed by Title 29, Chapter 6, Article 1 of the South Carolina Code of Laws. Amounts due to the Owner shall bear interest at the rate of one percent a month or a pro rata fraction thereof on the unpaid balance as may be due.

**3.109** *Delete the language of Section 13.7 and substitute the word "Reserved."*

**3.110** *Add the following Sections 13.8 through 13.16:*

**13.8 PROCUREMENT OF MATERIALS BY OWNER**

The Contractor accepts assignment of all purchase orders and other agreements for procurement of materials and equipment by the Owner that are identified as part of the Contract Documents. The Contractor shall, upon delivery, be responsible for the storage, protection, proper installation, and preservation of such Owner purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. Unless the Contract Documents specifically provide otherwise, all Contractor warranty of workmanship and correction of the Work obligations under the Contract Documents shall apply to the Contractor's installation of and modifications to any Owner purchased items.,.

**13.9 INTERPRETATION OF BUILDING CODES**

As required by Title 10, Chapter 1, Section 180 of the South Carolina Code of Laws, as amended, OSE shall determine the enforcement and interpretation of all building codes and referenced standards on state buildings. The Contractor shall refer any questions, comments, or directives from local officials to the Owner and OSE for resolution.

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**13.10 MINORITY BUSINESS ENTERPRISES**

Contractor shall notify Owner of each Minority Business Enterprise (MBE) providing labor, materials, equipment, or supplies to the Project under a contract with the Contractor. Contractor's notification shall be via the first monthly status report submitted to the Owner after execution of the contract with the MBE. For each such MBE, the Contractor shall provide the MBE's name, address, and telephone number, the nature of the work to be performed or materials or equipment to be supplied by the MBE, whether the MBE is certified by the South Carolina Office of Small and Minority Business Assistance, and the value of the contract.

**13.11 SEVERABILITY**

If any provision or any part of a provision of the Contract Documents shall be finally determined to be superseded, invalid, illegal, or otherwise unenforceable pursuant to any applicable Legal Requirements, such determination shall not impair or otherwise affect the validity, legality, or enforceability of the remaining provision or parts of the provision of the Contract Documents, which shall remain in full force and effect as if the unenforceable provision or part were deleted.

**13.12 ILLEGAL IMMIGRATION**

Contractor certifies and agrees that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide to the State upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony, and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractors language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at [www.procurement.sc.gov](http://www.procurement.sc.gov))

**13.13 SETOFF**

The Owner shall have all of its common law, equitable, and statutory rights of set-off.

**13.14 DRUG-FREE WORKPLACE**

The Contractor certifies to the Owner that Contractor will provide a Drug-Free Workplace, as required by Title 44, Chapter 107 of the South Carolina Code of Laws, as amended.

**13.15 FALSE CLAIMS**

According to the S.C. Code of Laws § 16-13-240, "a person who by false pretense or representation obtains the signature of a person to a written instrument or obtains from another person any chattel, money, valuable security, or other property, real or personal, with intent to cheat and defraud a person of that property is guilty" of a crime.

**13.16 NON-INDEMNIFICATION:**

Any term or condition is void to the extent it requires the State to indemnify anyone. It is unlawful for a person charged with disbursements of state funds appropriated by the General Assembly to exceed the amounts and purposes stated in the appropriations. (§ 11-9-20) It is unlawful for an authorized public officer to enter into a contract for a purpose in which the sum is in excess of the amount appropriated for that purpose. It is unlawful for an authorized public officer to divert or appropriate the funds arising from any tax levied and collected for any one fiscal year to the payment of an indebtedness contracted or incurred for a previous year. (§ 11-1-40)

**3.111** *Delete Section 14.1.1 and substitute the following:*

**14.1.1** The Contractor may terminate the Contract if the Work is stopped for a period of 45 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1** Issuance of an order of a court or other public authority having jurisdiction that requires substantially all Work to be stopped; or

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- .2 An act of government, such as a declaration of national emergency that requires substantially all Work to be stopped.
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents and the Contractor has stopped work in accordance with Section 9.7

**3.112** *Insert the following at the end of Section 14.1.3:*

Any adjustment to the Contract Sum pursuant to this Section shall be made in accordance with the requirements of Article 7.

**3.113** *In Section 14.1.4, replace the word “repeatedly” with the word “persistently.”*

**3.114** *Delete Section 14.2.1 and substitute the following:*

**14.2.1** The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials, or otherwise fails to prosecute the Work, or any separable part of the Work, with the diligence, resources and skill that will ensure its completion within the time specified in the Contract Documents, including any authorized adjustments;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the Contract Documents and the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

**3.115** *In Section 14.2.2, delete the parenthetical statement “, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action,” immediately following the word “Owner” in the first line.*

**3.116** *In Section 14.2.4, replace the words “Initial Decision Maker” with the word “Architect”*

**3.117** *Add the following Section 14.2.5:*

**14.2.5** If, after termination for cause, it is determined that the Owner lacked justification to terminate under Section 14.2.1, or that the Contractor’s default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Owner under Section 14.4.

**3.118** *Delete the second sentence of Section 14.3.2 and substitute the following:*

Any adjustment to the Contract Sum made pursuant to this section shall be made in accordance with the requirements of Article 7.3.3.

**3.119** *Delete Section 14.4.1 and substitute the following:*

**14.4.1** The Owner may, at any time, terminate the Contract, in whole or in part for the Owner’s convenience and without cause. The Owner shall give written notice of the termination to the Contractor specifying the part of the Contract terminated and when termination becomes effective.

**3.120** *Delete Section 14.4.2 and substitute the following:*

**14.4.2** Upon receipt of written notice from the Owner of such termination for the Owner’s convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;

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- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders; and
- .4 complete the performance of the Work not terminated, if any.

**3.121** *Delete Section 14.4.3 and substitute the following:*

**14.4.3** In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, costs incurred by reason of such termination, and any other adjustments otherwise allowed by the Contract. Any adjustment to the Contract Sum made pursuant to this Section 14.4 shall be made in accordance with the requirements of Article 7.3.3.

**3.122** *Add the following Sections 14.4.4, 14.4.5, and 14.5:*

**14.4.4** Contractor's failure to include an appropriate termination for convenience clause in any subcontract shall not (i) affect the Owner's right to require the termination of a subcontract, or (ii) increase the obligation of the Owner beyond what it would have been if the subcontract had contained an appropriate clause.

**14.4.5** Upon written consent of the Contractor, the Owner may reinstate the terminated portion of this Contract in whole or in part by amending the notice of termination if it has been determined that:

- .1 the termination was due to withdrawal of funding by the General Assembly, Governor, or Budget and Control Board or the need to divert project funds to respond to an emergency as defined by Regulation 19-445.2110(B) of the South Carolina Code of Regulations, as amended;
- .2 funding for the reinstated portion of the work has been restored;
- .3 circumstances clearly indicate a requirement for the terminated work; and
- .4 reinstatement of the terminated work is advantageous to the Owner.

**14.5 CANCELLATION AFTER AWARD BUT PRIOR TO PERFORMANCE**

Pursuant to Title 11, Chapter 35 and Regulation 19-445.2085 of the South Carolina Code of Laws and Regulations, as amended, this contract may be canceled after award but prior to performance.

**3.123** *Insert the following sentence after the second sentence of Section 15.1.1:*

A voucher, invoice, payment application or other routine request for payment that is not in dispute when submitted is not a Claim under this definition.

**3.124** *Delete Section 15.1.2 and substitute the following:*

**15.1.2 NOTICE OF CLAIMS**

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Architect. Such notice shall include sufficient information to advise the Architect and other party of the circumstances giving rise to the claim, the specific contractual adjustment or relief requested and the basis of such request. Claims by either party arising prior to the date final payment is due must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later except as stated for adverse weather days in Section 15.1.5.2. By failing to give written notice of a Claim within the time required by this Section, a party expressly waives its claim.

**3.125** *Delete Section 15.1.3 and substitute the following:*

**15.1.3 CONTINUING CONTRACT PERFORMANCE**

Pending final resolution of a Claim, including any administrative review allowed under Section 15.6, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will issue Certificates for Payment in accordance with the initial decisions and determinations of the Architect.

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**3.126** *Insert the following at the end of Section 15.1.5.1:*

Claims for an increase in the Contract Time shall be based on one additional calendar day for each full calendar day that the Contractor is prevented from working.

**3.127** *Insert the following Sub-Sections at the end of Section 15.1.5.2:*

- .1** Claims for adverse weather shall be based on actual weather conditions at the job site or other place of performance of the Work, as documented in the Contractor's job site log.
- .2** For the purpose of this Contract, a total of five (5) calendar days per calendar month (non-cumulative) shall be anticipated as "adverse weather" at the job site, and such time will not be considered justification for an extension of time. If, in any month, adverse weather develops beyond the five (5) days, the Contractor shall be allowed to claim additional days to compensate for the excess weather delays only to the extent of the impact on the approved construction schedule. The remedy for this condition is for an extension of time only and is exclusive of all other rights and remedies available under the Contract Documents or imposed or available by law.
- .3** The Contractor shall submit monthly with their pay application all claims for adverse weather conditions that occurred during the previous month. The Architect shall review each monthly submittal in accordance with Section 15.5 and inform the Contractor and the Owner promptly of its evaluation. Approved days shall be included in the next Change Order issued by the Architect. Adverse weather conditions not claimed within the time limits of this Subparagraph shall be considered to be waived by the Contractor. Claims will not be allowed for adverse weather days that occur after the scheduled (original or adjusted) date of Substantial Completion.

**3.128** *Delete Section 15.1.6 and substitute the following:*

**15.1.6 CLAIMS FOR LISTED DAMAGES**

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor and Owner waive Claims against each other for listed damages arising out of or relating to this Contract.

**15.1.6.1** For the Owner, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) costs suffered by a third party unable to commence work, (vi) attorney's fees, (vii) any interest, except to the extent allowed by Section 13.6 (Interest), (viii) lost revenue and profit for lost use of the property, (ix) costs resulting from lost productivity or efficiency.

**15.1.6.2** For the Contractor, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest, except to the extent allowed by Section 13.6 (Interest); (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waived as against the Owner. Without limitation, this mutual waiver is applicable to all damages due to either party's termination in accordance with Article 14. Nothing contained in this Section shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

**3.129** *Add the following Section 15.1.7:*

**15.1.7 WAIVER OF CLAIMS AGAINST THE ARCHITECT**

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor waives all claims against the Architect and any other design professionals who provide design and/or project management services to the Owner, either directly or as independent contractors or subcontractors to the Architect, for listed damages arising out of or relating to this Contract. The listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v)

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attorney's fees, (vi) any interest; (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waived as against the Owner. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

**3.130** *Delete the language of Sections 15.2, 15.3, and 15.4, including all Sub-Sections, and substitute the word "Reserved" for the deleted language of each Section and Sub-Section.*

**3.131** *Add the following Sections 15.5 and 15.6 with their sub-sections:*

**15.5 CLAIM AND DISPUTES - DUTY OF COOPERATION, NOTICE, AND ARCHITECTS**  
**INITIAL DECISION**

**15.5.1** Contractor and Owner are fully committed to working with each other throughout the Project to avoid or minimize claims. To further this goal, Contractor and Owner agree to communicate regularly with each other and the Architect at all times notifying one another as soon as reasonably possible of any issue that if not addressed may cause loss, delay, and/or disruption of the Work. If claims do arise, Contractor and Owner each commit to resolving such claims in an amicable, professional, and expeditious manner to avoid unnecessary losses, delays, and disruptions to the Work.

**15.5.2** Claims shall first be referred to the Architect for initial decision. An initial decision shall be required as a condition precedent to resolution pursuant to Section 15.6 of any Claim arising prior to the date of final payment, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered, or after all the Architect's requests for additional supporting data have been answered, whichever is later. The Architect will not address claims between the Contractor and persons or entities other than the Owner.

**15.5.3** The Architect will review Claims and within ten days of the receipt of a Claim (1) request additional supporting data from the claimant or a response with supporting data from the other party or (2) render an initial decision in accordance with Section 15.5.5.

**15.5.4** If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Architect when the response or supporting data will be furnished or (3) advise the Architect that all supporting data has already been provided. Upon receipt of the response or supporting data, the Architect will render an initial decision in accordance with Section 15.5.5.

**15.5.5** The Architect will render an initial decision in writing; (1) stating the reasons therefor; and (2) notifying the parties of any change in the Contract Sum or Contract Time or both. The Architect will deliver the initial decision to the parties within two weeks of receipt of any response or supporting data requested pursuant to Section 16.4, or within such longer period as may be mutually agreeable to the parties. If the parties accept the initial decision, the Architect shall prepare a Change Order with appropriate supporting documentation for the review and approval of the parties and the Office of State Engineer. If either the Contractor, Owner, or both, disagree with the initial decision, the Contractor and Owner shall proceed with dispute resolution in accordance with the provisions of Section 15.6.

**15.5.6** In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

**15.6 DISPUTE RESOLUTION**

**15.6.1** If a claim is not resolved pursuant to Section 15.5 to the satisfaction of either party, both parties shall attempt to resolve the dispute at the field level through discussions between Contractor's Representative and Owner's Representative. If a dispute cannot be resolved through Contractor's Representative and Owner's Representative, then the Contractor's Senior Representative and the Owner's Senior Representative, upon the request of either party, shall meet as soon as conveniently possible, but in no case later than twenty-one days after such a request is made, to attempt to resolve such dispute. Prior to any meetings between the Senior Representatives, the parties will exchange relevant information that will assist the parties in resolving their dispute. The meetings required by this Section are a condition precedent to resolution pursuant to Section 15.6.2.



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**15.6.2** If after meeting in accordance with the provisions of Section 15.6.1, the Senior Representatives determine that the dispute cannot be resolved on terms satisfactory to both the Contractor and the Owner, then either party may submit the dispute by written request to South Carolina’s Chief Procurement Officer for Construction (CPOC). Except as otherwise provided in Article 15, all claims, claims, or controversies relating to the Contract shall be resolved exclusively by the appropriate Chief Procurement Officer in accordance with Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws, or in the absence of jurisdiction, only in the Court of Common Pleas for, or in the absence of jurisdiction a federal court located in, Richland County, State of South Carolina. Contractor agrees that any act by the State regarding the Contract is not a waiver of either the State’s sovereign immunity or the State’s immunity under the Eleventh Amendment of the United State’s Constitution.

**15.6.3** If any party seeks resolution to a dispute pursuant to Section 15.6.2, the parties shall participate in non-binding mediation to resolve the claim. If the claim is governed by Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws as amended and the amount in controversy is \$100,000.00 or less, the CPOC shall appoint a mediator, otherwise, the mediation shall be conducted by an impartial mediator selected by mutual agreement of the parties, or if the parties cannot so agree, a mediator designated by the American Arbitration Association (“AAA”) pursuant to its Construction Industry Mediation Rules. The mediation will be governed by and conducted pursuant to a mediation agreement negotiated by the parties or, if the parties cannot so agree, by procedures established by the mediator.

**15.6.4** Without relieving any party from the other requirements of Sections 15.5 and 15.6, either party may initiate proceedings in the appropriate forum prior to initiating or completing the procedures required by Sections 15.5 and 15.6 if such action is necessary to preserve a claim by avoiding the application of any applicable statutory period of limitation or repose.

**15.6.5 SERVICE OF PROCESS**

Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any claims, claims, or controversies relating to the Contract; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on Contractor by certified mail (return receipt requested) addressed to Contractor at the address provided for the Contractor’s Senior Representative or by personal service or by any other manner that is permitted by law, in or outside South Carolina. Notice by certified mail is deemed duly given upon deposit in the United States mail.

**3.132** Add the following Article 16:

**ARTICLE 16 PROJECT-SPECIFIC REQUIREMENTS AND INFORMATION**

**16.1. Inspection Requirements:** *(Indicate the inspection services required by the Contract)*

- Special Inspections are required and are not part of the Contract Sum. *(see section 01400)*
- Building Inspections are required and are not part of the Contract Sum. *(see section 01400)*
- Building Inspections are required and are part of the Contract Sum. The inspections required for this Work are : *(Indicate which services are required and the provider)*

- Civil: \_\_\_\_\_
- Structural: \_\_\_\_\_
- Mechanical: \_\_\_\_\_
- Plumbing: \_\_\_\_\_
- Electrical: \_\_\_\_\_
- Gas: \_\_\_\_\_
- Other *(list)*: \_\_\_\_\_

Remarks: \_\_\_\_\_

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**16.1.1** Contractor shall schedule and request inspections in an orderly and efficient manner and shall notify the Owner whenever the Contractor schedules an inspection in accordance with the requirements of Section 16.1. Contractor shall be responsible for the cost of inspections scheduled and conducted without the Owner's knowledge and for any increase in the cost of inspections resulting from the inefficient scheduling of inspections.

**16.2** List Cash Allowances, if any. (*Refer to attachments as needed. If none, enter NONE*)

None

**16.3.** Requirements for Record Drawings, if any. (*Refer to attachments as needed. If none, enter NONE*)

Refer to SECTION 01780 - CLOSEOUT SUBMITTALS

**16.4.** Requirements for Shop Drawings and other submittals, if any, including number, procedure for submission, list of materials to be submitted, etc. (*Refer to attachments as needed. If none, enter NONE*)

Refer to SECTION 01300 - ADMINISTRATIVE REQUIREMENTS

**16.5.** Requirements for signage, on-site office or trailer, utilities, restrooms, etc., in addition to the Contract, if any. (*Refer to attachments as needed. If none, enter NONE*)

See Section 01500 Temporary Facilities and Controls

**16.6.** Requirements for Project Cleanup in addition to the Contract, if any. (*Refer to attachments as needed. If none, enter NONE*)

See Final Cleaning in Section 01700 - Execution Requirements

**16.7.** List all attachments that modify these General Conditions. (*If none, enter NONE*)

USC Supplemental Conditions

**Performance Bond**

**KNOW ALL MEN BY THESE PRESENTS**, that *(Insert full name or legal title and address of Contractor)*

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as “Contractor”, and *(Insert full name and address of principal place of business of Surety)*

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_

hereinafter called the “surety”, are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as “Agency”, or its successors or assigns, the sum of \_\_\_\_\_ (\$ \_\_\_\_\_), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

**WHEREAS**, Contractor has by written agreement dated \_\_\_\_\_ entered into a contract with Agency to construct

State Project Name: Bursar- Registrar Office Expansion – UTS Renovations  
State Project Number: H27-Z052-A  
Brief Description of Awarded Work, as found on the SE-330, Bid Form: The project consist of HVAC modifications, ceiling replacement, minor reconfiguration of interior spaces, bathroom upgrades, and electrical upgrades.

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GMK Associates, Inc.  
Address: 1201 Main Street, Suite 2100  
Columbia, South Carolina 29201

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

**IN WITNESS WHEREOF**, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 2\_\_\_\_\_ BOND NUMBER \_\_\_\_\_  
*(shall be no earlier than Date of Contract)*

CONTRACTOR

SURETY

By: \_\_\_\_\_  
(Seal)

By: \_\_\_\_\_  
(Seal)

Print Name: \_\_\_\_\_

Print Name: \_\_\_\_\_

Print Title: \_\_\_\_\_

Print Title: \_\_\_\_\_  
(Attach Power of Attorney)

Witness: \_\_\_\_\_

Witness: \_\_\_\_\_

*(Additional Signatures, if any, appear on attached page)*

**Performance Bond**

**NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency for the full and faithful performance of the contract, which is incorporated herein by reference

2. If the Contractor performs the contract, the Surety and the Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

3. The Surety's obligation under this Bond shall arise after:

**3.1** The Agency has notified the Contractor and the Surety at the address described in paragraph 10 below, that the Agency is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If the Agency, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the Agency's right, if any, subsequently to declare a Contractor Default; or

**3.2** The Agency has declared a Contractor Default and formally terminated the Contractor's right to complete the Contract.

4. The Surety shall, within 15 days after receipt of notice of the Agency's declaration of a Contractor Default, and at the Surety's sole expense, take one of the following actions:

**4.1** Arrange for the Contractor, with consent of the Agency, to perform and complete the Contract; or

**4.2** Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

**4.3** Obtain bids or negotiated proposals from qualified contractors acceptable to the Agency for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Agency and the contractor selected with the Agency's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the Agency the amount of damages as described in paragraph 7 in excess of the Balance of the Contract Sum incurred by the Agency resulting from the Contractor Default; or

**4.4** Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and:

**4.4.1** After investigation, determine the amount for which it may be liable to the Agency and, within 60 days of waiving its rights under this paragraph, tender payment thereof to the Agency; or

**4.4.2** Deny liability in whole or in part and notify the Agency, citing the reasons therefore.

5. Provided Surety has proceeded under paragraphs 4.1, 4.2, or 4.3, the Agency shall pay the Balance of the Contract Sum to either:

**5.1** Surety in accordance with the terms of the Contract; or

**5.2** Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

**5.3** The balance of the Contract Sum due either the Surety or another contractor shall be reduced by the amount of damages as described in paragraph 7.

6. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond 15 days after receipt of written notice from the Agency to the Surety demanding that the Surety perform its obligations under this Bond, and the Agency shall be entitled to enforce any remedy available to the Agency.

**6.1** If the Surety proceeds as provided in paragraph 4.4, and the

Agency refuses the payment tendered or the Surety has denied liability, in whole or in part, then without further notice the Agency shall be entitled to enforce any remedy available to the Agency.

**6.2** Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the Dispute Resolution process defined in the Contract Documents and the laws of the State of South Carolina.

7. After the Agency has terminated the Contractor's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Agency shall be those of the Contractor under the Contract, and the responsibilities of the Agency to the Surety shall those of the Agency under the Contract. To a limit of the amount of this Bond, but subject to commitment by the Agency of the Balance of the Contract Sum to mitigation of costs and damages on the Contract, the Surety is obligated to the Agency without duplication for:

**7.1** The responsibilities of the Contractor for correction of defective Work and completion of the Contract; and

**7.2** Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

**7.3** Damages awarded pursuant to the Dispute Resolution Provisions of the Contract. Surety may join in any Dispute Resolution proceeding brought under the Contract and shall be bound by the results thereof; and

**7.4** Liquidated Damages, or if no Liquidated Damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. The Surety shall not be liable to the Agency or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Sum shall not be reduced or set-off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Agency or its heirs, executors, administrators, or successors.

9. The Surety hereby waives notice of any change, including changes of time, to the contract or to related subcontracts, purchase orders and other obligations.

10. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the address shown on the signature page.

**11. Definitions**

**11.1** Balance of the Contract Sum: The total amount payable by the Agency to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts to be received by the Agency in settlement of insurance or other Claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.

**11.2** Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

**SE-357  
Labor and Material Payment Bond**

**KNOW ALL MEN BY THESE PRESENTS**, that *(Insert full name or legal title and address of Contractor)*

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as "Contractor", and *(Insert full name and address of principal place of business of Surety)*

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_

hereinafter called the "surety", are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as "Agency", or its successors or assigns, the sum of \_\_\_\_\_ (\$ \_\_\_\_\_), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

**WHEREAS**, Contractor has by written agreement dated \_\_\_\_\_ entered into a contract with Agency to construct

Project Name: Bursar- Registrar Office Expansion – UTS Renovations  
Project Number: H27-Z052-A  
Brief Description of Awarded Work, as found on the SE-330, Bid Form: The project consist of HVAC modifications, ceiling replacement, minor reconfiguration of interior spaces, bathroom upgrades, and electrical upgrades.

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GMK Associates  
Address: 1201 Main Street, Suite 2100  
Columbia, South Carolina 29201

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

**IN WITNESS WHEREOF**, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Labor and Material Payment Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 2\_\_\_\_\_ BOND NUMBER \_\_\_\_\_  
*(shall be no earlier than Date of Contract)*

CONTRACTOR

SURETY

By: \_\_\_\_\_  
(Seal)

By: \_\_\_\_\_  
(Seal)

Print Name: \_\_\_\_\_

Print Name: \_\_\_\_\_

Print Title: \_\_\_\_\_

Print Title: \_\_\_\_\_  
(Attach Power of Attorney)

Witness: \_\_\_\_\_

Witness: \_\_\_\_\_

*(Additional Signatures, if any, appear on attached page)*

**SE-357****Labor and Material Payment Bond****NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency to pay for all labor, materials and equipment required for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to the Agency, this obligation shall be null and void if the Contractor:
  - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants; and
  - 2.2 Defends, indemnifies and holds harmless the Agency from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract.
3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.
4. With respect to Claimants, and subject to the provisions of Title 29, Chapter 5 and the provisions of §11-35-3030(2)(c) of the SC Code of Laws, as amended, the Surety's obligation under this Bond shall arise as follows:
  - 4.1 Every person who has furnished labor, material or rental equipment to the Contractor or its subcontractors for the work specified in the Contract, and who has not been paid in full therefore before the expiration of a period of ninety (90) days after the date on which the last of the labor was done or performed by him or material or rental equipment was furnished or supplied by him for which such claim is made, shall have the right to sue on the payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute such action for the sum or sums justly due him.
    - 4.2 A remote claimant shall have a right of action on the payment bond upon giving written notice by certified or registered mail to the Contractor within ninety (90) days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material or rental equipment upon which such claim is made.
  - 4.3 Every suit instituted upon a payment bond shall be brought in a court of competent jurisdiction for the county or circuit in which the construction contract was to be performed, but no such suit shall be commenced after the expiration of one year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.
5. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
  - 5.1 Send an answer to the Claimant, with a copy to the Agency, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
  - 5.2 Pay or arrange for payment of any undisputed amounts.
  - 5.3 The Surety's failure to discharge its obligations under this paragraph 5 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a claim. However, if the Surety fails to discharge its obligations under this paragraph 5, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs to recover any sums found to be due and owing to the Claimant.
6. Amounts owed by the Agency to the Contractor under the

Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the Contractor furnishing and the Agency accepting this Bond, they agree that all funds earned by the contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Agency's prior right to use the funds for the completion of the Work.

7. The Surety shall not be liable to the Agency, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Agency shall not be liable for payment of any costs or expenses of any claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

9. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Agency or the contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

10. By the Contractor furnishing and the Agency accepting this Bond, they agree that this Bond has been furnished to comply with the statutory requirements of the South Carolina Code of Laws, as amended, and further, that any provision in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

11. Upon request of any person or entity appearing to be a potential beneficiary of this bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

12. Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the laws of the State of South Carolina.

**13. DEFINITIONS**

**13.1 Claimant:** An individual or entity having a direct contract with the Contractor or with a Subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the Contractor and the Contractor's Subcontractors, and all other items for which a mechanic's lien might otherwise be asserted.

**13.2 Remote Claimant:** A person having a direct contractual relationship with a subcontractor of the Contractor or subcontractor, but no contractual relationship expressed or implied with the Contractor.

**13.3 Contract:** The agreement between the Agency and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

## USC SUPPLEMENTAL GENERAL CONDITIONS FOR CONSTRUCTION PROJECTS

1. Contractor's employees shall take all reasonable means not to interrupt the flow of student traffic in building corridors, lobbies and stairs. All necessary and reasonable safety precautions shall be taken to prevent injury to building occupants while transporting materials and equipment through the building to the work area. Providing safe, accessible, plywood pedestrian ways around construction may be required if a suitable alternative route is not available.
2. Fraternalization between Contractor's employees and USC students, faculty or staff is strictly prohibited-zero tolerance!
3. USC will not tolerate rude, abusive or degrading behavior on the job site. Heckling and cat-calling directed toward students, faculty or staff or any other person on USC property is strictly prohibited. Any contractor whose employees violate this requirement will be assessed a fine of up to \$500 per violation.
4. Contractor's employees must adhere to the University's policy of maintaining a drug-free and smoke-free/tobacco free workplace.
5. Contractor must sign a Contractor Key Receipt/Return form before any keys are issued. Keys must be returned immediately upon the completion of the work. The Contractor will bear the cost of any re-keying necessary due to the loss of or failure to return keys.
6. A welding permit must be issued by the University Fire Marshall before any welding can begin inside a building. Project Manager will coordinate.
7. Contractor must notify the University immediately upon the discovery of suspect material such as those potentially containing asbestos or other such hazardous materials. These materials **must not** be disturbed until approved by the USC Project Manager.
8. At the beginning of the project, the USC Project Manager will establish the Contractor's lay-down area. This area will also be used for the Contractor's work vehicles. No personal vehicles will be allowed in this area, or in any areas surrounding the construction site that are not regular or authorized parking lots. Personal vehicles must be parked in the perimeter parking lots. Parking permits can be obtained at the USC Parking Office located in the Pendleton Street parking garage. The lay down area will be clearly identified to the contractor by the PM, with a sketch or drawing provided to Parking. In turn, the contractor will mark off this area with a sign containing the project name, PM name, Contractor name and contact number, and end date. Where this area is subject to foot traffic, protective barriers will be provided as specified by the PM. The area will be maintained in a neat and orderly fashion. Vehicles parked in the lay down area (or designated parking areas) will be clearly marked or display a CPC furnished placard for identification.
9. Contractor will be responsible for providing its own temporary toilet facilities, unless prior arrangements are made with the USC Project Manager.
10. Use of USC communications facilities (telephones, computers, etc.) by the Contractor is prohibited, unless prior arrangements are made with the USC Project Manager.

Updated: July 15, 2011

11. For all projects over \$100,000, including IDC 's, an SE-395, Contractor Performance Evaluation, will be completed by the USC Project Manager and reviewed with the GC at the beginning of the project and a copy given to the GC. At the end of the project the form will be completed and a Construction Performance rating will be established.
12. Contractor is responsible for removal of all debris from the site, and is required to provide the necessary dumpsters which will be emptied at least 2 times per week. Construction waste must not be placed in University dumpsters. **THE CONSTRUCTION SITE MUST BE THOROUGHLY CLEANED WITH ALL TRASH PICKED UP AND PROPERLY DISPOSED OF ON A DAILY BASIS AND THE SITE MUST BE LEFT IN A SAFE AND SANITARY CONDITION EACH DAY. THE UNIVERSITY WILL INSPECT JOB SITES REGULARLY AND WILL FINE ANY CONTRACTOR FOUND TO BE IN VIOLATION OF THIS REQUIREMENT AN AMOUNT OF UP TO \$1,000 PER VIOLATION.**
13. **Contractor must provide all O&M manuals, as-built drawings, and training of USC personnel on new equipment, controls, etc. prior to Substantial Completion. Final payment will not be made until this is completed.**
14. The contractor will comply with all regulations set forth by OSHA and SCDHEC. Contractor must also adhere to USC's internal policies and procedures (available by request). As requested, the contractor will submit all Safety Programs and Certificates of Insurance to the University for review.
15. Tree protection fencing is required to protect existing trees and other landscape features to be preserved within a construction area. The limits of this fence will be evaluated for each situation with the consultant, USC Arborist and USC Project Manager. The tree protection fence shall be 5' high chain link fence unless otherwise approved by USC Project Manager. No entry or materials storage will be allowed inside the tree protection zone. A 4" layer of mulch shall be placed over the tree protection area to maintain moisture in the root zone.
16. Where it is necessary to cross walks, tree root zones (i.e., under canopy) or lawns the following measures shall be taken: For single loads up to 9,000 lbs., a 3/4" minimum plywood base shall be placed over areas impacted. For single loads over 9,000 lbs., two layers of 3/4" plywood is required.
17. For projects requiring heavy loads to cross walks tree root zones or lawns. A construction entry road consisting of 10' X 16' oak logging mates on 12" coarse, chipped, hardwood base. Mulch and logging mats shall be supplemented throughout the project to keep matting structurally functional.
18. Any damage to existing landscaping (including lawn areas) will be remediated before final payment is made.
19. Orange safety fence to be provided by the contractor. (USC Arborist, Kevin Curtis may be contacted at 777-0033 or 315-0319)



## **CAMPUS VEHICLE EXPECTATIONS**

1. All motorized vehicles on the University campus are expected to travel and park on roadways and/or in parking stalls.
2. All motorized vehicle traffic on USC walkways must first receive the Landscape Manager=s authorization. Violators may be subject to fines and penalties.
3. All motorized vehicles that leak or drip liquids are prohibited from traveling or parking on walks or landscaped areas.
4. Contractors, vendors, and delivery personnel are required to obtain prior parking authorization before parking in a designated space. Violators may be subject to fines and/or penalties. See Item 10 below.
5. Drivers of equipment or motor vehicles that damage university hardscape or landscape will be held personally responsible for damages and restoration expense.
6. Vehicle drivers who park on landscape or drives must be able to produce written evidence of need or emergency requiring parking on same.
7. All vehicles parked on landscape, hardscape, or in the process of service delivery, must display adequate safety devices, i.e. flashing lights, cones, signage, etc.
8. All drivers of equipment and vehicles will be respectful of University landscape, equipment, structures, fixtures and signage.
9. All incidents of property damage will be reported to Parking Services or the Work Management Center.
10. Parking on campus is restricted to spaces designated by Parking Services at the beginning of the project. Once the project manager and contractor agree on how many spaces are needed, the project manager will obtain a placard for each vehicle. This placard must be hung from the mirror of the vehicle, otherwise a ticket will be issued and these tickets cannot be “fixed”. Parking spaces are restricted to work vehicles only; no personal vehicles.

University of South Carolina, Upstate  
USC Upstate Administration Building Repairs and Renovation  
Spartanburg, South Carolina

STATE PROJECT # H34-9541-JM  
PROJECT #11049.02

Project Name: Bursar- Registrar Office Expansion – UTS Renovations

Project Number: H27-Z052-A

University of South Carolina

**CONTRACTOR'S ONE YEAR GUARANTEE**

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

WE \_\_\_\_\_

as General Contractor on the above-named project, do hereby guarantee that all work executed under the requirements of the Contract Documents shall be free from defects due to faulty materials and /or workmanship for a period of one (1) year from date of acceptance of the work by the Owner and/or Architect/Engineer; and hereby agree to remedy defects due to faulty materials and/or workmanship, and pay for any damage resulting wherefrom, at no cost to the Owner, provided; however, that the following are excluded from this guarantee;

Defects or failures resulting from abuse by Owner.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars, riots, or civil commotion.

\_\_\_\_\_  
[Name of Contracting Firm]

\*By \_\_\_\_\_

Title \_\_\_\_\_

\*Must be executed by an office of the Contracting Firm.

SWORN TO before me this \_\_\_\_\_ day of \_\_\_\_\_, 2\_\_\_\_ (seal) \_\_\_\_\_ State

My commission expires \_\_\_\_\_

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**SECTION 01066 - INTERIM LIFE SAFETY MEASURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interim Life Safety Measures

1.02 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Submit a written plan indicating that Interim Life Safety Measures (ILSM) have been addressed and shall be enforced, within two weeks of Notice to Proceed .

1.03 PROCEDURES

- A. The Interim Life Safety Measures shall:
  - 1. Ensure that exits provide free and unobstructed egress. Personnel shall receive training if alternative exits are designated. Buildings and areas under construction shall have maintained escape facilities for the Contractor's work forces at all times. Means of egress in construction areas shall be inspected daily.
  - 2. Ensure the fire alarm and detection systems are properly functioning and are not impaired.
  - 3. Provide additional fire-fighting equipment and use training for personnel.
  - 4. Prohibit smoking in or adjacent to construction areas.
  - 5. Develop and enforce storage, housekeeping, and debris removal practices that reduce the flammable and combustible fire load of the building to the lowest level necessary for daily operations.
  - 6. Conducting a minimum of two fire drills per shift per quarter.
  - 7. Increase "hazard surveillance" of buildings, grounds and equipment with special attention to excavations, construction areas, construction storage, and field offices.
  - 8. Conduct organization-wide safety education programs to ensure awareness of Life Safety Code deficiencies, construction hazards, and these requirements.

**END OF SECTION**

**SECTION 01068 - DUST CONTROL PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Dust Control Procedures to be implemented by the Contractor for construction and renovation projects. The work shall include, but not be limited to, dust control measures pertaining to the following:
  - 1. Location of and erection methods of interim dust barriers, preceding erection and/or demolition of impervious dust barriers around demolition/construction areas.
  - 2. Location of and erection methods for impervious dust barriers around demolition/construction areas.
  - 3. Debris removal.
  - 4. Dust/debris control.
  - 5. Small-scale demolition/construction activities.
  - 6. Cleaning frequently at:
    - a. Dust barrier entrances.
    - b. Corridors used for both debris removal circulation.
  - 7. Circulation control patterns for construction personnel.
  - 8. Limitations/restrictions for outdoor demolition/construction activities pertaining to:
    - a. Activities adjacent to air intakes.
    - b. Dirt/debris removals and movement.
    - c. Location and use of air compressors or other construction equipment machinery capable of creating odors, fumes, or exhausts.

**1.02 RELATED SECTIONS**

- A. Section 01066 - Interim Life Safety Measures

**1.03 WORK SEQUENCE**

- A. Interior construction/demolition work will be conducted in phases as described in the Contract Documents. The Contractor is responsible for submitting phasing drawings, indicating work areas and locations of impervious barriers once final phasing has been coordinated with the Owner's Representative.

**1.04 QUALITY ASSURANCE**

- A. Provide daily monitoring/inspection of construction barriers to verify that they are properly sealed.
- B. Define techniques prior to initiation of the construction/demolition project.
- C. Review existing ventilation systems and identify potential for contamination to be dispersed through air intakes or ductwork that might be disrupted during demolition/construction activities. Identify the effect of air pressure changes in the ventilation system caused by temporary sealing of active ventilation systems sealed during the demolition/construction activities.

**1.05 SUBMITTALS**

- A. Prior to starting work, the Contractor shall submit for review by the Architect and approval by the Owner's Representative an outline of proposed procedure showing compliance with specifications for each of the following:

1. Systems, arrangements, construction, and locations of interim and impervious barriers.
2. Clean up, debris removal, and dust/debris control systems.
3. Foot traffic patterns to and from work areas for construction/demolition personnel and materials.

## **PART 2 PRODUCTS**

### **2.01 Materials/Equipment:**

- A. Reinforced polyethylene sheets used for dust control shall be fire retardant, and have a minimum thickness of 6-mil.
- B. Refer to applicable specification sections for building materials utilized in the execution of this work.

## **PART 3 EXECUTION**

### **3.01 General Requirements:**

- A. Interim Dust Barriers
  1. Prior to erection and/or demolition of impervious dust barriers around construction/demolition areas whether or not indicated on the plans, install an interim, air-tight, reinforced plastic dust abatement curtain approximately four (4) feet outside construction/demolition limits at exiting corridors, to isolate public areas from the area of work.
  2. Dust abatement curtain shall be constructed of polyethylene sheets, and is to be completely taped to walls, floors, and ceilings with duct tape and/or spackling compound.
  3. Prior to removal of the interim dust barrier, obtain approval from the Owner's Representative.
  4. Cover existing carpet in all interior spaces with polyethelene sheets. Overlap and tape all joints. Inspect and repair damage to polyethelene sheets daily. Protect carpet throughout construction duration.
- B. Impervious Dust Control Barriers
  1. Prior to performing work within an interior construction area, the Contractor shall install an impervious dust barrier at locations around the work area, as indicated on drawings, and/or as directed by the Owner's Representative. Coordinate placement of impervious barriers with the owner's representative and architect. It is the Contractor's responsibility to coordinate amendments to Interim Life Safety requirements caused by the location of impervious barriers throughout the course of the construction/demolition work.
  2. At completion of impervious dust barrier erection or demolition, completely clean floor, ceiling, and walls, including a minimum of four feet beyond the limits of the barrier using HEPA-filtered vacuum equipment.
  3. The impervious barrier shall completely seal off the construction/demolition area from occupied areas. Barriers will be full height, temporary partitions extending from the floor to the underside of the floor/roof structure above. Partitions shall be constructed of 3-5/8" metal studs (20 gauge), spaced a maximum of 16" on center, with 5/8" gypsum board on one side on one side and taped, mudded and painted.
- C. At high traffic cart areas, corridors, areas exposed to visitors and building occupants, or as indicated on submittal, use type x gypsum board in lieu of polyethylene sheets. Provide fire/smoke rated partitions where required.
- D. When gypsum board is used, provide temporary doors set in hollow metal frames when required

for access into the work area. Coordinate door locations with the Owner's Representative.

- E. Where existing mechanical and/or electrical systems obstruct extending impervious partitions to underside of floor/roof structures above, terminate partition at obstruction and seal off the balance of the underside of the deck of the floor above with reinforced, fire-retardant polyethylene sheets and duct tape.
- F. Inspect interior and exterior perimeters of the construction/demolition area for miscellaneous openings, such as penetrations of duct and/or piping, conduit, and hangers on a daily basis. All openings must be sealed airtight to confine dust and dirt to within the construction/demolition work area.
- G. Dust and Debris Control Measures
  - 1. Prior to utility shutdowns which will necessitate removal of ceiling for access to valves and/or equipment, and which may necessitate access on floors above or below the work area, review dust containment procedures at each specific location with the Owner's Representative.
  - 2. The construction/demolition work area shall be cleaned and maintained daily to eliminate dust and debris.
  - 3. Seal or tape doors, areas, or rooms during projects that are dust producing. Block off and seal all grilles and diffusers in the areas of small-scale activities.
  - 4. Cleaning of Work Area
    - a. Frequency of cleaning
      - 1) On a daily basis, clean elevators used for debris removal and/or material delivery.
      - 2) On a daily basis clean exit pathways inside of the building that lead from the demolition/construction work area to the dumpster and/or the designated materials storage area.
    - b. Cleaning Personnel
      - 1) The Contractor shall designate certain staff for housekeeping and cleaning responsibilities, and use appropriate equipment and supplies. Covered carts used for debris removal should be clean and dust-free while transporting debris through occupied areas of the building.

**END OF SECTION**

**SECTION 01100 - SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: Bursar- Registrar Office Expansion - UTS Renovations.
- B. Owner's Name: University of South Carolina.
- C. Architect's Name: GMK Associates, Inc.
- D. The Project consists of the alteration of 8,300 square feet of office space including HVAC modifications, ceiling replacement, minor reconfiguration of interior spaces, bathroom upgrades, and electrical upgrades..

**1.02 CONTRACT DESCRIPTION**

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00500 - Agreement.

**1.03 DESCRIPTION OF ALTERATIONS WORK**

- A. Scope of demolition and removal work is shown on drawings.
- B. Scope of alterations work is shown on drawings.
- C. Plumbing: Alter existing system and add new construction, keeping existing in operation.
- D. HVAC: Alter existing system and add new construction, keeping existing in operation.
- E. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.
- F. Fire Alarm: Alter existing system and add new construction, keeping existing in operation.

**1.04 WORK BY OWNER**

- A. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Substantial Completion.
  - 1. Door card readers - contractor is to install the infrastructure.
- B. Owner will supply the following for installation by Contractor:

**1.05 OWNER OCCUPANCY**

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

**1.06 CONTRACTOR USE OF SITE AND PREMISES**

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Provide access to and from site as required by law and by Owner:
- C. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
- D. Utility Outages and Shutdown:



1. Coordinate all utility outages with the owner at least 7 days prior to activity requiring outage.
2. Fire alarm shall be active throughout the project. The contractor is responsible for maintaining the system. A fire watch shall be provided at all times in which the fire alarm isn't active. The fire watch must be maintained 24 hours a day during fire alarm service disruption.

#### **1.07 WORK SEQUENCE**

- A. Construct Work in phases during the construction period:
  1. Phase 1: Phase one shall include demoliiton, renovation , mechanical and electrical activities associated with the following spaces: Office 117, 118, Corridors H105, H106, Open Offices 112, 119, 120, Storage 121A and the new Security Office in the lobby.
  2. Phase 2: Phase Two shall include demolition, renovation, mechanical and electrical activities associated with the following spaces: Offices 105, 105A, 105B, 105C, 105D, 105E, 105F, 114, 115, 116, Open Offices 111, 112, Corridor H101, H102, H104, Security 104, Men 102 and Women 103.
- B. Coordinate construction schedule and operations with Owner.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01200 - PRICE AND PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts, and Submittal Schedule.
- D. The Contractor's Construction Schedule and Submittal Schedule are included in other sections of Division 1.
- E. See also the payment requirements in Supplementary Conditions.
- F. Change procedures.
- G. Correlation of Contractor submittals based on changes.
- H. Procedures for preparation and submittal of application for final payment.

**1.02 SCHEDULE OF VALUES**

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- B. Forms filled out by hand will not be accepted.
- C. Submit Schedule of Values in duplicate within 30 days after date of Owner-Contractor Agreement.
- D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization and bonds and insurance.
  - 1. Provide minimum of 1% of the Construction Cost for Project Record Drawings.
  - 2. Provide minimum of 1% of the Construction Cost for Operating and Maintenance Data.
  - 3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
- E. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
  - 1. Contractor's construction schedule.
  - 2. Application for Payment form.
  - 3. List of Subcontractors.
  - 4. Schedule of allowances.
  - 5. List of principal suppliers and fabricators.
  - 6. Schedule of submittals.
- F. Sub-Schedules: Where the Work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- G. Identification: Include the following Project identification on the Schedule of Values:
  - 1. Project name and location.

2. Name of the Architect.
3. Contractor's name and address.
4. Date of submittal.

- H. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
- I. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- J. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- K. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values.
- L. Revise schedule to list approved Change Orders, with each Application For Payment.

### 1.03 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
1. List of Subcontractors.
  2. List of principal suppliers and fabricators.
  3. Schedule of Values.
  4. Contractor's Construction Schedule (preliminary if not final).
  5. Schedule of principal products.
  6. List of Contractor's staff assignments.
  7. List of Contractor's principal consultants.
  8. Copies of building permits.
  9. Copies of authorizations and licenses from governing authorities for performance of the Work.
  10. Initial progress report.
  11. Report of pre-construction meeting.
  12. Certificates of insurance and insurance policies.
  13. Performance and payment bonds (if required).
  14. Data needed to acquire Owner's insurance.
  15. Initial settlement survey and damage report, if required.
- E. For each item, provide a column for listing each of the following:
1. Item Number.
  2. Description of work.
  3. Scheduled Values.
  4. Previous Applications.
  5. Work in Place and Stored Materials under this Application.
  6. Authorized Change Orders.
  7. Total Completed and Stored to Date of Application.

8. Percentage of Completion.
  9. Balance to Finish.
  10. Retainage.
- F. Execute certification by signature of authorized officer.
1. Incomplete applications will be returned without action.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
- I. Submit three copies of each Application for Payment.
- J. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to Owner.
- K. Include the following with the application:
1. Transmittal letter as specified for Submittals in Section 01300.
  2. Construction progress schedule, revised and current as specified in Section 01325.
  3. Partial release of liens from major Subcontractors and vendors.
- L. Waiver Delays: Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.
- M. When an application shows completion of an item, submit final or full waivers.
- N. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- O. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- P. Administrative actions and submittals that shall proceed or coincide with this application include:
1. Occupancy permits and similar approvals.
  2. Warranties (guarantees) and maintenance agreements.
  3. Test/adjust/balance records.
  4. Meter readings.
  5. Start-up performance reports.
  6. Change-over information related to Owner's occupancy, use, operation and maintenance.
  7. Final cleaning.
  8. Application for reduction of retainage, and consent of surety.
  9. Advice on shifting insurance coverages.
- Q. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
- R. Contractor is required to assemble and complete information required by SC Department of Health and Environmental Control for project close-out. Copies of these regulations and guidelines are available from SCDHEC or will be given to successful bidder upon start of work.

Three copies of all information is required.

#### 1.04 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Price or Contract Time, Architect will issue instructions directly to Contractor.
- C. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  - 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.
- E. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01600.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
  - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
  - 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
  - 4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
  - 1. Provide following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  - 2. Support each claim for additional costs with additional information:
    - a. Origin and date of claim.
    - b. Dates and times work was performed, and by whom.
    - c. Time records and wage rates paid.
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly

documented.

3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

- H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

#### 1.05 APPLICATION FOR FINAL PAYMENT

- A. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.
- B. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- C. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
  1. Completion of Project closeout requirements.
  2. Completion of items specified for completion after Substantial Completion.
  3. Assurance that unsettled claims will be settled.
  4. Assurance that Work not complete and accepted will be completed without undue delay.
  5. Transmittal of required Project construction records to Owner.
  6. Certified property survey.
  7. Proof that taxes, fees and similar obligations have been paid.
  8. Removal of temporary facilities and services.
  9. Removal of surplus materials, rubbish and similar elements.
  10. Change of door locks to Owner's access.
- D. Application for Final Payment will not be considered until the following have been accomplished:
  1. All closeout procedures specified in Section 01700.

**END OF SECTION**

**SECTION 01300 - ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Coordination drawings.
- D. Submittals for review, information, and project closeout.
- E. Number of copies of submittals.
- F. Submittal procedures.

**1.02 RELATED REQUIREMENTS**

- A. Document 00700 - General Conditions: Dates for applications for payment.
- B. Section 01325 - Construction Progress Schedule: Form, content, and administration of schedules.
- C. Section 01700 - Execution Requirements: Additional coordination requirements.
- D. Section 01780 - Closeout Submittals: Project record documents.

**1.03 PROJECT COORDINATION**

- A. Project Coordinator: Hospital's Project Manager.
- B. During construction, coordinate use of site and facilities through the Project Coordinator.
- C. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- D. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- E. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- F. Make the following types of submittals to Architect through the Project Coordinator:
  - 1. Requests for interpretation.
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Manufacturer's instructions and field reports.
  - 6. Applications for payment and change order requests.
  - 7. Progress schedules.
  - 8. Coordination drawings.
  - 9. Closeout submittals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. Owner.
  - 2. Architect.
  - 3. Contractor.
- C. Agenda:
  - 1. Execution of Owner-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
  - 5. Designation of personnel representing the parties to Contract and Architect.
  - 6. Designation of personnel representing the parties to Contract, Owner, and Architect.
  - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 8. Scheduling.
- D. Contractor to record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### 3.02 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals on day and time convenient for all parties involved.
- B. Make arrangements for meetings, prepare agenda with copies for participants prior to meetings, preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers as appropriate to agenda topics for each meeting. The Architect and Owner may attend.
- D. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of Work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems that impede, or will impede, planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Review of status of Request for Information (RFI).
  - 7. Review of status of Architectural Supplemental Instructions (ASI).
  - 8. Review of status of proposal requests (PR).
  - 9. Review of status of Change Orders (CO).
  - 10. Review of off-site fabrication and delivery schedules.
  - 11. Maintenance of progress schedule.
  - 12. Corrective measures to regain projected schedules.
  - 13. Planned progress during succeeding work period.
  - 14. Coordination of projected progress.
  - 15. Maintenance of quality and work standards.
  - 16. Effect of proposed changes on progress schedule and coordination.
  - 17. Other business relating to Work.
- E. Record minutes and distribute copies within five days after meeting to participants, with three



copies to Architect, one copy to Owner, participants, and those affected by decisions made.

### 3.03 COORDINATION DRAWINGS

### 3.04 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
1. Product data.
    - a. When product data submittals are prepared specifically for this project (in the absence of standard printed information) submit such information as shop drawings and not as product data submittals.
    - b. Content:
      - 1) Identify the particular product being submitted; submit only pertinent pages.
      - 2) Show compliance with properties specified.
      - 3) Identify which options and accessories are applicable.
      - 4) Show compliance with the specific standards referenced.
      - 5) Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
      - 6) Identify dimensions which have been verified by field measurement.
      - 7) Show special coordination requirements for the product.
  2. Shop drawings.
    - a. Original drawings, prepared by Contractor, Subcontractor, supplier or distributor, which illustrate portion of the work, showing fabrication, layout, setting and erection details.
    - b. Do not reproduce the Contract Drawings for the shop drawing submittals. Electronic media of the Construction Documents are not available for the Contractor's Subcontractor's, or material suppliers use.
    - c. Identify details by reference to drawing sheet number(s) and pertinent detail number(s).
    - d. Shop drawings shall not include the phrase by others, except when relating to materials, products or equipment not included under the total Contract.
  3. Samples.
    - a. Provide samples that are the same as proposed product.
    - b. Where products are to match a sample prepared by other entities, prepare sample to match.
    - c. Preparation:
      - 1) Attach a description to each sample.
      - 2) Attach name of manufacturer or source to each sample.
      - 3) Where compliance with specified properties is required, attach documentation showing compliance.
      - 4) Where selection is required, the first submittal may be a single set of all options; after return of submittal with selection indicated, submit standard number of sets of selected item.
    - d. Keep final sample set(s) at the project site, available for use during progress of the work.
    - e. Contractor shall be responsible for submitting all interior and exterior materials samples that require a color and/or finish selection or is required to be part of a mock up assembly at the same time. The Contractor shall include the color, finish, material selection schedule in the shop drawing submittal schedule. The Architect will provide final color, finish, and material selections only when they have all been

submitted by the Contractor.

- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01780 - CLOSEOUT SUBMITTALS.

### 3.05 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
  - 1. Design data.
  - 2. Certificates.
  - 3. Test reports.
  - 4. Inspection reports.
  - 5. Manufacturer's instructions.
  - 6. Manufacturer's field reports.
  - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

### 3.06 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, submit them at project closeout:
  - 1. Project record documents.
  - 2. Operation and maintenance data.
  - 3. Warranties.
  - 4. Bonds.
  - 5. Other types as indicated.
- B. Submit for Owner's benefit during and after project completion.

### 3.07 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
  - 1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit the number of copies that Contractor requires, plus two copies that will be retained by Architect.
- B. Documents for Information: Submit two copies.
- C. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

### 3.08 SUBMITTAL PROCEDURES

- A. Transmit each submittal with AIA Form G810, in duplicate.
  - 1. Submittals received without a transmittal form will be returned without review or action.
  - 2. Fill out a separate transmittal form for each submittal; also include the following:
    - a. Other relevant information.
    - b. Requests for additional information.
  - 3. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- B. Identify Project name and numbers, Contractor's, Subcontractor's or supplier's name and

address, Architect's name and address, Manufacturer's name ; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

- C. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, quantities, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
  - 1. Contractor's responsibility regarding errors and omissions in submittals is not relieved by Architect's review of submittals.
  - 2. Contractor's responsibility regarding deviations in submittals from requirements of Contract Documents is not relieved by Architect's review submittals, unless Architect gives written acceptance of specific deviations as approved by Owner.
  - 3. When work is directly related and involves more than one trade, shop drawings shall be coordinated by the submitting Contractor/Subcontractor with other trades prior submission and related work submitted under one cover.
    - a. After shop drawing has been submitted for review, no changes may be made to that Drawing other than changes resulting from review notes made by the Architect unless such changes are clearly identified and circled before being resubmitted. Any failure to comply with this requirement shall nullify and invalidate the Architect's review.
  - 4. Submittals without Contractor's stamp of review will not be reviewed and will be returned for resubmission.
- D. Submittals will be accepted from the Contractor only. Submittals received from other entities will be returned without review or action.
- E. Do not submit substitute items that have not been approved by means of the procedure specified elsewhere.
- F. Do not include requests for substitution (either direct or indirect) on submittals; comply with procedures for substitutions specified elsewhere.
- G. Schedule submittals to expedite the Project, and coordinate submission of related items.
  - 1. Prepare and submit, in accordance with the approved Project Construction Schedule, a separate document listing dates by which shop drawings, product data and samples must be submitted for each material, product or equipment item requiring submittal.
  - 2. The schedule shall reflect an orderly sequence so as to cause no delay in the Work.
  - 3. Coordinate submittals and activities that must be performed in sequence, so that the Architect has enough information to properly review the submittals.
  - 4. Coordinate submittals of different types for the same product or system so that the Architect has enough information to properly review each submittal.
  - 5. The dates indicated shall allow reasonable time for the review process of checking, correcting and resubmitting and reasonable time for procurement.
  - 6. No extension of time will be granted to the Contractor/Subcontractor because of failure to expeditiously submit shop drawings and samples in reasonable time to allow for review process.
  - 7. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor. Architect shall review with reasonable promptness.
- H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- I. Provide space for Contractor and Architect review stamps. Submittals to receive Architect's action marking: Provide blank space on the label or on the submittal itself for action marking;

4 inches wide by 6 inches high.

- J. Do not commence work which requires review of any submittals until receipt of returned submittals with an acceptable action.
  - 1. Stamped Reviewed, no corrections or resubmissions required, fabrication may proceed.
  - 2. Stamped Revise and Resubmit.
    - a. If Contractor/Subcontractor complies with noted corrections, fabrication may proceed.
  - 3. If for any reason the Contractor/Subcontractor cannot comply with the noted corrections, fabrication shall not proceed and Contractor/Subcontractor shall resubmit, following procedures outlined herein before.
  - 4. Stamped Revise and Resubmit or Resubmit.
    - a. Contractor/Subcontractor shall revise and resubmit for review. Fabrication shall not proceed.
- K. When revised for resubmission, identify all changes made since previous submission.
- L. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- M. Submittals not requested will not be recognized or processed.

**END OF SECTION**

**SECTION 01325 - CONSTRUCTION PROGRESS SCHEDULE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.
- C. Reports.

**1.02 SUBMITTALS**

- A. Within 7 days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 45 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 3 working days.
- C. Within 10 days after date established in Notice to Proceed, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 3 days after Architect's review, submit complete schedule.
- E. Submit Daily Construction Reports every week.
- F. Submit updated schedule and Progress Reports with each Application for Payment.
- G. Submit the number of opaque reproductions that Contractor requires, plus three copies that will be retained by Architect.
- H. Submit under transmittal letter form specified in Section 01300.

**1.03 QUALITY ASSURANCE**

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

**1.04 SCHEDULE FORMAT**

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Diagram Sheet Size: Maximum 22 x 17 inches or width required.
- C. Sheet Size: Multiples of 8-1/2 x 11 inches.
- D. Scale and Spacing: To allow for notations and revisions.

**1.05 COORDINATION**

- A. In preparation of schedules, take into account the time allowed or required for the Architect's administrative procedures.

**PART 2 PRODUCTS - NOT USED**

### 3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

### 3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules to define critical portions of the entire schedule.
- E. Include conferences and meetings in schedule.
- F. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- G. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, Products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- H. Indicate delivery dates for owner-furnished products.
- I. Coordinate content with schedule of values specified in Section 01200.
- J. Provide legend for symbols and abbreviations used.
- K. Use the same terminology as that used in the Contract Documents.

### 3.03 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.
- C. Coordinate each element on the schedule with other construction activities.
- D. Show activities in proper sequence.
- E. Include cost bar at top of chart, showing estimated and actual costs of work performed at the date of each application for payment.
- F. Use vertical lines to mark the time scale at not more than one week intervals.

### 3.04 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Provide construction schedule in the form of bar charts:
  - 1. Use the same items of work as shown in the schedule of values.
  - 2. Where related activities must be performed in sequence, show relationship graphically.
  - 3. Incorporate the submittal schedule specified elsewhere.
  - 4. Incorporate the quality control activities schedule specified elsewhere.
  - 5. Show dates of:
    - a. Each activity that influences the construction time.
    - b. Preconstruction meeting.
    - c. Ordering dates for products requiring long lead time.

- d. Completion of demolition.
  - e. Completion of mechanical work.
  - f. Completion of electrical work.
  - g. Instruction of the Owner's personnel in operation and maintenance of equipment and systems.
  - h. Substantial and final completion, with time frames for the Architect's completion procedures.
6. In developing the schedule take into account:
- a. Continued occupancy of areas adjacent to the work area as well as throughout the building.
  - b. Interruption of services to occupied facilities
  - c. Site limitations

### 3.05 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit progress reports required to support recommended changes.

### 3.06 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules and reports to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

### 3.07 REPORTS

- A. Daily Construction Logs: Every day, record the following information concerning events at the site:
  1. Approximate number of persons at the site.
  2. Visitors to the site.
  3. Modifications to the contract received; modifications implemented.
  4. Changes in occupancy.
  5. Delays; reasons for delay.
  6. Emergencies and accidents.
  7. Equipment and system start-ups and tests.
  8. Losses of material and property.
  9. Meetings held and significant decisions made there.
  10. Names of Subcontractors at site.
  11. Orders and requests of representatives of governing authorities.
  12. Unusual events.
  13. Utility service disconnections and connections.

- B. Progress Reports: Prepare a narrative report describing the general state of completion of the work and describing in detail the following:
1. Actual and anticipated delays, their impact on the schedule, and corrective actions taken or proposed.
  2. Actual and potential problems.
  3. Status of change order work.
  4. Effect of delays, problems, and changes on the schedules of Subcontractors.
  5. Outstanding change proposal requests.
  6. Status of corrective work ordered by the Architect

**END OF SECTION**



**SECTION 01400 - QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. References and standards.
- B. Mock-ups.
- C. Control of installation.
- D. Tolerances.
- E. Testing and inspection services.
- F. Manufacturers' field services.

**1.02 RELATED REQUIREMENTS**

- A. Document 00700 - General Conditions: Inspections and approvals required by public authorities.
- B. Section 01300 - Administrative Requirements: Submittal procedures.
- C. Section 01600 - Product Requirements: Requirements for material and product quality.

**1.03 SUBMITTALS**

- A. Testing Agency Qualifications:
  - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
  - 1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of inspector.
    - d. Date and time of sampling or inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of test/inspection.
    - h. Date of test/inspection.
    - i. Results of test/inspection.
    - j. Conformance with Contract Documents.
    - k. When requested by Architect, provide interpretation of results.
- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities

specified for Product Data.

1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- E. **Manufacturer's Instructions:** When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. **Manufacturer's Field Reports:** Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit report within 10 days of observation to Architect for information.
  2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- G. **Erection Drawings:** Submit drawings for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

#### 1.04 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

#### 1.05 TESTING AND INSPECTION AGENCIES

- A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.
- B. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D. **Contractor Employed Agency:**
  1. **Testing agency:** Comply with requirements of ASTM E329, ASTM E 548, ASTM E543,

ASTM C1021, ASTM C1077, and ASTM C1093.

2. Inspection agency: Comply with requirements of ASTM D3740, ASTM E329, and ASTM E548.
3. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
4. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

### 3.02 MOCK-UPS

- A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.
- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

### 3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

### 3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing required.
- B. Testing Agency Duties:
  - 1. Test samples of mixes submitted by Contractor.
  - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 3. Perform specified sampling and testing of products in accordance with specified standards.
  - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  - 5. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
  - 6. Perform additional tests and inspections required by Architect.
  - 7. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Agency may not approve or accept any portion of the Work.
  - 3. Agency may not assume any duties of Contractor.
  - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
  - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  - 3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

### 3.05 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

**3.06 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

**END OF SECTION**

**Schedule of Special Inspections**

Project Name: Bursar- Registrar Office Expansion – UTS Renovations

Project Number: H27-Z052-A

Page: 1 Of: 1

Instructions: The Structural Engineer of Record shall determine the material and/or work on the project requiring Special Inspections. The Special Inspection requirements shall be based on Section 1704 of Chapter 17 of the 2009 International Building Code. If Inspection is by “Other,” the inspecting entity shall be identified.

Materials	Type of Inspection	Specification Reference	Inspection by		
			Architect	Engineer	Other
Concrete Construction	Inspection of reinforcing steel, and placement. (Periodic)	03300			X
	Verifying use of required design mix. (Periodic)	03300			X
	Slump and air content tests, temperature of concrete at time of placement. (Continuous)	03300			X
	Inspection for maintenance of specified curing temperature and techniques. (Periodic)	03300			X
Suspended Ceilings	Review Submittal	09511	X		
	Inspection of installation and anchorage of Suspension System. (Periodic)	09511			X
Mechanical and Electrical Components	Manufacturers certification required on mechanical equipment.	15010		X	
	Inspection of label and anchorage of mechanical equipment.	15010			X
	Inspection of label and anchorage of electrical equipment.	16010			X
	Seismic Isolators, review of submittals.	15073		X	
	Seismic isolators, field inspection of installation.	15073			X

**SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary utilities.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers and enclosures.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

**1.02 SUBMITTALS**

- A. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility connection within 10 days of the date established for commencement of the Work.

**1.03 QUALITY ASSURANCE**

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
  - 1. Building Code requirements.
  - 2. Health and safety regulations.
  - 3. Utility company regulations.
  - 4. Police, Fire Department and Rescue Squad rules.
  - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library, "Temporary Electrical Facilities."
- C. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- D. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

**1.04 PROJECT CONDITIONS**

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility connection. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.

**1.05 MATERIALS**

- A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Lumber and Plywood: Comply with requirements in Division-6 Section "Wood Blocking and Curbing"

- C. Gypsum Wallboard: Provide gypsum wallboard complying with requirements of ASTM C 36 on interior walls of temporary offices.
- D. Paint: Comply with requirements of Division-9 Section "Paints and Coatings."
- E. Water: Provide potable water approved by local health authorities.

#### 1.06 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- C. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- D. Temporary Offices: Locate office within the construction site as directed by Owner.
- E. First Aid Supplies: Comply with governing regulations. All accidents or injuries shall be reported to Owner.
- F. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
- G. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.
- H. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site

#### 1.07 TEMPORARY UTILITIES

- A. Owner will provide the following:
  - 1. Electrical power and metering, consisting of connection to existing facilities.
  - 2. Water supply, consisting of connection to existing facilities.
- B. Existing facilities may be used.

#### 1.08 TEMPORARY SANITARY FACILITIES

- A. Use of existing facilities is not permitted as directed by Owner.

#### 1.09 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.



- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide temporary barrier at open area above existing walls to separate the ceiling plenum of finished space from areas of construction as indicated in the construction documents.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

#### 1.10 INTERIOR ENCLOSURES

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces:
  - 1. STC rating of 35 in accordance with ASTM E90.
  - 2. Maximum flame spread rating of 75 in accordance with ASTM E84.
- C. Paint surfaces exposed to view from Owner-occupied areas.

#### 1.11 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer as requested by the Architect.
- C. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
- D. Store combustible materials in containers in fire-safe locations
- E. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities for fighting fires. Prohibit smoking in the building.
- F. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
- G. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
- H. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, might be contaminated or polluted, or that other undesirable effects might result.
- I. Coordinate with Owner's security program.

#### 1.12 VEHICULAR ACCESS AND PARKING

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Parking will be provided in designated areas. Coordinate parking with owner.
- C. Designated existing on-site roads may be used for construction traffic.

**1.13 WASTE REMOVAL**

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

**1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Restore existing facilities used during construction to original condition.

**END OF SECTION**

**SECTION 01600 - PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 RELATED REQUIREMENTS**

- A. Document 00200 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01100 - Summary: Lists of products to be removed from existing building.
- C. Section 01400 - Quality Requirements: Product quality monitoring.

**1.03 REFERENCE STANDARDS**

- A. NFPA 70 - National Electrical Code; National Fire Protection Association.

**1.04 SUBMITTALS**

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
  - 1. Submit within 15 days after date of Agreement.
  - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

**PART 2 PRODUCTS**

**2.01 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Do not use products having any of the following characteristics:
- C. Provide interchangeable components of the same manufacture for components being replaced.

- D. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
- E. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

## 2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

## 2.03 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

## PART 3 EXECUTION

### 3.01 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Substitutions will not be considered when a product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- D. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Will provide the same warranty for the substitution as for the specified product.
  - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
  - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
3. The Architect will notify Contractor in writing of decision to accept or reject request.

G. Substitution Request Form:

1. **SUBSTITUTIONS WILL BE CONSIDERED ONLY WHEN THE ATTACHED FORM IS COMPLETED AND INCLUDED WITH THE SUBMITTAL WITH ALL BACK-UP DATA.**

### 3.02 OWNER-SUPPLIED PRODUCTS

- A. See Section 01100 - Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
  1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
  2. Arrange and pay for product delivery to site.
  3. On delivery, inspect products jointly with Contractor.
  4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
  5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
  1. Review Owner reviewed shop drawings, product data, and samples.
  2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
  3. Handle, store, install and finish products.
  4. Repair or replace items damaged after receipt.

### 3.03 TRANSPORTATION AND HANDLING

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### 3.04 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.

- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION**

SECTION 01601 - SUPPLEMENT A - SUBSTITUTION REQUEST FORM

TO:

GMK Associates, Inc.  
1201 Main Street, Suite 2100  
Columbia, South Carolina 29201  
fax: 803.255.7243

We hereby submit for your consideration the following product instead of the specified item for the above project:

DRAWING NO. \_\_\_\_\_ DRAWING NAME \_\_\_\_\_

SPEC. SECT.	SPEC NAME	PARAGRAPH	SPECIFIED ITEM
_____	_____	_____	_____

Proposed Substitution: \_\_\_\_\_

Attached complete information on changes to Drawings and/or Specifications, which proposed substitution would require for its proper installation.

Submit with request necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

The undersigned certifies that the function, appearance and quality are of equal performance and assumes liability for equal performance, equal design and compatibility with adjacent materials.

Submitted By:

\_\_\_\_\_  
Signature Title

\_\_\_\_\_  
Firm

\_\_\_\_\_  
Address

\_\_\_\_\_  
Telephone Date

Signature shall be by person having authority to legally bind his firm to the above terms. Failure to provide legally binding signature will result in retraction of approval.

\_\_\_\_\_  
For use by the Architect: For use by the Owner:

- |  |   |                                       |
|--|---|---------------------------------------|
| <input type="checkbox"/> Recommended     | <input type="checkbox"/> Recommended as noted | <input type="checkbox"/> Approved     |
| <input type="checkbox"/> Not Recommended | <input type="checkbox"/> Received too late    | <input type="checkbox"/> Not Approved |

Insufficient data received

Approved as noted

By:

By:

Date:

Date:

---

Fill in Blanks Below:

- A. Does the substitution affect dimensions shown on Drawings: Yes \_\_\_ No \_\_\_ If yes, clearly indicate changes. \_\_\_\_\_
- B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes \_\_\_ No \_\_\_ If no, fully explain: \_\_\_\_\_
- C. What affect does substitution have on other Contracts or other trades?  
\_\_\_\_\_
- D. What affect does substitution have on construction schedule?  
\_\_\_\_\_
- E. Manufacturer's warranties of the proposed and specified items are: \_\_\_ Same \_\_\_ Different (If Different, Explain on Attachment)
- F. Reason for Request: \_\_\_\_\_
- G. Itemized comparison of specified item(s) with the proposed substitution; list significant variations: \_\_\_\_\_  
\_\_\_\_\_
- H. Accurate cost data comparing proposed substitution with product specified:  
\_\_\_\_\_
- I. Designation of maintenance services and sources:  
\_\_\_\_\_

(Attach additional sheets if required.)

**END OF SECTION**



**SECTION 01700 - EXECUTION REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Cutting and patching.
- D. Cleaning and protection.
- E. Starting of systems and equipment.
- F. Closeout procedures, except payment procedures.
- G. General requirements for maintenance service.

**1.02 RELATED REQUIREMENTS**

- A. Section 01100 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01300 - Administrative Requirements: Submittals procedures.
- C. Section 01400 - Quality Requirements: Testing and inspection procedures.
- D. Section 01500 - Temporary Facilities and Controls: Temporary interior partitions.
- E. Section 01780 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
- F. Section 07840 - Firestopping.

**1.03 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of Owner or separate Contractor.
  - 6. Include in request:
    - a. Identification of Project.
    - b. Location and description of affected work.
    - c. Necessity for cutting or alteration.
    - d. Description of proposed work and products to be used.
    - e. Alternatives to cutting and patching.
    - f. Effect on work of Owner or separate Contractor.
    - g. Written permission of affected separate Contractor.
    - h. Date and time work will be executed.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities.

#### 1.04 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
  - 1. Clean interior spaces prior to the start of the finish painting and continue cleaning on an as-needed basis until painting is finished.
  - 2. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.
  - 3. Handle materials in a controlled manner with as little handling as possible; do not drop or throw materials from heights.
- C. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- D. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- E. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

#### 1.05 PRE-CONSTRUCTION

- A. Meet with management staff of the area of construction for required infection control practices in that department and comply with the Owner's policies.

#### 1.06 COORDINATION

- A. See Section 01100 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's

activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. **New Materials:** As specified in product sections; match existing products and work for patching and extending work.
- B. **Type and Quality of Existing Products:** Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. **Product Substitution:** For any proposed change in materials, submit request for substitution described in Section 01600.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. **Prior to Cutting:** Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Building shall be enclosed, ventilated and sealed from the exterior prior to installation of interior finish materials.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

### 3.04 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
  - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01500 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
  - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
  - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
  - 2. Remove items indicated on drawings.
  - 3. Relocate items indicated on drawings.
  - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
  - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
  - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
  - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    - b. See Section 01100 for other limitations on outages and required notifications.
    - c. Provide temporary connections as required to maintain existing systems in service.
  - 4. Verify that abandoned services serve only abandoned facilities.

5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
  1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- H. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
- I. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- J. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
- K. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.
- L. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- M. Refinish existing surfaces as indicated:
- N. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
- O. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- P. Clean existing systems and equipment.
- Q. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- R. Do not begin new construction in alterations areas before demolition is complete.
- S. Comply with all other applicable requirements of this section.

### 3.05 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
  1. Complete the work.
  2. Fit products together to integrate with other work.
  3. Provide openings for penetration of mechanical, electrical, and other services.
  4. Match work that has been cut to adjacent work.
  5. Repair areas adjacent to cuts to required condition.
  6. Repair new work damaged by subsequent work.

7. Remove samples of installed work for testing when requested.
  8. Remove and replace defective and non-conforming work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.
- J. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  2. Match color, texture, and appearance.
  3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- K. Meet with management staff of the area of construction for required infection control practices in that department and comply with the Owner's policies.

### 3.06 PROGRESS CLEANING

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.
- B. Contractor shall assess the amount of air borne dust and debris for construction and apprise the Owner of the need to change the air filtration filters in the air handling system at an increased frequency.
- C. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- D. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- E. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- F. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.
- G. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.

### 3.07 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

### 3.08 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### 3.09 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 15950.

### 3.10 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Materials:
  - 1. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
  - 2. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
  - 3. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
  - 4. Sweeping compounds used in cleaning operations shall leave no residue on concrete floor surfaces that may effect installation of finish flooring materials.
- C. Execute final cleaning prior to final project assessment.
  - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

- D. Use cleaning materials that are nonhazardous.
- E. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- F. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- G. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior surfaces.
- H. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- I. Dust cabinetwork and remove markings.
- J. Prior to final completion, or Owner occupancy, the Contractor shall conduct an inspection of sight-exposed interior surfaces, and all work areas, to verify that the entire Work is clean
- K. Tunnels and closed off spaces shall be cleaned of packing boxes, wood frame members and other waste materials used in the construction.
- L. The entire system of piping and equipment shall be cleaned internally. The Contractor installing those items shall open all dirt pockets and strainers, completely blowing down as required and clean strainer screens of all accumulated debris.
- M. Tanks, fixtures and pumps shall be drained and proved free of sludge and accumulated matter.
- N. Temporary labels, stickers, etc., shall be removed from fixtures and equipment. (Do not remove permanent name plates, equipment model numbers, ratings, etc.)
- O. Heating and air conditioning equipment, tanks, pumps and traps shall be thoroughly cleaned and new filters or filter media installed.
- P. Before being placed in service, domestic water distribution systems, including those for cold water, drinking water and the hot water system shall be chlorinated. The method to be used shall be at the option of the Contractor installing the systems, and one of the methods set forth in the AWWA Standard specifications, latest edition, including all amendments thereto. The treatment shall consist of a solution of not less than 50 parts per million of available chlorine. The chlorinating material shall be either liquid chlorine or sodium hypochloride. After sterilization the system shall be flushed with clear water until the chlorine residual is not greater than 0.2 per million.
- Q. Clean filters of operating equipment.
- R. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### 3.11 CLOSEOUT PROCEDURES

- A. Contract requirements shall be met when construction activities have successfully produced, in this order, these three terminal activities:
  - 1. Substantial Completion.
  - 2. Final Completion.
  - 3. Final Payment.
- B. Make submittals that are required by governing or other authorities.



1. Provide copies to Architect and Owner.

**C. Substantial Completion:**

1. The date of Substantial Completion of the Work or designated portion thereof is the date certified by the Architect when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner may occupy the Work or designated portion thereof for the use for which it is intended.
2. When the Contractor considers the Work is substantially complete, he shall submit to the Architect:
  - a. A written notice that the Work, or designated portion thereof, is substantially complete.
  - b. A list of items to be completed or corrected, (herein after referred to as Punch List ).
  - c. Request Substantial Completion Observation at a mutually agreeable date.
3. Within a reasonable time after receipt of such notice, the Architect, the Contractor, and at his option, the Owner, will make an observation to determine the status of completion.
4. Should the Architect determine that the Work is not substantially complete:
  - a. The Architect will promptly notify the Contractor in writing, giving the reasons thereof.
  - b. The Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Architect.
  - c. The Architect will re-observe the Work and the cost of the Architect's time and reimbursable expenses will be charged to the Contractor.
5. When the Architect concurs that the Work is substantially complete, he will:
  - a. Prepare a Certificate of Substantial Completion on AIA Form G704, accompanied by the Contractor's Punch List of items to be completed or corrected, as verified and amended by the Architect. (Note: Contract responsibilities are not altered by inclusion or omission of required work from the Punch List.)
  - b. Submit the Certificate to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.
6. The Contractor shall complete or correct all items identified on the Punch List and required by the Contract requirements within time limits established by the Certificate.
7. Owner will occupy portions of the building as specified in Section 01100.
8. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

**D. Final Completion:**

1. To attain final completion the Contractor shall complete activities pertaining to Substantial Completion, and complete work on punch list items. Only then shall he issue written request to the Architect for Final Observation.
2. When the Contractor considers the Work is complete, he shall submit written certification that:
  - a. Contract Documents have been reviewed.
  - b. Work has been inspected for compliance with Contract Documents.
  - c. Work has been completed in accordance with Contract Documents.
  - d. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
  - e. Work is completed and ready for final observation.
3. The Architect, the Contractor and the Owner will make an observation to verify the status of completion with reasonable promptness after receipt of such certification.
4. Should the Architect consider that the Work is incomplete or defective:

- a. The Architect will promptly notify the Contractor in writing, listing the incomplete or defective work.
  - b. The Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Architect that the Work is complete.
  - c. The Architect will reinspect the Work.
  5. When the Architect finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.
- E. The Contractor's Closeout Submittals to the Architect:
1. Evidence of compliance with requirements of governing authorities:
    - a. Certificate of Occupancy
    - b. Certificates of Inspection
    - c. Mechanical
    - d. Electrical
  2. Project Record Documents: To requirements of Section 01780.
  3. Operating and Maintenance Data, Instructions to the Owner's Personnel: To requirements of Section 01780.
  4. Warranties and Bonds: To requirements of individual sections.
  5. Spare Parts and Maintenance Materials: To requirements of individual sections.
  6. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.
- F. Final Adjustment of Accounts:
1. Submit a final statement of accounting to the Architect.
  2. Statement shall reflect all adjustments to the Contract Sum:
    - a. The original Contract Sum.
    - b. Additions and deductions resulting from:
      - 1) Previous Change Orders.
      - 2) Deductions for uncorrected Work.
      - 3) Deductions for reinspection payments.
      - 4) Other adjustments.
    - c. Total contract sum, as adjusted.
    - d. Previous payments
    - e. Sum remaining due.
  3. Architect will prepare a final Change Order, reflecting adjustments to the Contract Sum which were not previously made by Change Orders.
- G. Final Application for Payment:
1. The Contractor shall submit the final Application and Certificate for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

### 3.12 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace

parts whenever required. Use parts produced by the manufacturer of the original component.

- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

**END OF SECTION**

**SECTION 01780 - CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 01300 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01700 - Execution Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect prior to claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
  - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 15 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
  - 4. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.
  - 5. Refer to individual Sections of Divisions-2 through -16 for specific content requirements, and particular requirements for submittal of special warranties.

6. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
7. Bind warranties and bonds in two (or more) duplicate heavy-duty, commercial quality, durable 3-hole punch tab binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
8. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
9. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
10. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  1. Drawings.
  2. Specifications.
  3. Addenda.
  4. Change Orders and other modifications to the Contract.
  5. Reviewed shop drawings, product data, and samples.
  6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  1. Manufacturer's name and product model and number.
  2. Product substitutions or alternates utilized.
  3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  2. Field changes of dimension and detail.
  3. Details not on original Contract drawings.

### 3.02 OPERATION AND MAINTENANCE DATA

- A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors

and suppliers, including local source of supplies and replacement parts.

- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- E. Manuals:
  - 1. Purpose:
    - a. Operation and maintenance manuals will be used for training of, and use by, Owner's personnel in operation and maintenance of mechanical and electrical systems and equipment. A separate manual or chapter within a manual shall be prepared for each class of equipment or system.
    - b. For additional requirements refer to various specification sections.
- F. Instructions of Owner's Personnel
  - 1. Fully instruct Owner's designated operating and maintenance personnel in operating, adjustments and maintenance of all mechanical and electrical systems and equipment as required by respective and pertinent sections, after all final inspection, tests and repairs have been completed.
  - 2. Operating and maintenance manuals shall constitute the basis of instructions. Contents of manual shall be reviewed in full detail, explaining all aspects of operations and maintenance.
  - 3. Prepare and include additional data when need for such data becomes apparent during instruction and training and sessions.
  - 4. Training sessions shall be jointly arranged with Owner during Contractor's normal week and daily hours. The Owner shall have the responsibility of scheduling its shift work personnel accordingly.
  - 5. Owner and Contractor shall coordinate and cooperate to keep training sessions to a reasonable minimum.

### 3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
  - 1. Product data, with catalog number, size, composition, and color and texture designations.
  - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

**3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.
  - 2. Identify function, normal operating characteristics, and limiting conditions.
  - 3. Include performance curves, with engineering data and tests.
  - 4. Complete nomenclature and model number of replaceable parts.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- C. Include color coded wiring diagrams as installed.
- D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Include test and balancing reports.
- O. Safety instructions.
- P. Additional Requirements: As specified in individual product specification sections.

**3.05 OPERATION AND MAINTENANCE MANUALS**

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in the form of an instructional manual.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder on the front and the spine with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of

contents.

- E. Provide heavy duty paper tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
  - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
  - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
    - a. Significant design criteria.
    - b. List of equipment.
    - c. Parts list for each component.
    - d. Operating instructions.
    - e. Maintenance instructions for equipment and systems.
    - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
  - 3. Part 3: Project documents and certificates, including the following:
    - a. Shop drawings and product data.
    - b. Air and water balance reports.
    - c. Certificates.
- J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- K. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

### 3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder on the front and the spine with typed or printed title



WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- I. See all provisions under "3.5 WARRANTY:" in General Conditions.
- J. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- K. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, guarantee the corrected work with a new warranty equal to the original.
- L. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- M. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- N. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- O. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

**END OF SECTION**

**SECTION 01820 - DEMONSTRATION AND TRAINING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
  - 1. All software-operated systems.
  - 2. HVAC systems and equipment.
  - 3. Plumbing equipment.
  - 4. Electrical systems and equipment.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
  - 1. Finishes, including flooring, wall finishes, ceiling finishes.
  - 2. Fixtures and fittings.
  - 3. Items specified in individual product Sections.

**1.02 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
  - 1. Submit to Architect for transmittal to Owner.
  - 2. Submit not less than four weeks prior to start of training.
  - 3. Revise and resubmit until acceptable.
  - 4. Provide an overall schedule showing all training sessions.
  - 5. Include at least the following for each training session:
    - a. Identification, date, time, and duration.
    - b. Description of products and/or systems to be covered.
    - c. Name of firm and person conducting training; include qualifications.
    - d. Intended audience, such as job description.
    - e. Objectives of training and suggested methods of ensuring adequate training.
    - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
    - g. Media to be used, such as slides, hand-outs, etc.
    - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
  - 1. Include applicable portion of O&M manuals.
  - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
  - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:
  - 1. Identification of each training session, date, time, and duration.
  - 2. Sign-in sheet showing names and job titles of attendees.
  - 3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

**1.03 QUALITY ASSURANCE**

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
  - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
  - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 DEMONSTRATION - GENERAL**

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
  - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
  - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
  - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

**3.02 TRAINING - GENERAL**

- A. Conduct training on-site unless otherwise indicated.
- B. Owner will provide classroom and seating at no cost to Contractor.
- C. Provide training in minimum two hour segments.
- D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
  - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
  - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
  - 3. Typical uses of the O&M manuals.
- F. Product- and System-Specific Training:
  - 1. Review the applicable O&M manuals.
  - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
  - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including

- preventative maintenance.
  - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
  - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
  - 6. Discuss common troubleshooting problems and solutions.
  - 7. Discuss any peculiarities of equipment installation or operation.
  - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
  - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
  - 10. Review spare parts and tools required to be furnished by Contractor.
  - 11. Review spare parts suppliers and sources and procurement procedures.
- G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

**END OF SECTION**

# D I V I S I O N 2

Applicable Portions Of The Conditions  
Of The Contract And Division 1 General  
Requirements Apply To The Work Of  
This Division.

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**SECTION 02223 - MINOR DEMOLITION FOR REMODELING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Removal of designated building equipment and fixtures.
- B. Removal of designated construction.
- C. Disposal of materials.

**1.02 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of capped utilities.
  - 1. Indicate unanticipated structural, electrical, or mechanical conditions.

**1.03 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.
- B. Obtain required permits from authorities.
- C. Do not close or obstruct egress from any building exit.
- D. Do not disable or disrupt building fire or life safety systems without 7 days' prior written notice to Owner.
- E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.

**1.04 SCHEDULING**

- A. Schedule work under the provisions of Section 01325.
- B. Arrange schedule so as not to interfere with the Owner's operations.
- C. Describe demolition removal procedures and schedule.

**1.05 PROJECT CONDITIONS**

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.
- C. Occupancy:
  - 1. The Owner will continue to occupy portions of the existing building.
  - 2. Adjacent spaces will not be vacated during demolition activities.
- D. Existing Conditions:
  - 1. After the project is begun, the Contractor is responsible for the condition of structures to be demolished. The Owner does not warrant that the condition of structures to be demolished will not have changed since the time of inspection for bidding purposes.
- E. Unforeseen Conditions: Should unforeseen conditions be encountered that affect design or function of project, investigate fully and submit an accurate, detailed, written report to the

architect. While awaiting the architect's response, reschedule operations if necessary to avoid delay of overall project.

**PART 2 PRODUCTS - NOT USED.**

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Survey existing conditions and correlate with drawings and specifications to determine extent of demolition required.
- B. Insofar as is practicable, arrange operations to reveal unknown or concealed structural conditions for examination and verification before removal or demolition.
- C. Perform continuing surveys as the work progresses to detect hazards resulting from demolition or construction activities.
- D. Verify actual conditions to determine in advance whether removal or demolition of any element will result in structural deficiency, overloading, failure, or unplanned collapse.

**3.02 PREPARATION**

- A. Provide, erect, and maintain temporary barriers at locations indicated.
- B. Provide for the protection of persons passing around or through the area of demolition.
- C. Erect and maintain weatherproof closures for exterior openings.
- D. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued building occupancy. Insulate to provide noise protection to occupied areas.
- E. Construct temporary partitions in a manner at least equal to the following (or superior, if necessary to provide effective protection specified):
  - 1. Gypsum-board surfaces adjacent to occupied areas, with joints taped.
- F. Protect existing materials that are not to be demolished.
- G. Prevent movement of structure; provide bracing and shoring.
- H. Notify affected utility companies before starting work and comply with their requirements.
- I. Mark location and termination of utilities.
- J. Provide appropriate temporary signage including signage for exit or building egress.
- K. Damages: Without cost to the Owner and without delay, repair any damages caused to facilities to remain.

**3.03 POLLUTION CONTROLS**

- A. Control as much as practicable the spread of dust and dirt.
- B. Observe environmental protection regulations.
- C. Do not allow water usage that results in freezing or flooding.
- D. Do not allow adjacent improvements to remain to become soiled by demolition operations.

**3.04 DEMOLITION**

- A. Disconnect, remove, and identify designated utilities within demolition areas.
- B. Demolish in an orderly and careful manner. Protect existing supporting structural members.
- C. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- D. Remove materials as demolition progresses. Upon completion of demolition, leave areas in clean condition.
- E. Remove temporary facilities.
- F. Remove: Unless items are otherwise indicated to be reinstalled or salvaged, remove and scrap.
- G. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare for service; reinstall in the same location (or in the location indicated).
- H. Remove and Install New: Remove and dispose of items indicated and install new items in the same location (or in the location indicated).
- I. Remove and Salvage: Items indicated to be salvaged will remain the Owner's property. Carefully remove and clean items indicated to be salvaged; pack or crate to protect against damage; identify contents of containers; deliver to the locations indicated.
- J. Remove and Scrap: Remove and dispose of items indicated.
  - 1. All demolished or removed items and materials shall be considered scrap except for those indicated to remain, those indicated to be reinstalled, and those indicated to be salvaged.
  - 2. Items of value to the contractor:
    - a. Do not store removed items on site.
- K. Existing to Remain: Construction or items indicated to remain shall be protected against damage during demolition operations. Where practicable, and with the Architect's permission, the Contractor may elect to remove items to a suitable storage location during demolition and then properly clean and reinstall the items.
- L. Detailed requirements for cutting are specified under cutting and patching in Division 1.
- M. Perform work in a systematic manner.
- N. Demolish and remove existing construction only to the extent required by new construction and as indicated in the contract documents.
- O. Perform selective demolition using methods which are least likely to damage work to remain and which will provide proper surfaces for patching.
- P. Remove debris daily.
- Q. Masonry: Detach masonry to be demolished from adjoining construction to remain with power-driven masonry saws or hand tools.
- R. Use any methods permitted by governing regulations and the requirements of the contract documents.

### 3.05 REPAIRS AND PATCHING

- A. Perform repairs in accordance with patching requirements specified in Division 1 under cutting and patching.



- A. Remove tools and equipment. Dispose of scrap.
- B. Broom clean interior areas.
- C. Clean soil, smudges, and dust from surfaces to remain.
- D. Leave exterior areas free of debris.
- E. Return structures and surfaces to remain to condition existing prior to commencement of demolition.

**END OF SECTION**

# D I V I S I O N 3

Applicable Portions Of The Conditions  
Of The Contract And Division 1 General  
Requirements Apply To The Work Of  
This Division.

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**SECTION 03300 - CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

**1.2 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Shop Drawings: For steel reinforcement.
- D. Material test reports and certificates.

**1.3 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- C. Preinstallation Conference: Conduct conference at Project site.

**PART 2 - PRODUCTS**

**2.1 FORM-FACING MATERIALS**

- A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

**2.2 STEEL REINFORCEMENT**

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 60 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

### 2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I. Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class C or F.
    - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, graded, 3/4-inch nominal maximum coarse-aggregate size.
  - 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

### 2.4 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Water: Potable.
- C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
- D. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

### 2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

### 2.6 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
- C. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi. at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50
3. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

## 2.7 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

### 3.2 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

### 3.3 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch . Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

### 3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

### 3.5 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
  - 1. Apply float finish to surfaces to receive trowel finish.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
  - 2. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 3/16 inch .
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.
  - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

### 3.6 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

**3.7 CONCRETE SURFACE REPAIRS**

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

**3.8 FIELD QUALITY CONTROL**

- A. Testing and Inspecting: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
  - 1. Testing Services: Tests shall be performed according to ACI 301.

**END OF SECTION 03300**

# D I V I S I O N 6

Applicable Portions Of The Conditions  
Of The Contract And Division 1 General  
Requirements Apply To The Work Of  
This Division.

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**SECTION 06114 - WOOD BLOCKING AND CURBING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, and wood trim.

**1.02 QUALITY ASSURANCE**

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
  - 1. Acceptable Lumber Inspection Agencies: Any agency with rules approved by American Lumber Standards Committee.
  - 2. Lumber of other species or grades, or graded by other agencies, is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
- B. Plywood: Comply with PS 1.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Lumber fabricated from old growth timber is not permitted.

**2.02 DIMENSION LUMBER**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Blocking, Furring, and Nailers:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

**2.03 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Fasteners: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and treated wood locations, unfinished steel elsewhere.
  - 2. Anchors: Bolt or ballistic fastener for anchorages to steel.

**END OF SECTION**

**SECTION 06410 - CUSTOM CABINETS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Countertops.
- C. Cabinet hardware.
- D. Factory finishing.

1.02 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.
- B. AWI 400 - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute.
- C. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association (ANSI/BHMA A156.9).
- D. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association.
- E. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).

1.03 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes. Show field measurements.
- C. Product Data: Provide data for hardware accessories. Maintenance data. Operation Data.
- D. Plastic Laminate:
  - 1. Product data.
  - 2. For initial selection, submit manufacturers standard full range of colors on a bead chain.
  - 3. Samples for verification: 8- by 10-inch piece of each type, pattern, and color.
  - 4. Maintenance data.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Premium quality with modifications as specified.
- B. Perform cabinet construction in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Premium quality with modifications as specified.
- C. Where contract documents indicate requirements which are less restrictive than the woodworking standard, comply with the minimum requirements of the woodworking standard.

- D. All work of this section shall be fabricated by a single firm.
- E. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.
- B. Store materials for interior woodwork indoors in air conditioned spaces maintained within design temperature and humidity range.
- C. Deliver inserts and anchors required to be built into concrete masonry before start of construction of these substrates.

#### 1.06 FIELD CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

#### 1.07 PROJECT CONDITIONS

- A. Maintain final design temperature and humidity in areas where woodwork is installed.
- B. Fit woodwork to actual construction. Take field measurements before fabricating woodwork.
- C. Coordinate installation of woodwork with other work to avoid damage.
- D. Coordination Data:
  - 1. Furnish locations and types of all blocking and other anchors to be built into substrates to installers of such work.
- E. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

#### 1.08 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

### PART 2 PRODUCTS

#### 2.01 CABINETS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI Architectural Woodwork Standards for Premium Grade.

#### 2.02 WOOD MATERIALS

- A. Softwood Lumber: NIST PS20; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade I/ Premium; average moisture content of 4-9 percent.
  - 1. Cabinet Frame: Species Southern Yellow Pine.
    - a. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
    - b. Sizes: Nominal sizes as indicated on drawings or as required for proper support of unit, S4S.
    - c. Moisture Content: S-dry or MC19.
    - d. Miscellaneous Blocking, Furring, and Nailers:

- 1) Lumber: S4S, No. 2 or Standard Grade.
- 2) Boards: Standard or No. 3.
- e. Pressure Treatment of Lumber Above Grade: AWWPA Treatment C2 using waterborne preservative to 0.25 lb/cu ft retention.
  - 1) Kiln dry after treatment to maximum moisture content of 19 percent.
  - 2) Treat wood in contact with masonry or concrete.
- B. Provide lumber dressed on all exposed faces, unless otherwise indicated.
- C. Do not use twisted, warped, bowed, or otherwise defective lumber.
- D. Sizes indicated are nominal, unless otherwise indicated.

#### 2.03 PANEL MATERIALS

- A. Softwood Plywood: HPVA HP-1; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, core materials of lumber, type of glue recommended for application. Exterior grade veneer core plywood and exterior glue when used in counters with sinks:
  1. Door and Drawer Fronts: Species Southern Yellow Pine.
  2. Countertops: Species Southern Yellow Pine.
- B. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with moisture resistant adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.

#### 2.04 LAMINATE MATERIALS

- A. Manufacturers:
  1. Formica Corporation: [www.formica.com](http://www.formica.com).
  2. Panolam Industries International, Inc\Nevamar: [www.nevamar.com](http://www.nevamar.com).
  3. Wilsonart International, Inc: [www.wilsonart.com](http://www.wilsonart.com).
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications and as follows:
  1. All exposed surfaces, including all surfaces of open front cabinets and glass door cabinets shall be finished with "General Purpose GP-50" plastic laminate, except postformed surfaces which shall be finished with type PF-42.
  2. All exposed and semi-exposed surfaces (backs) of doors and drawer fronts, shall be finished with "General Purpose GP-50" plastic laminate.
  3. All edges shall be finished with 3 mm pvc edge treatment, hot glue applied.

#### 2.05 COUNTERTOPS

- A. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
  1. Flat Sheet Thickness: 3/4 inch, minimum.
  2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISSFA-2 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
    - a. Surface Burning Characteristics: Flame spread 25, maximum; smoke developed 450, maximum; when tested in accordance with ASTM E84.

- b. Finish on Exposed Surfaces: Semi-gloss, gloss rating of 25 to 50.
  - c. Color and Pattern: As selected by Architect from manufacturer's full line.
  - d. Manufacturers:
    - 1) Dupont: [www.corian.com](http://www.corian.com).
    - 2) Formica Corporation: [www.formica.com](http://www.formica.com).
    - 3) Wilsonart International, Inc: [www.wilsonart.com](http://www.wilsonart.com).
  3. Other Components Thickness: 1/2 inch, minimum.
  4. Exposed Edge Treatment: Built up to minimum 1-1/2 inch thick; square edge.
  5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
- B. Material: Homogeneous filled acrylic; not coated, laminated or of composite construction; meeting ANSI Z124.3 & .6, Type Six, and Fed. Spec. WW-P-541E/GEN.1. Material shall have minimum physical and performance properties specified in the following Section U.2. Superficial damage to a depth of 0.010" (.25 mm) shall be repairable by sanding and polishing.

## 2.06 ACCESSORIES

- A. Adhesive: Solvent-based contact type, as recommended by manufacturer of plastic laminate for applicable substrates and laminate(s).
- B. Fasteners: Size and type to suit application.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel, or chrome-plated finish in exposed locations.
- D. Concealed Joint Fasteners: Threaded steel.
- E. Screws: Select material, type, size and finish required for each use. Comply with FS FF-S-111 for applicable requirements.
  1. For metal framing supports, provide screws as recommended by metal framing manufacturer.
- F. Anchors: Select material, type, size and finish required by each substrate for secure anchorage. Provide non-ferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion-resistance. Provide toothed steel for lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.
- G. Cable Grommets: plastic material for cut-outs.
  1. Doug Mockett SG Series CP-2, color as selected by architect.
  2. Hafele #429.98.327
  3. Outwater Plastics #33BK.

## 2.07 HARDWARE

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets in accordance with the following and as detailed. See Division 8 section "Finish Hardware" for additional requirements.
- B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
  1. Type 255-256 by Knape and Vogt Manufacturing Company; Type 798-799 by Stanley Hardware; type 12-21 by Grant Hardware Co., or approved equal.

2. Mortise mount in cabinet end panels; one pair per shelf end.
3. All cabinet shelves to be adjustable.
- C. Drawer and Door Pulls: "U" shaped wire pull, steel with satin finish, 4 inch centers.
  1. Drawer pulls shall be mounted horizontally, all cabinet doors shall be vertical.
- D. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with satin finish.
  1. Heavy duty cylinder type equivalent to Yale #F6700 Series, unless otherwise indicated.
  2. Keys minimum 3/32" thick stamped brass.
  3. Required: As indicated on Drawings.
  4. All locks shall be keyed alike within each room and master-keyed.
- E. Drawer Slides: Galvanized steel construction, ball bearings separating tracks, full extension type.
  1. Type: Extension types as scheduled.
  2. Static Load Capacity: Commercial grade.
  3. Mounting: Side mounted.
  4. Stops: Integral type.
  5. Features: Provide self closing/stay closed type.
  6. Products:
    - a. Accuride International, Inc: [www accuride.com](http://www accuride.com).
    - b. Grass America Inc: [www.grassusa.com](http://www.grassusa.com).
    - c. Hettich America, LP: [www.hettichamerica.com](http://www.hettichamerica.com).
    - d. Knappe & Vogt Manufacturing Company: [www.knappeandvogt.com](http://www.knappeandvogt.com).
  7. Provide heavy duty, self closing drawer slides capable of supporting 150 pound load (20" wide drawers) with nylon bearings and ball bearing rollers, steel inner and outer races and epoxy paint finish.
  8. Acceptable Products: No. 1485 Drawer Slides by Knappe & Vogt Mfg. Co. or equivalent products by Grant Hardware Co. or Accuride.
- F. Hinges: Pivot (knife) type, steel with satin finish.
  1. Blum 170 Series "Modul" 91A6550 with 170 degrees swing.
  2. Elongated screw holes on all leaves for vertical and horizontal adjustment.
- G. Hinge schedule for door up to 24" wide.
  1. Door height (minimum requirements)
    - a. 2 hinges - up to 3'-0"
    - b. 3 hinges - up to 5'-0"
    - c. 4 hinges - up to 7'-0"
  2. Door weight
    - a. 2 hinges - weighing to 20 lbs.
    - b. 3 hinges - 20 lbs. To 40 lbs.
    - c. 4 hinges - 40 lbs. To 60 lbs.

## 2.08 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- C. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with

manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

- D. Apply wood laminate by grain matching adjacent sheets to book matching.
- E. Mechanically fasten back splash to countertops with steel brackets at 16 inches on center.
- F. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

## 2.09 SHOP FINISHING

- A. Fabricate woodwork to dimensions, profiles, and details indicated with openings and mortises precut, where possible, to receive hardware and other items and work.
  - 1. Ease edges to a 1/16" radius, for corners of cabinets and edges of solid wood (lumber) members less than 1" in nominal thickness, 1/8" radius for edges of rails and similar members over 1" in nominal thickness.
- B. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- C. Pre-Cut Openings: Fabricate architectural woodwork with pre-cut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams, obtained from other Divisions providing related items, for proper size and shape. Smooth edges of cutoffs and, where located in countertops and similar exposures seal edges of cutouts with a water-resistant coating.
- D. Finish work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 5 - Finishing for Grade specified and as follows:

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

### 3.02 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.
- B. Pre-Installation Meeting: Meet at project site prior to delivery of architectural woodwork and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Include in meeting the Contractor; Architect and other Owner Representatives; Installers of architectural woodwork, wet work such as plastering, other finishes, painting, mechanical work and electrical work; and firms or persons responsible for continued operation (whether temporary or permanent) of HVAC system as required to maintain temperature and humidity conditions. Proceed with woodwork installation only when everyone concerned agrees that required ambient conditions can be maintained.

### 3.03 INSTALLATION

- A. Set and secure casework in place; rigid, plumb, and level. Shim as required using concealed

shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including tops); and with no variations in flushness of adjoining surfaces.

- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinets and counter bases to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- G. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.
- H. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
- I. Tops: Anchor securely to base units and other support systems as indicated.
- J. Under counter Lights: Installed by Division 16, which shall also provide wiring to and between lights.
- K. Complete the finishing work specified as work of this section, to whatever extent not completed at shop or prior to installation of woodwork.

#### 3.04 ADJUSTING

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.
- C. Clean, lubricate and adjust hardware.
- D. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

#### 3.05 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures. Touch-up shop-applied finishes to restore damaged or soiled areas.

**END OF SECTION**



# D I V I S I O N 7

Applicable Portions Of The Conditions  
Of The Contract And Division 1 General  
Requirements Apply To The Work Of  
This Division.

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**SECTION 07900 - JOINT SEALERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sealants and joint backing.
- B. The sealing of joints indicated on schedule at the end of this section.
- C. The sealing of joints in interior wet areas, including:
  - 1. Toilet rooms.
- D. The sealing of concealed joints in sound-retardant assemblies, including:
  - 1. Around all outlet boxes, thru the wall penetrations, between top and bottom stud runners and structure and where indicated on the drawings to reduce transmission of airborne sound.
- E. The sealing of other joints indicated on drawings.
- F. Joints of a nature similar to that of joints indicated on the schedule shall be sealed with same sealer, whether indicated on drawings to be sealed or not.

**1.02 REFERENCE STANDARDS**

- A. ASTM C834 - Standard Specification for Latex Sealants.
- B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- E. ASTM D1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell).

**1.03 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples: Submit two samples, illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.
- E. Field Installation Test Reports.
- F. Certificates: For each sealer, provide manufacturer's certificate stating that the product complies with the specifications and is appropriate for the use it is being put to.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience.

#### 1.05 MOCK-UP

- A. Provide mock-up of sealant joints in conjunction with window, wall, and adjacent materials under provisions of Section 01400.
- B. Construct mock-up with specified sealant types and with other components noted.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original containers or bundles with labels showing manufacturer, product name or designation, color, shelf life, and installation instructions.

#### 1.07 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- B. Environmental Limitations: Do not install sealers if any of the following conditions exist:
  - 1. Air or substrate temperature exceeds the range recommended by sealer manufacturer or is below 40 degrees F (4.4 degrees C).
  - 2. Substrate is wet, damp, or covered with snow, ice, or frost.
- C. Dimensional Limitations: Do not install sealers if joint dimensions are less than or greater than that recommended by sealer manufacturer; notify the Architect and get sealer manufacturer's recommendations for alternative procedures.

#### 1.08 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

### PART 2 PRODUCTS

#### 2.01 MATERIALS - GENERAL

- A. General: Provide only products which are recommended and approved by their manufacturer for the specific use to which they are put and which comply with all requirements of the contract documents.
  - 1. For each generic product, use only materials from one manufacturer.
  - 2. Provide only materials which are compatible with each other and with joint substrates.
  - 3. Colors of exposed sealers: To match Architect's samples.
- B. Products: The design is based on the product(s) listed for each generic type. Comparable products of the manufacturers listed will be considered for substitution.

#### 2.02 MANUFACTURERS

- A. Silicone Sealants: not permitted
  - 1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).

3. BASF Construction Chemicals-Building Systems: [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com).
  4. Substitutions: See Section 01600 - Product Requirements.
- B. Polyurethane Sealants:
1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  3. BASF Construction Chemicals-Building Systems: [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com).
  4. Substitutions: See Section 01600 - Product Requirements.
- C. Butyl Sealants:
1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  3. Substitutions: See Section 01600 - Product Requirements.
- D. Acrylic Emulsion Latex Sealants:
1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  3. BASF Construction Chemicals-Building Systems: [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com).

### 2.03 SEALANTS

- A. Type 1 - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
1. Color: two.
  2. Product: Dymeric 511 manufactured by Tremco, Inc.
- B. Type 5 - Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
1. Product: Tremco Butyl Sealant manufactured by Tremco, Inc.
- C. Type 6 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
1. Color: Colors as selected.
  2. Product: Tremco Acrylic Latex 834 manufactured by Tremco, Inc.
- D. Type 7 - Bathtub/Tile Sealant: White silicone; ASTM C920, Uses I, M and A; single component, mildew resistant.
1. Product: Tremco 200 manufactured by Tremco, Inc.
- E. Type 8 - Acoustical Sealant for Concealed Locations:
1. Product: Tremco Acoustical Sealant manufactured by Tremco, Inc.

### 2.04 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; closed cell polyethylene; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## PART 3 EXECUTION

### JOINT SEALERS

**07900-3**

### 3.01 EXAMINATION

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.
- C. Do not begin joint sealer work until unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.
  - 1. Masking Tape: Use masking tape to keep primers and sealers off of adjacent surfaces which would be damaged by contact or by cleanup. Remove tape as soon as practical.
- E. Install fillers where needed to provide proper joint depth or support for sealant backers.

### 3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Backers:
  - 1. Install backers at depth required to result in shape and depth of installed sealant which allows the most joint movement without failure.
    - a. Make backers continuous, without gaps, tears, or punctures.
    - b. Do not stretch or twist backers.
  - 2. If backers become wet or damp before installation of sealant, dry out thoroughly before proceeding.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

### 3.04 CLEANING

- A. Clean adjacent soiled surfaces.

### 3.05 PROTECTION

- A. Protect sealants until cured.

### 3.06 SCHEDULE

- A. Exterior Joints for Which No Other Sealant Type is Indicated: Type 1; colors as selected.
- B. Control, Expansion, and Soft Joints in Masonry, and Between Masonry and Adjacent Work: Type 1.

- C. Lap Joints in Exterior Sheet Metal Work: Type 5.
- D. Under Exterior Door Thresholds: Type 1.
- E. Interior Joints for Which No Other Sealant is Indicated: Type 6; colors as shown on the drawings.
- F. Joints Between Plumbing Fixtures and Walls and Floors: Type 7.
- G. In STC-Rated Walls, Between Metal Stud Track/Runner and Adjacent Construction and Between Outlet Boxes and Gypsum Board: Type 8.

**END OF SECTION**

# D I V I S I O N 8

Applicable Portions Of The Conditions  
Of The Contract And Division 1 General  
Requirements Apply To The Work Of  
This Division.

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**SECTION 08115 - STEEL DOOR FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated steel frames for non-steel doors.

**1.02 REFERENCE STANDARDS**

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council.
- B. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames.
- E. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute (ANSI/DHI A115 Series).
- F. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers.
- G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
- H. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
- I. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc..

**1.03 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

**1.04 QUALITY ASSURANCE**

- A. Conform to requirements of NAAMM Hollow Metal Manual and ANSI A117.1.
- B. Provide custom hollow metal frames manufactured by a single firm specializing in the production of this type of work, unless otherwise acceptable to the Architect.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

**1.05 REGULATORY REQUIREMENTS**



- A. Fire Rated Frame Construction: Conform to NFPA 252.
  - 1. Listed and classified by UL as suitable for the purpose specified and indicated.
- B. Installed Frame Assembly: Conform to NFPA 80 for fire rated class same as fire door.
  - 1. Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 Standard for Fire Doors and Windows ' and have been tested, listed, and labeled in accordance with ASTM E 152 Standard Methods of fire Tests of Door Assemblies by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.
- C. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage.
- D. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the Architect; otherwise remove and replace damaged items as directed.
- E. Store doors and frames at the building site under cover. Place units on minimum 4" high wood blocking. Avoid the use of non-vented plastic or canvas shelters which could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide 1/4" spaces between stacked doors to promote air circulation.
- F. Accept frames on site in manufacturer's packaging. Inspect for damage.
- G. Break seal on-site to permit ventilation.

#### PROJECT CONDITIONS

- 2.01 Coordinate the work with frame opening construction, door and hardware installation.
- 2.02 Sequence installation to ensure wire connections are achieved in an orderly and expeditious manner.

#### PART 2 PRODUCTS

##### 3.01 MANUFACTURERS

- A. Steel Frames with Integral Casings:
  - 1. Ceco Door Products: [www.cecodoor.com](http://www.cecodoor.com).
  - 2. Windsor Republic Doors: [www.republicdoor.com](http://www.republicdoor.com).
  - 3. Steelcraft: [www.steelcraft.com](http://www.steelcraft.com).
  - 4. Curries Mfg., Inc..
  - 5. D & D Specialties, Inc.
  - 6. Deronde Products.
  - 7. Pioneer Industries/Div. CORE Industries, Inc.
  - 8. Metal Products, Inc.
  - 9. Palmetto Wholesale Company.
  - 10. Substitutions: See Section 01600 - Product Requirements.

##### 3.02 STEEL DOOR FRAMES - GENERAL REQUIREMENTS

- A. Refer to Door and Frame Schedule on the drawings for frame sizes, fire ratings, sound ratings,

finishing, door hardware to be installed, and other variations, if any.

- B. Door Frame Type: Provide steel door frames with integral casings, for field finishing.
- C. Accessibility: Comply with ANSI/ICC A117.1.
- D. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.
- E. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified.

### 3.03 STEEL DOOR AND INTERIOR GLAZED LIGHT FRAMES

- A. Finish: Factory primed, for field finishing.
- B. Requirements for All Frames:
  - 1. Accessibility: Comply with ANSI/ICC A117.1.
  - 2. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
  - 3. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
  - 4. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) per ASTM A653/A653M, with manufacturer's standard coating thickness.
  - 5. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.
  - 6. Provide 0.0179 inch thick steel mortar guard boxes welded to frame for hardware cut-outs in frames to be installed in masonry or to be grouted.
  - 7. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
  - 8. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
  - 9. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.
  - 10. Fabricate hollow metal units to be rigid, neat in appearance, and free from defects, warp, or buckle. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at the project site. Weld exposed joints continuously; grind, dress, and make smooth, flush, and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
  - 11. Locate finish hardware as shown on final shop drawings, or if not shown, in accordance with Recommended Location for Builder's Hardware for Custom Steel Doors and Frames, published by Door and Hardware Institute.
- C. Interior Door Frames, Non-Fire-Rated: Fully welded with corners mitered, reinforced, continuously welded full depth and width of frame. Knock-down type frames are not acceptable..

1. Grade: Comply with frame requirements specified in NAAMM HMMA 861; 0.0598 inch thick frames up to 3'-0" in width, and 0.747 inch thick metal frames over 3'-0" in width.
2. Terminated Stops: Provide at locates indicated on drawings; closed end stop terminated 6 inches above floor at 45 degree angle.

### 3.04 ACCESSORY MATERIALS

- A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions. Install plastic plugs to keep holes clear during construction.
- B. Removable Stops: Formed of not less than 0.0359 inch thick steel sheets matching steel of frames, shape as indicated on drawings, butted hairline joint corners; Secure with countersunk machine screws spaced uniformly not more than 12 inches on center.
- C. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.
- D. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames. Tack welded to jambs and mullions.
- E. Supports and Anchors: Fabricate of not less than 0.0598" thick sheet metal. Galvanize after fabrication units to be built into exterior walls, complying with ASTM A 153, Class B.
- F. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

### 3.05 FINISH MATERIALS

- A. Primer: Rust-inhibiting, complying with ANSI A250.10 Zinc chromate type.
- B. Bituminous Coating: Fibered asphalt emulsion.

### 3.06 FABRICATION

- A. Finish Hardware Reinforcement: Reinforce frames for required finish hardware, as follows:
  1. Hinges and Pivots: Steel plate 3/16" thick x 1-1/2" wide x 6" longer than hinge, secured by not less than 6 spot-welds.
  2. Strike Plate Clips: Steel plate 3/16" thick x 1-1/2" wide x 3" long.
  3. Surface-Applied Closers: 0.1046" thick steel sheet, secured with not less than 6 spot-welds.
  4. Concealed Closers: Removable steel access plate, 0.1046" thick internal reinforcement of size and shape required, and enclosing housing to keep closer pocket free of mortar or other materials.
- B. Jamb Anchors: Furnish jamb anchors as required to secure frames to adjacent construction, formed of galvanized steel with a minimum thickness of 0.0478", before galvanizing.
  1. Metal Stud Partitions: Insert type with notched clip for fastening to channel type metal stud, or toothed perforated anchors for wire attachment to truss- type studs. Weld anchors to back of frames. Provide at least 4 anchors for each jamb for frames up to 7'-6" in height; 5 anchors up to 8'-0" jamb height; one additional anchor each 24" or fraction thereof over 8'-0" height.
- C. Floor Anchors: Provide floor anchors for each jamb and mullion which extends to floor, formed of galvanized steel sheet, not less than 0.0747" thick before galvanizing, and as follows:
  1. Monolithic Concrete Slabs: Clip type anchors, with 2 holes to receive fasteners, welded to bottom of jambs.

- D. Head Anchors: Provide 2 anchors at head of frames exceeding 42" wide for frames mounted in steel stud walls.
- E. Head Strut Supports: Provide 3/8" x 2" vertical steel struts extending from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable bolted anchorage to frame jamb members.

### 3.07 STOPS AND MOLDINGS

- A. Provide stops and moldings around solid, glazed, and louvered panels in hollow metal units and in frames to receive doors, where indicated.
- B. Form fixed stops and moldings integral with frame, unless otherwise indicated.
- C. Coordinate width of rabbet between fixed and removable stops with type of glass or panel and type of installation indicated.

### 3.08 FINISH

- A. Interior Units: ASTM A 525 G60.
- B. Shop Painting:
  - 1. Clean, treat, and paint exposed surfaces of fabricated hollow metal units, including galvanized surfaces, but excluding stainless steel surfaces.
  - 2. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
  - 3. Apply pretreatment to cleaned metal surfaces, using cold phosphate solution (SSPC-PT2), hot phosphate solution (SSPC-PT4) or basic zinc chromate- vinyl butyral solution (SSPC-PT3).
  - 4. Apply shop coat of prime paint within time limits recommended by pretreatment manufacturer. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 2.0 mils.
- C. Coat inside of frame profile with bituminous coating to a thickness of 1/16 inch.

## PART 3 EXECUTION

### 4.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

### 4.02 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### 4.03 INSTALLATION

- A. Install frames in accordance with manufacturer's instructions and recommendations and as follows.
- B. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

- C. In addition, install fire rated units in accordance with NFPA 80.
- D. Coordinate frame anchor placement with wall construction.
- E. Grout frames using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- F. Coordinate installation of glazing.
- G. Coordinate installation of hardware specified in Section 08710.
- H. Coordinate installation of electrical connections to electrical hardware items.
- I. Setting Masonry Anchorage Devices: Provide masonry anchorage devices where required for securing hollow metal frames to in-place concrete or masonry construction.
  - 1. Set anchorage devices opposite each anchor location, in accordance with details on final shop drawings and anchorage device manufacturer's instructions. Leave drilled holes rough, not reamed, and free from dust and debris.
- J. Placing Frames: Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
  - 1. Remove spreader bars only after frames or bucks have been properly set and secured.
  - 2. Make field splices in frames as detailed on final shop drawings, welded and finished to match factory work.

#### 4.04 PROTECTION OF INSTALLED WORK

- A. Provide acceptable temporary protection of installed work so as to prevent damage from movement of materials through openings and subsequential construction activities, until such time that risk of damage has been minimized. Hollow metal work suffering physical damage will be repaired or replaced at no additional cost to the Contract and in such manner acceptable to Architect.

#### 4.05 TOLERANCES

- A. Clearances Between Door and Frame: As specified in ANSI A250.8.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

#### 4.06 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

**END OF SECTION**

**SECTION 08211 - FLUSH WOOD DOORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire rated and non-rated.

1.02 RELATED REQUIREMENTS

- A. Section 08115 - Steel Door Frames.
- B. Section 08800 - Glazing.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada.
- B. ICC (IBC) - International Building Code; 2009.
- C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc..
- D. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association.
- E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
- F. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc..
- G. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Specimen warranty.
- D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing and louvers.
  - 1. For factory-premachined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light openings.
- E. Samples: Submit samples, 1-0" square or as indicated, for the following:
  - 1. Doors for Plastic Laminate Finish: 6 inches (150 mm) square, for each color, texture, and pattern selected.
  - 2. Metal Frames for Light Openings: Metal light frames in 6" lengths; for each material, type and finish required.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

- A. Quality Standards: Comply with the following standards:

1. NWWDA Quality Standard: I.S.1 Industry Standard for Wood Flush Doors , of National Wood Window and Door Association (NWWDA).
  2. AWI Quality Standard: Architectural Woodwork Quality Standards , including Section 1300 Architectural Flush Doors , of Architectural Woodwork Institute (AWI) for grade of door, core construction, finish and other requirements exceeding those of NWWDA quality standard.
- B. Perform work in accordance with AWI Quality Standards, Section 1300, Custom Grade.
- C. Finish doors in accordance with AWI Quality Standards, Section 1500, grades identified in schedule.
- D. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- E. Obtain doors from a single manufacturer.
- F. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated.
- G. Smoke and Draft Control Doors: In addition to required fire rating, comply with air leakage requirements of International Building Code, Sections 709 and 714; with "S" label; if necessary, provide additional gasketing or edge sealing.

#### 1.06 REGULATORY REQUIREMENTS

- A. Fire Door and Panel Construction: Conform to NFPA 252.
1. Listed and classified by UL as suitable to for the purpose specified and indicated.
- B. Installed Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire rated class as indicated.
- C. Smoke Barrier Door Assembly: In addition to required fire rating, provide astragals at meeting edges of smoke barrier double doors.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of NWWDA pamphlet How to Store, Handle, Finish, Install, and Maintain Wood Doors , as well as with manufacturer's instructions.
- B. Package, deliver and store doors in accordance with specified quality standard.
- C. Accept doors on site in manufacturer's packaging. Inspect for damage.
- D. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.
- E. Identify each door with individual opening numbers which correlate with designation system used on shop drawings for door, frames, and hardware, using temporary, removable or concealed markings.

#### 1.08 PROJECT CONDITIONS

- A. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during

remainder of construction period to comply with the following requirements applicable to project's geographical location:

1. Referenced AWI quality standard including Section 100-S-3 Moisture Content .

B. Coordinate the work with door opening construction, door frame and door hardware installation.

#### 1.09 WARRANTY

A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

B. See Section 01780 - Closeout Submittals for additional warranty requirements.

C. Interior Doors: Provide manufacturer's warranty for the life of the installation.

D. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by Manufacturer, Installer and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup or twist) or that show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards.

1. Warranty shall also include reinstallation which may be required due to repair or replace.
2. Warranty shall be in effect during following period of time after date of Substantial Completion.
  - a. Solid Core Interior Doors: Life of installation.

E. Provide warranty for the following term:

1. Interior Doors: Life of installation.

F. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:

1. Algoma Hardwoods, Inc.
2. Buell Door Company
3. Eggers Industries: [www.eggersindustries.com](http://www.eggersindustries.com).
4. Mohawk Flush Doors, Inc.: [www.mohawkdoors.com](http://www.mohawkdoors.com)
5. VT Industries, Inc.
6. Substitutions: See Section 01600 - Product Requirements.

##### 2.02 DOORS

A. All Doors: See drawings for locations and additional requirements.

1. Quality Level: Premium Grade with A grade veneer, in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1300.
2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.

1. Provide solid core doors at all locations.
2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with International Building Code ("positive pressure"); UL or WH (ITS) labeled without any visible seals when door is open.
3. Wood veneer facing with factory transparent finish.



### 2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type staved lumber core (SLC), plies and faces as indicated above.

### 2.04 DOOR FACINGS

- A. Wood Veneer Facing for Transparent Finish: Natural birch, veneer grade as specified by quality standard, plain sliced, book veneer match, running assembly match; unless otherwise indicated.
  - 1. Vertical Edges: Any option allowed by quality standard for grade.
  - 2. Pairs: Pair match each pair; set match pairs within 10 feet of each other when doors are closed.
- B. Facing Adhesive: Type I - waterproof. Use hot press method for crossbands and face veneers.

### 2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with AWI Quality Standards requirements.
- B. Cores Constructed with stiles and rails:
- C. Fabricate fire rated doors in accordance with UL requirements. Attach fire rating label to door.
- D. Astragals for Non-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge.
- E. Astragals for Fire Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge, specifically for double doors.
- F. Provide solid blocks at lock edge for hardware reinforcement.
  - 1. Provide solid blocking for other throughbolted hardware.
- G. Fit door edge trim to edge of stiles after applying veneer facing.
- H. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- I. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
  - 1. Exception: Doors to be field finished.
- J. Provide edge clearances in accordance with the quality standard specified.

### 2.06 FACTORY FINISHING - WOOD VENEER DOORS

- A. Factory finish doors in accordance with specified quality standard:

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.
- D. Reject doors with defects.

- E. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Adjust width of non-rated doors by cutting equally on both jamb edges.
- D. Use machine tools to cut or drill for hardware.
- E. Coordinate installation of doors with installation of frames and hardware.
- F. Coordinate installation of glazing.

### 3.03 TOLERANCES

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp, and squareness.
- C. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 by 84 inches surface area.
- D. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inches surface area.

### 3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.
- C. Rehang or replace doors which do not swing or operate freely.
- D. Refinish or replace doors damaged during installation.
- E. Protect doors as recommended by door manufacture to ensure that wood doors will be without damage or deterioration at time of Substantial Completion.

### 3.05 SCHEDULE - See Drawings

**END OF SECTION**

**SECTION 08710 - FINISH HARDWARE**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to work of this section.
- B. Hollow metal frames are specified with door frames elsewhere in Division 8.
- C. Wood doors are specified elsewhere in Division 8.
- D. Paint - Division 9.

**1.02 DESCRIPTION OF WORK:**

- A. Definition: "Finish Hardware" includes items known commercially as finish hardware which are requested for swinging, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.
- B. Extent of finish hardware required is indicated on drawings and in schedules.

**1.03 QUALITY ASSURANCE:**

- A. Supplier: A recognized AHI certified architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.
  - 1. Information contained below describes the grade and general functional intent of the design. If additional hardware devices are required or if hardware specified isn't appropriate to provide a functional and code compliant opening, or if hardware indicated below has been discontinued, the supplier shall include correct devices in his scope of work at no cost to the Owner.
- B. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of the door and door frame labels.
- C. Americans with Disabilities Act (ADA): Provide and install finish hardware in accordance with requirements of Americans with Disabilities Act (ADA). Specifically, comply with ADA sections relating to accessibility and usability.
  - 1. Notification of Architect: Before installation of finish hardware, notify Architect of any Contract Document requirements that are suspected to be in noncompliance with ADA.
  - 2. ANSI Standards for Physically Handicapped: Finish Hardware shall comply with:
  - 3. American National Standard for Buildings and Facilities -- Providing Accessibility and Usability for Physically Handicapped People" (ANSI A117.1-1986). 1986 edition, by American National Standards Institute, Inc.; New York, New York. Before installation of finish hardware, Notify Architect of any Contract Document requirements that are suspected to be in noncompliance with ANSI A117.1-1986. In addition, before installation of finish hardware, notify Architect of conflicting requirements of ADA and ANSI A117.1-1986.

**1.04 SUBMITTALS:**

- A. Product Data: Submit manufacturers technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.
- B. Vertical Hardware Schedule: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function and finish of hardware.
  1. Final Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
    - a. Type, style, function, size and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Fastening and other pertinent information.
    - d. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door schedule.
    - e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
    - f. Door and frame sizes and materials.
    - g. Keying information.
- C. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordination review of hardware schedule.
- D. Templates: Furnish hardware templates to each fabricator of doors, frames, and other work being factory-prepared for the installation of hardware. Upon request, check shop drawings of other such others work to confirm that adequate provisions are made for proper location and installation of hardware.
- E. Operations and Maintenance Data: After installation, representative templates, instructions sheets and installation details shall be provided to the owner when building is accepted. Include one copy of each hardware schedule, keying and wiring diagrams.

#### 1.05 PRODUCT HANDLING:

- A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of hardware, is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packaged in the same container.
- C. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

### PART 2 PRODUCTS

#### 2.01 SCHEDULED HARDWARE:

### FINISH HARDWARE

- A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated in the Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.
  1. Manufacturer's Product Designations: One or more manufacturers are listed for each hardware type required.
  2. Warranty: Provide published warranties in accordance this Section .
    - a. LOCKSETS: 7 years
    - b. DOOR CLOSERS: 10 years
    - c. EXIT DEVICES: 2 years
    - d. OTHER HARDWARE: One year
  3. Maintenance Materials: Provide special wrenches and tools applicable to each different or special hardware component. Provide maintenance tools and accessories supplied by hardware component manufacturer to owner representative.

## 2.02 ACCEPTABLE MANUFACTURES:

- A. Hinges: PBB Inc., Stanley , McKinney
  1. Locksets: Corbin Russwin, Sargent, Yale
  2. Exit Device: Corbin Russwin, Sargent, Yale
  3. Closers: Norton, Sargent, Yale,
  4. Flat Goods: McKinney, Trimco, BBW, Quality
  5. Gasketing: McKinney, Pemko, Reese, Zero
  6. Cores: Best
  7. Key cabinet: Telkee, Lund, Key Control
  8. Substitutions: In accordance with Instructions to Bidders.
- B. Provide free wheeling outside trim when unit is locked. Provide locksets with one piece lever handles both sides not less than 4 ½ inches and 3 ½ inch diameter rose cold forged, for accessibility by Handicapped. Torqued tested at 1300 lbs.
- C. Provide closers with the following functions: Unitrol shock absorber foot, independent sweep, fast latch, hydraulic check "V" grooved valves, accessibility by Handicapped, delay action, adjustable spring tensions. Closers must meet barrier free requirements. Closers must have two-tooth engagement rack and pinion. All valves must be accessible without removing closer from the door. Cover must not have slotted cover. Cover must be secured with screw holes in cover. Provide installation and sizing instructions in cover.
- D. Closers shall have cast aluminum alloy shell. Closer shall be surface mounted and shall project no more than 2 1/8" from the surface of the door. Closer shall be non-handed. Closers shall be mounted on side of door not seen from common area.
- E. Exit Devices (as scheduled) "touchbar" Provide all exposed surfaces same material and finish. Exit device must have free wheeling outside trim when device is locked. Touch bar must not protrude from housing when pad is compressed.
- F. Latchbolt shall be investment cast stainless steel pullman type with 3/4" throw. All devices to be furnished with auxiliary dead-latching mechanism. Roller strike shall be furnished.
- G. Unless otherwise specified. Vandal resistant outside lever escutcheon trim shall be heavy duty cold forged constructed incorporating four threaded studs for through-bolting. All escutcheon trim shall be UL listed and constructed with beveled edges. Rigid levers while locked or manual type clutch mechanisms are not acceptable.

**2.03 MATERIALS AND FABRICATION:**

- A. General: Hand of Door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacture's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI A 156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- D. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

**2.04 KEYING**

- A. Door Locks: Grand master keyed.
  - 1. Include control keying with removable core cylinders.
  - 2. Key to existing keying system.
  - 3. During the construction period all exterior doors and (20) specific interior doors to be designated after construction begins, shall be keyed to a Construction Master Key System by Best Lock Corporation that shall remain operative until Final Acceptance of building by the Owner.
  - 4. Base the permanent keying system on the Owner's existing Great Grand Master system, which is the Best Lock Corporation. Determine keyed-alike sets jointly by the Owner's Representative and the Contractor immediately after contract award. Perform keying and biting by and registered with the lock manufacturer.
  - 5. Final keying shall be keyed to a 7-pin Master Keyed plan by Best Lock Corporation. All keying and biting shall be performed by and registered with the lock manufacturer.
  - 6. Provide key control system with a capacity of 1.75 times the number of door locks, with complete dual tag system.
  - 7. Tags: set for permanent attachment of file key without the use of tools and one set with snap hook holding at least four keys.

**2.05 HARDWARE FINISHES:**

- A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door opening. In general, match items to the manufacture's standard finish for the latch and lockset or (push-pull units if no latch-lock sets) for color and texture.
- B. Provide finishes which match those established by BHMA.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition,



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4.02 HARDWARE SET 2

A. EACH TO HAVE:

B. 3 BUTTS	TA2714 4 ½ X 4 ½ NRP	32D	MC
C. 1 ELE. RIM EXIT DEVICE	ED5200S x N9905	630	CR
D. 1 ELECTRIC STRIKE	1006 KM x 12VDC	630	HS
E. 1 CLOSER	CLP-8301 SN-134	630	NO
F. 1 WALL BUMPER	409	US32D	RO
G. 1 TRANSFORMER	2002-12		HS
H. 1 POWER CONTROLLER	2005		HS
I. 1 CARD SWIPE	SEE ELECTRICAL SPECS		XX

**END OF SECTION**



**SECTION 08800 - GLAZING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Glass.
- B. Types of work in this section include glass and glazing for:
  - 1. Wood Doors.
  - 2. Hollow Metal Windows.
  - 3. Aluminum Windows.
- C. Glazing compounds and accessories.

**1.02 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- D. ASTM C1036 - Standard Specification for Flat Glass.
- E. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
- F. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
- I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
- J. GANA (GM) - GANA Glazing Manual; Glass Association of North America.
- K. GANA (SM) - GANA Sealant Manual; Glass Association of North America.

**1.03 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Certificates: Certify that products meet or exceed specified requirements.
  - 1. Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.

**1.04 QUALITY ASSURANCE**

- A. Safety Glazing Standard: Where safety glass is indicated or required by authorities having

jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201 for category II materials.

1. Subject to compliance with requirements, provide safety glass permanently marked with certification label of safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.
  2. Manufacture and label tempered glass in accordance with Consumer Product Safety Commission's Safety Standards for Architectural Glazing Materials , 16 CFR, Part 1201.
- B. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.
- C. Use glazing sealants which have been proven to be fully adherent to glass types involved and compatible with substrates.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

#### 1.06 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer's Special Project Warranty on Laminated Glass: Provide written warranty signed by manufacturer of laminated glass agreeing to provide replacements for those laminated glass units which develop manufacturing defects. Manufacturing defects are defined as edge separation or delamination which materially obstructs vision through glass.
1. Warranty Period: Manufacturer's standard but not less that 4 years after date of Substantial Completion.
- C. Sealed Insulating Glass Units: Provide a five (5) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

### PART 2 PRODUCTS

#### 2.01 GLAZING TYPES

- A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing.
1. Application(s): All exterior glazing unless otherwise indicated.
  2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    - a. Tint: To match existing.
  3. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    - a. Tint: To match existing.
  4. Total Thickness: 1 inch.
- B. Type S-3 - Single Safety Glazing: Non-fire-rated.
1. Applications: Provide this type of glazing in the following locations:
    - a. Glazed lites in doors, except fire doors.
    - b. Sliding glass doors.
    - c. Glazed sidelights to doors, except in fire-rated walls and partitions.
    - d. Other locations required by applicable federal, state, and local codes and regulations.

- e. Other locations indicated on the drawings.
2. Type: Laminated safety glass as specified.
3. Tint: Clear.
4. Thickness: 1/4 inch.

## 2.02 EXTERIOR GLAZING ASSEMBLIES

- A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7.
  1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
  2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
  3. Thicknesses listed are minimum.
- B. Air and Vapor Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier:
  1. In conjunction with vapor retarder and joint sealer materials described in other sections.
  2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

## 2.03 GLASS MATERIALS

- A. Float Glass Manufacturers:
  1. AGC Flat Glass North America, Inc: [www.na.agc-flatglass.com](http://www.na.agc-flatglass.com).
  2. Pilkington North America Inc: [www.pilkington.com/na](http://www.pilkington.com/na).
  3. PPG Industries, Inc: [www.ppgideasapes.com](http://www.ppgideasapes.com).
  4. Falconer Glass Industries.
  5. Hordis Brothers, Inc.
  6. LOF Glass, Inc.
  7. Saint-Gobain/Euroglass.
  8. Viracon.
  9. Substitutions: Refer to Section 01600 - Product Requirements.
- B. Float Glass: All glazing is to be float glass unless otherwise indicated.
  1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
  2. Heat-Strengthened and Fully Tempered Types: ASTM C1048.
  3. Tinted Types: Color and performance characteristics as indicated.
  4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.
- C. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
  1. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
  2. Plastic Interlayer: 0.060 inch thick, minimum.
  3. Where fully tempered is specified or required, provide glass that has been tempered by the tong-less horizontal method.
  4. Manufacturers:
    - a. AGC Flat Glass North America, Inc: [www.na.agc-flatglass.com](http://www.na.agc-flatglass.com).
    - b. Cardinal Glass Industries: [www.cardinalcorp.com](http://www.cardinalcorp.com).
    - c. Viracon, Apogee Enterprises, Inc: [www.viracon.com](http://www.viracon.com).
    - d. Substitutions: Refer to Section 01600 - Product Requirements.

## 2.04 SEALED INSULATING GLASS UNITS

- A. Manufacturers:
  - 1. Any of the manufacturers specified for float glass.
  - 2. Any fabricator certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty, if any.
  - 3. Substitutions: Refer to Section 01600 - Product Requirements.
- B. Sealed Insulating Glass Units: Types as indicated.
  - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  - 2. Edge Spacers: Aluminum, bent and soldered corners.
  - 3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
  - 4. Purge interpane space with dry hermetic air.

## 2.05 GLAZING COMPOUNDS

- A. Manufacturers:
  - 1. Dow Corning Corp; Product Dow Corning 790: [www.dowcorning.com](http://www.dowcorning.com).
  - 2. Pecora Corporation; Product 864: [www.pecora.com](http://www.pecora.com).
  - 3. Bostik Construction Products Div; Product Chem-Calk 1000.
  - 4. Sonneborn Building Products Div., Rexnord Chemical Products, Inc.; Product Omniseal.
  - 5. Tremco, Inc; Product Spectrum 1.
  - 6. Substitutions: Refer to Section 01600 - Product Requirements.
- B. General: Provide product of type indicated and complying with the following requirements:
  - 1. Compatibility: Select glazing sealants and tapes of proven compatibility with other materials with which they will come into contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and services, as demonstrated by testing and field experience.
  - 2. Suitability: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants and tapes which have performance characteristics suitable for applications indicated and conditions at time of installation.
  - 3. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those for Type, Grade, Class and Uses.
  - 4. Colors: Provide color exposed sealants indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- C. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; color as selected.

## 2.06 GLAZING ACCESSORIES

- A. Preformed Butyl-Polyisobutylene Glazing Tape Without Spacer Rod:
  - 1. Pecora Corporation; Product Extru-Seal: [www.pecora.com](http://www.pecora.com).
  - 2. Tremco, Inc; Product Tremco 440 Tape: [www.tremcosealants.com](http://www.tremcosealants.com).
  - 3. Bostik Construction Products Div; Product Chem-Tape 40.
  - 4. Protective Treatments, Inc.; Product PTI 303 Glazing Tape.
- B. Preformed Butyl-Polyisobutylene Glazing Tape With Spacer Rod:
  - 1. Pecora Corporation; Product Extru-Seal: [www.pecora.com](http://www.pecora.com).
  - 2. Tremco, Inc; Product Tremco 440 Tape: [www.tremcosealants.com](http://www.tremcosealants.com).
  - 3. Bostik Construction Products Div; Product Chem-Tape 40.
  - 4. Protective Treatments, Inc.; Product PTI 303 Glazing Tape.

5. Substitutions: Refer to Section 01600 - Product Requirements.
- C. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- D. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- E. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; size as appropriate for this application; black color.
- F. Glazing Clips: Manufacturer's standard type.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that openings for glazing are correctly sized and within tolerance. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected. Accuracy of sizing rest with glazier.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected. Accuracy of sizing rest with glazier.

#### **3.02 PREPARATION**

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
- E. Install sealant in accordance with manufacturer's instructions.

#### **3.03 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)**

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.

**3.04 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND)**

- A. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
- B. Locate and secure glazing pane using glazers' clips.
- C. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

**3.05 INSTALLATION - WIRE GLASS**

- A. Wire Glass: Take care in cutting and installing square mesh wire glass so that vertical wires run parallel to jamb members.

**3.06 CLEANING**

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

**END OF SECTION**

# D I V I S I O N 9

Applicable Portions Of The Conditions  
Of The Contract And Division 1 General  
Requirements Apply To The Work Of  
This Division.

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**SECTION 09260 - GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Acoustic insulation.
- E. Gypsum wallboard.
- F. Joint treatment and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06114 - Wood Blocking and Curbing: Wood blocking for support of wall-mounted equipment.
- B. Section 07900 - Joint Sealers: Acoustic sealant.

**1.03 REFERENCE STANDARDS**

- A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute. (replaced SG-971)
- B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
- F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- H. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
- I. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- J. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Substrate Sheets.
- K. ASTM C1396/C1396M - Standard Specification for Gypsum Board.
- L. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels.
- M. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.



- N. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- O. ASTM E413 - Classification for Rating Sound Insulation.
- P. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association.
- Q. GA-600 - Fire Resistance Design Manual; Gypsum Association.
- R. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc..

#### 1.04 SYSTEM DESCRIPTION

- A. Acoustic Attenuation for Interior Partitions: STC of 45-49 calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

#### 1.05 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this section or other referenced standards.

#### 1.06 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- D. Test Reports: For all stud framing products that do not comply with ASTM C645 or C 754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.
- E. Certification from supplier, in writing to the Architect, that metal studs and related accessories delivered to project site comply with these specifications, including but not limited to required metal gages.

#### 1.07 QUALITY ASSURANCE

- A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
- B. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 5 years of documented experience.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

**1.09 PROJECT CONDITIONS**

- A. Minimum Room Temperatures: For non adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously thereafter until drying is complete.

**PART 2 PRODUCTS**

**2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions Indicated as Acoustic: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

**2.02 METAL FRAMING MATERIALS**

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
  - 1. Clarkwestern Dietrich Building Systems LLC: [www.clarkdietrich.com](http://www.clarkdietrich.com).
  - 2. Dietrich Metal Framing: [www.dietrichindustries.com](http://www.dietrichindustries.com).
  - 3. Marino\Ware: [www.marinoware.com](http://www.marinoware.com).
  - 4. Substitutions: See Section 01600 - Product Requirements.
- B. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, ASTM A525 G-60 coating, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
  - 1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
  - 2. Thickness: 20 gauge minimum.
  - 3. Depth: As indicated on drawings.
  - 4. Studs: C shaped. Flange edges of studs bent back 90 deg and hemmed to form 3/16" minimum lip (return).
  - 5. Runners: U shaped, sized to match studs. Hemmed to form 3/16" minimum lip (return).
  - 6. Ceiling Channels: C shaped. Cold-rolled steel, 0.0598 inch minimum thickness of base ( uncoated ) metal and 7/16 inch wide flanges, protected with rust-inhibitive paint for interior elements or hot-dip galvanized coating complying with ASTM A525 , G-60, when used for exterior soffits, and as follows:
    - a. Carrying Channels: 1-1/2 inch deep, 475 lbs per 1000 ft., unless otherwise indicated.
  - 7. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
  - 8. Fasteners: Provide fasteners of type, material, size, corrosion resistance, holding power and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum drywall manufacturers for applications indicated.
- C. Concrete Inserts: Inserts designed for attachment to concrete forms and for embedment in concrete, fabricated from corrosion-resistant materials, with holes or loops for attachment of hanger wires and capability to sustain, without failure, a load equal to 3 times that imposed by

ceiling construction, as determined from testing per ASTM E 488, conducted by an independent testing laboratory.

- D. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper.
- E. Isolation Hangers: Combination neoprene element and spring hanger type. Hanger shall be selected for a minimum 0.75" spring deflection and factory precompressed 70% of the deflection at the assigned load per hanger. Hangers shall be capable of supporting ceiling assembly and limiting the maximum deflection to L/240.
  - 1. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include but are not limited to Mason Industries, Inc. and Peabody Noise Control, Inc.
- F. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- G. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
  - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
  - 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.
  - 3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems specified in this section.
  - 4. Deflection and Firestop Track:
    - a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.
  - 5. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.

## 2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
  - 1. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
  - 2. Georgia-Pacific Gypsum: [www.gpgypsum.com](http://www.gpgypsum.com).
  - 3. National Gypsum Company: [www.nationalgypsum.com](http://www.nationalgypsum.com).
  - 4. USG Corporation: [www.usg.com](http://www.usg.com).
  - 5. Substitutions: See Section 01600 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  - 2. Glass-mat-faced gypsum panels as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
  - 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
    - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
    - b. Mold-resistant board is required at all locations.
  - 4. Thickness:
    - a. Vertical Surfaces: 5/8 inch.
    - b. Ceilings: 5/8 inch.

- C. Backing Board For Wet Areas: One of the following products:
1. Application: Surfaces behind tile in wet areas including all toilet room walls.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
    - a. Thickness: 5/8 inch.
    - b. Products:
      - 1) Custom Building Products; Wonderboard.
      - 2) National Gypsum Company; PermaBase Brand Cement Board.
      - 3) National Gypsum Company; PermaBase Flex Brand Cement Board.
      - 4) USG Corporation; Durock Brand Cement Board.
      - 5) Substitutions: See Section 01600 - Product Requirements.

#### 2.04 ACCESSORIES

- A. Sound Attenuation Blankets: Unfaced mineral fiber blanket insulation produced by combining glass or slag mineral fibers with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).
- B. Acoustic Insulation: ASTM C 665; preformed glass fiber, friction fit type, unfaced. Thickness as indicated.
- C. Acoustic Sealant: As specified in Section 07900.
- D. Corner bead and Edge Trim for Interior Installation: Provide formed metal Galvanized steel corner beads, edge trim and control joints which comply with ASTM C 1047 and requirements indicated below:
  1. For use at all gypsum wallboard, except where special aluminum edge trim is indicated.
- E. Joint Materials: ASTM C475.
  1. Joint Tape: Paper reinforcing tape, unless otherwise indicated.
  2. Use pressure sensitive or staple-attached open-weave glass fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.
  3. Ready-mixed vinyl-based joint compound.
    - a. Where setting-type joint compounds are indicated for use as taping and topping compounds, use formulation for each which develops greatest bond strength and crack resistance and is compatible with other joint compounds applied over it.
    - b. For filling joints and treating fasteners of water-resistant gypsum backer board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer for this purpose.
- F. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.
- G. Screws: ASTM C 1002; self-piercing tapping type.
- H. Grout: Sanded gypsum plaster for grouting hollow metal door frames.
- I. Metal Back-Up System:
  1. Metal back-up system is required to accommodate the wall hung casework, millwork, railings or other items mounted to metal stud and wallboard walls and partitions. Use one

of the following:

2. Plate installation shall be designed to support an imposed load of 250 lbs. per lin. foot in addition to the weight of the unit being supported.
  - a. Provide one of the following types of back-up as manufactured by Metal-Lite, Inc. 1160 N. Blue Gum Avenue; Anaheim, CA 92806 (Tel: 800 886-6824).
    - 1) Flush Mount.
    - 2) Notch-Tite.
  - b. Metal Back-up Plates: Minimum 16 gauge galvanized steel plates of sizes and configurations detailed, or if not detailed, as required to accommodate the wall hung casework, millwork, railings or other items mounted to metal stud and wallboard walls and partitions. Provide plates up to 8 feet in length as one-piece units.
    - 1) Plate installation shall be designed to support an imposed load of 250 lbs. per lin. foot in addition to the weight of the unit being supported.
- J. Contractor to use fire-resistive treated wood blocking where indicated.
- K. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.
- B. Examine substrates to which gypsum board construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of gypsum board construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.
  1. Furnish concrete inserts and/or other required devices, to other trades for installation well in advance of time needed for coordination with other construction.

#### **3.03 FRAMING INSTALLATION**

- A. Metal Framing: Comply with ASTM C 754, ASTM 840 requirements that apply to framing installation and manufacturer's instructions.
- B. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer, or if none available, with Gypsum Construction Handbook published by United States Gypsum Company.
  1. Metal Back-up Plates: Secure back-up plates to metal studs as recommended by manufacturer, or by welding if 20 gauge or heavier studs, or by using self-tapping pan head screws, minimum two (2) screws per stud. Required for wall hung casework, millwork, railings, etc. as detailed.

2. Wood Blocking: Secure wood blocking to metal studs with self-tapping pan head screws.
  3. Provide 12 gauge or heavier C-studs or channels when required to accommodate heavy wall-hung items.
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement, at locations indicated below to comply with this section:
1. Where edges of suspended ceilings abut building structure horizontally at ceiling perimeters or penetration of structural elements.
  2. Where partition and wall framing abuts overhead structure.
  3. Provide slip or cushioned type joints as detailed to attain lateral support and avoid axial loading.
- D. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.
- E. Install runners (tracks) at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other construction. Align floor and ceiling tracks to assure plumb partitions. Secure track with suitable fasteners spaced 24 inches on center, maximum.
- F. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch from plane of faces of adjacent framing.
- G. Extend all partition framing full height to structural supports or substrates above suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
- H. Partitions 10 feet or more in height shall be braced horizontally, for lateral strength, with 3/4 inch channels wired or screw attached permanently to inside of studs. Channels shall be spaced not more than 6 feet on center.
- I. Install studs and furring in sizes indicated and spaced 16 inches on center, unless otherwise indicated. Secure each stud to both top and bottom runners with screws, or other accepted fastening method, through each stud flange and runner flange.
- J. Install studs so that flanges point in the same direction.
- K. Frame door openings to comply with details indicated, with GA-219 and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
1. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- L. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
1. Secure hangers to structural support by connecting directly to structure where possible, otherwise connect to cast-in concrete inserts or other anchorage devices or fasteners as indicated. Provide additional structural members if required for hanger spacing.
    - a. Do not attach hangers to metal deck tabs.
    - b. Do not attach hangers to metal roof deck.
    - c. Do not attach hangers to underside of concrete slabs with powder-actuated fasteners; use drilled-in type anchors instead.
  2. Do not connect or suspend steel framing from ducts, pipes or conduit.
  3. Keep hangers and braces 2 inches clear of ducts, pipes and conduits.
  4. Sway-brace suspended steel framing with hangers used for support.

5. Where, indicated, incorporate isolation hangers into supporting wires.
  6. Level Installation Tolerances: Install steel framing components for suspended ceilings so that cross furring members or grid suspension members are level to within 1/8 inch in 12 ft. as measured both lengthwise on each member and transversely between parallel members. ceiling 1/1200.
  7. Install suspended steel framing components in sizes and at spacings indicated but not less than that required by referenced steel framing installation standard and conforming to ASTM E580 - Seismic Restraint.
    - a. Wire Hangers: 0.1620 inch diameter (8 gage), 4ft. on center (maximum).
    - b. Carrying Channels (Main Runners): 4 ft. on center.
    - c. Rigid Furring Channels (Furring Members): 16 inches on center.
  8. Level ceiling system to a tolerance of 1/1200.
  9. Laterally brace entire suspension system.
- M. Studs: Space studs at 16 inches on center.
1. Extend partition framing to structure in all locations.
  2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- N. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- O. Blocking: Install blocking for support of plumbing fixtures, wall cabinets, toilet accessories, hardware, and base cabinets. Bolt or screw steel channels to studs.

### 3.04 ACOUSTIC ACCESSORIES INSTALLATION

- A. Where walls with acoustic insulation are indicated, provide a single bead of acoustical sealant at center of floor, ceiling and wall tracks, seal construction at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.
1. Minimum size of sealant bead shall be 1/4 inch, but size must be increased as necessary to assure positive seal.
- B. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- C. Acoustic Sealant: Install in accordance with manufacturer's instructions.

### 3.05 BOARD INSTALLATION

- A. Comply with ASTM C 840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
1. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
  2. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24 inches.
  3. Install wall/partition boards in manner which minimizes the number of end-butt joints or

avoids them entirely where possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.

4. Install sound attenuation or thermal blankets where indicated, prior to gypsum board unless readily installed after board has been installed. Completely fill stud space, full height of wall/partition.
  5. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.
  6. Locate either edge or end joints over supports. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
  7. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.
  8. Grout hollow metal door frames solid with sanded gypsum plaster. Grouting shall be done before adjacent studs are installed.
  9. Fit gypsum board around ducts, pipes, and conduits.
  10. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2 inch space. Seal joints with acoustical sealant.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Installation on Metal Framing: Use screws for attachment of all gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.
1. On partitions/walls apply gypsum board vertically (parallel to framing) and provide sheet lengths which will minimize end joints.
- D. Direct-Bonding to Interior Masonry Surfaces: Where gypsum board is indicated to be directly adhered to interior masonry surfaces, comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum board until fastening adhesive has set. (Fire rated assemblies require fasteners in view of adhesive.)
- E. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

### 3.06 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

### 3.07 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  2. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.



- B. Finish interior gypsum wall board by applying the following joint compounds in a minimum of 3 coats (not including pre-fill of openings in base), and sand between coats and after last coat:
  - 1. Embedding and First Coat: Setting-Type Joint Compound.
  - 2. Fill (Second) Coat: Setting-type joint compound.
  - 3. Finish (Third) Coat: Ready-mix drying-type all-purpose or topping compound.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
  - 1. Where perimeter wall angles of acoustic tile ceilings contact wallboard encased columns, the contact are between corner beads shall be made true to line using joint compound which is then tapered to a feather edge.
  - 2. Feather coats of joint compound so that camber is maximum 1/32 inch.
  - 3. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
- D. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

### 3.08 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

**END OF SECTION**

**SECTION 09300 - TILE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Cementitious backer board as tile substrate.
- D. Stone thresholds.
- E. Ceramic trim.
- F. Non-ceramic trim.

1.02 RELATED REQUIREMENTS

- A. Section 07900 - Joint Sealers.

1.03 REFERENCE STANDARDS

- A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).
  - 1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
  - 2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
  - 3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement Mortar.
  - 4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive.
  - 5. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
  - 6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy.
  - 7. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout.
  - 8. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
  - 9. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework.
  - 10. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units.
  - 11. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior glue plywood) Latex-Portland Cement Mortar.
  - 12. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
  - 13. ANSI A118.1 - American National Standard Specifications for Dry-Set Portland Cement Mortar.
  - 14. ANSI A118.4 - American National Standard Specifications for Latex-Portland Cement

Mortar.

15. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation.
16. ANSI A118.7 - American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation.
17. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units.

B. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation.

#### 1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Samples of standard line of colors for final color selection.
- C. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- D. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, and setting details.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.
- F. Selection Samples: Color charts illustrating full range of colors and patterns.
- G. Selection Samples: Samples of actual tiles for selection.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01600 - Product Requirements, for additional provisions.
  2. Extra Tile: 20 square feet of each size, color, and surface finish combination.

#### 1.05 QUALITY ASSURANCE

- A. Maintain one copy of The Tile Council of North America Handbook and ANSI A108 Series/A118 Series on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.
- C. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

#### 1.06 MOCK-UP

- A. See Section 01400 - Quality Requirements, for general requirements for mock-up.
- B. Construct tile mock-up where indicated on the drawings, incorporating all components specified for the location.
- C. Approved mock-up may remain as part of the Work.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

#### 1.08 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.
- C. Deliver supply of maintenance materials to the owner. Furnish maintenance materials from same lot as materials installed, and enclosed in protective packaging with appropriate identifying labels.

## **PART 2 PRODUCTS**

### **2.01 TILE**

- A. Manufacturers: All products by the same manufacturer.
  - 1. American Olean: [www.americanolean.com](http://www.americanolean.com).
  - 2. Dal-Tile Corporation: [www.daltile.com](http://www.daltile.com).
  - 3. Summitville Tiles, Inc: [www.summitville.com](http://www.summitville.com).
  - 4. Substitutions: See Section 01600 - Product Requirements.
- B. ColorBody Porcelain Tile
  - 1. Basis of Design: Refer to drawings for color selections

### **2.02 TRIM AND ACCESSORIES**

- A. Ceramic Trim: Matching cove base ceramic shapes in sizes coordinated with field tile.
  - 1. Applications: Use in the following locations:
    - a. Floor to Wall Joints: Cove base.
  - 2. Manufacturer: Same as for tile.
- B. Non-Ceramic Trim: Brushed stainless steel, style and dimensions to suit application, for setting using tile mortar or adhesive.
  - 1. Applications: Use in the following locations:
    - a. Open edges of wall tile.
    - b. Open edges of floor tile.
    - c. Wall corners, outside and inside.
    - d. Transition between floor finishes of different heights.
  - 2. Manufacturer:
    - a. Schluter-Systems: [www.schluter.com](http://www.schluter.com).
    - b. Genesis APS International: [www.genesis-aps.com](http://www.genesis-aps.com).
- C. Thresholds: Marble, white or gray, honed finish; 2 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.
  - 1. Applications: Provide at the following locations:
    - a. At doorways where tile terminates.
    - b. At open edges of floor tile where adjacent finish is a different height.

### **2.03 SETTING MATERIALS**

- A. Provide setting materials made by the same manufacturer as grout.
- B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
  - 1. Application(s): Use this type of bond coat where indicated and where no other type of bond coat is indicated.
  - 2. Products:

- a. ARDEX Engineered Cements; ARDEX X 77 MICROTEC: [www.ardexamericas.com](http://www.ardexamericas.com).
- b. AVM Industries, Inc; Thin-Set 780: [www.avmindustries.com](http://www.avmindustries.com).
- c. LATICRETE International, Inc; LATICRETE 254 Platinum: [www.laticrete.com](http://www.laticrete.com).

#### 2.04 ADHESIVE MATERIALS

- A. Manufacturers:
  1. Bostik Inc; Product Hydroment Ultra-Set: [www.bostik-us.com](http://www.bostik-us.com).
  2. Mapei Corporation; Product Planicrete W: [www.mapei.com](http://www.mapei.com).
  3. Substitutions: See Section 01600 - Product Requirements.
- B. Organic Adhesive: ANSI A136.1, thinset bond type; use Type I in areas subject to prolonged moisture exposure.

#### 2.05 MORTAR MATERIALS

- A. Manufacturers:
  1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  2. Custom Building Products: [www.custombuildingproducts.com](http://www.custombuildingproducts.com).
  3. Substitutions: See Section 01600 - Product Requirements.
- B. Mortar Bond Coat Materials:
  1. Dry-Set Portland Cement type: ANSI A118.1.
  2. Latex-Portland Cement type: ANSI A118.4.

#### 2.06 GROUTS

- A. Manufacturers:
  1. ARDEX Engineered Cements: [www.ardexamericas.com](http://www.ardexamericas.com).
  2. ProSpec, an Oldcastle brand; ProColor Sanded Tile Grout: [www.prospec.com](http://www.prospec.com).
  3. LATICRETE International, Inc; LATICRETE SpectraLOCK PRO Premium Grout: [www.laticrete.com](http://www.laticrete.com).
  4. Substitutions: See Section 01600 - Product Requirements.
- B. Standard Grout: Any type specified in ANSI A118.6 or A118.7.

#### 2.07 THICK-BED MATERIALS

- A. Mortar Bed Materials: Portland cement, sand, latex additive, and water.
  1. Products:
    - a. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed: [www.laticrete.com](http://www.laticrete.com).
    - b. Merkrete, by Parex USA, Inc.; Merkrete Underlay C: [www.merkrete.com](http://www.merkrete.com).
    - c. Substitutions: See Section 01600 - Product Requirements.
- B. Grout: Any type specified in ANSI A118.6 or A118.7 used for interior walls with cementitious backer board/underlayment.

#### 2.08 THIN-SET ACCESSORY MATERIALS

- A. Cementitious Backer Board: ANSI A118.9; High density, cementitious, glass fiber reinforced, 5/8 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
- B. Tile Cleaner: Product specifically acceptable to tile manufacturer and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation or Ceramic Tile Institute.

1. Manufacturers: Provide products complying with requirements of the contract documents and made by one of the following:
  - a. Mapei Corporation.
- C. Temporary Protective Coating: Factory-apply product listed to protect exposed tile surfaces from mortar and grout residue.
  1. Grout release: Manufacturer's standard liquid coating.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
- D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

#### **3.02 PREPARATION**

- A. Factory-Blending: Before start of installation verify that tile with an anticipated range of colors has been correctly blended to achieve a uniform color range from tile package to tile package
- B. Field-Applied Temporary Protective Coating: Coat exposed tile surfaces with temporary protective coating indicated to comply with manufacturer's recommendations. Do not coat unexposed surfaces.
  1. Grout release.
- C. Protect surrounding work from damage.
- D. Vacuum clean surfaces and damp clean.
- E. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- F. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.
- G. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.
- H. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

#### **3.03 INSTALLATION - GENERAL**

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America Handbook recommendations.

- B. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- C. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- D. Form internal angles coved and external angles bullnosed.
- E. Install non-ceramic trim in accordance with manufacturer's instructions.
- F. Install thresholds where indicated.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control joints free of adhesive or grout. Apply sealant to joints.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints. Use standard grout unless otherwise indicated.
- K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

#### 3.04 INSTALLATION - FLOORS - MORTAR BED METHODS

- A. Over interior concrete substrates, install in accordance with The Tile Council of North America Handbook Method F112, bonded.
- B. Mortar Bed Thickness: 1-1/4 inch, unless otherwise indicated.

#### 3.05 INSTALLATION - WALL TILE

- A. Over cementitious backer units on studs, install in accordance with The Tile Council of North America Handbook Method W244.
- B. Over interior ceramic tile in accordance with The Tile Council of North America Handbook Method TR713, organic adhesive.

#### 3.06 CLEANING

- A. Clean tile and grout surfaces after installation is complete.
  - 1. Wipe latex-portland cement residue from tile with a damp cloth or sponge as soon as possible after tile installation.
  - 2. Temporary protective coating: Remove from tile surfaces in strict accordance with manufacturer's instructions. Collect and dispose of coating material off project site.

#### 3.07 PROTECTION

- A. Protection: Apply neutral protective cleaner to tile after installation if recommended by tile manufacturer. Overlay completed tile installation with kraft paper for protection from subsequent construction activities.
  - 1. Do not permit traffic over finished floor surface for 4 days after installation.
  - 2. Remove protection, rinse, and dry tile installations before final review and acceptance.

**END OF SECTION**

**SECTION 09511 - SUSPENDED ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.
- C. Seismic grid restraint.

**1.02 REFERENCE STANDARDS**

- A. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

**1.03 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.04 QUALITY ASSURANCE**

- A. Seismic Grid Restraint: Design and install in accordance to International Building Code Section 1708.6 and ASCE 7.
- B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.05 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**1.06 PROJECT CONDITIONS**

- A. In a timely manner, furnish to affected installers, attachment devices for incorporation into other work.
- B. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Coordination Data: Prepare and distribute to affected installers, data necessary for coordination



with related work. Include setting diagrams showing placement of attachment devices for acoustical ceiling hangers.

- D. Install acoustical units after interior wet work is dry.
- E. Work above ceilings has been finished, tested, and approved.
- F. Coordinate ceiling system installation with work of other sections as required, including the following:
  - 1. Light fixtures.
  - 2. HVAC equipment.
  - 3. Fire suppression system components.
  - 4. Fire Alarm System Components.
  - 5. Partitions.
- G. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained.

#### 1.07 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Provide 2.5 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

### PART 2 PRODUCTS

#### 2.01 ACOUSTICAL UNITS

- A. Manufacturers:
  - 1. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
  - 2. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
  - 3. USG: [www.usg.com](http://www.usg.com).
  - 4. Substitutions: See Section 01600 - Product Requirements.
- B. Acoustical Units - General: ASTM E1264, Class A.
- C. Acoustical Tile Type 1: Painted mineral fiber, ASTM E1264 Type III, with to the following characteristics:
  - 1. Size: 24 x 24 inches (600 x 600 mm).
  - 2. Thickness: 7/8 inches.
  - 3. Composition: Water felted.
  - 4. Edge: Square.
  - 5. Surface Color: White.
  - 6. Surface Pattern: Non-directional fissured.
  - 7. Product: Fine Fissured by Armstrong World Industries.
- D. Acoustical Tile Type 2: Plastic faced mineral fiber, ASTM E1264 Type IV, with the following characteristics:
  - 1. Size: 24 x 24 inches (600 x 600 mm).
  - 2. Thickness: 7/8 inches.
  - 3. Composition: Water felted.
  - 4. Surface Pattern: Perforated, small holes with mylar film.
  - 5. Product: Clean Room Mylar by Armstrong World Industries.
  - 6. For use in all toilet rooms only.

## 2.02 SUSPENSION SYSTEM(S)

- A. Manufacturers:
  - 1. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
  - 2. Chicago Metallic Corporation: [www.chicagometallic.com](http://www.chicagometallic.com).
  - 3. USG: [www.usg.com](http://www.usg.com).
  - 4. Substitutions: See Section 01600 - Product Requirements.
- B. Suspension Systems - General: ASTM C635; die cut and interlocking components, with stabilizer bars, clips, splices, and perimeter moldings as required. Grids in toilet and utility rooms shall be aluminum, all others are to be electro-galvanized unless noted otherwise.
- C. Colors: Provide indicated colors. Where color is not indicated, provide colors as selected by the architect from manufacturer's complete set of standard colors.
- D. Finishes: Manufacturer's standard shop-applied finishes.
- E. Attachment Devices for Suspension System:
- F. Anchors and intermediate support members: Provide sizes capable of sustaining 5 times the load-carrying capabilities shown in ASTM C 635, Table 1, "Direct Hung" column.
- G. Deck inserts and hanger clips: Fabricate from hot-dip galvanized sheet steel with loops or holes for attachment at hanger wires.
- H. Hanger wire: Zinc-coated (galvanized) carbon steel wire, ASTM A 641, soft temper, with Class 1 coating, minimum 10 gage (0.135 inch diameter).
- I. Exposed Steel Suspension System Type 1: Formed steel, commercial quality cold rolled; heavy-duty.

## 2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
  - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates and conditions under which products of this section are to be installed and verify that the work properly may commence.
- B. Verify existing conditions before starting work.
- C. Verify that layout of hangers will not interfere with other work.
- D. Verify that products furnished as work of this section, but not installed under this section, have been properly installed by the entity performing the installation.

### 3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's

instructions and as supplemented in this section.

- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Layout: Position ceiling components to maximize use of full-sized acoustical units and to provide border units which are equal in size and shape at opposing ceiling edges. Use of acoustical units which are smaller than 1/2 full-width is prohibited at ceiling perimeters. Conform to reflected ceiling plans to greatest extent possible.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members. Do not allow hangers to contact any objects or materials in ceiling plenum which are not actual components of ceiling system.
  - 1. Splay hangers only where necessary to avoid obstacles. Provide counter splaying, bracing, or other acceptable devices to compensate for lateral stresses caused by splayed hangers.
  - 2. Install splay hangers or other means of seismic restraint as required to meet the requirements of International Building Code Section 1621.2.5.2.2, ASTM E 580, and ASCE 7.
  - 3. Do not attach hangers to piping, conduit, or duct. Provide carrying channel trapeze support where obstruction cannot be avoided by splaying hanger 45 degrees from vertical or less.
- G. Space hangers at not more than 48 inches on center and within 6 inches of ends of each direct-hung runner or carrying channel, unless indicated otherwise.
- H. Loop and tie wire hangers securely to building's structural members; to attachment devices indicated; or, where not indicated, to devices suitable for substrate and capable of permanently supporting ceiling weight without failure or deterioration.
- I. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet, with cumulative tolerance not to exceed 1/4 inch. Bending or kinking of hangers is not allowed.
- J. Exposed (Lay-in) Grid Installation: Install grid members square, with ends of members securely interlocked. Remove and replace dented, bent, or kinked members.
- K. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- L. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- M. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- N. Do not eccentrically load system or induce rotation of runners.
- O. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.

1. Molding and trim attachment: Space screws not more than 16 inches on center and within 3 inches of ends of each trim-piece being installed. Install moldings and trim level with suspension system and within tolerance specified for suspension system.
2. Use longest practical lengths.
3. Miter corners and align butt joints carefully to form tight hairline joints.
4. Face-riveting of trim and moldings is not allowed.

### 3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  1. Make field cut edges of same profile as factory edges.

### 3.04 ADJUST AND CLEAN

- A. Use ceiling manufacturer's recommended methods and materials to clean and touch-up exposed components of ceiling system.
- B. Replace ceiling system components which are discolored or damaged in any way, in a manner which results in the ceiling system showing no evidence of replacement work.

### 3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**

**SECTION 09650 - RESILIENT FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

1.02 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
- D. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base.
- F. ASTM F 1869 -Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Sub-floor Using Anhydrous Calcium Chloride; 1998
- G. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing.

1.03 PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for fire performance ratings as follows:
  - 1. Critical radiant flux (CRF): Minimum 0.22 watt per square centimeter, per ASTM E 648.
  - 2. Flame spread: Maximum 75, per ASTM E 84.
  - 3. Smoke developed: Maximum 450, per ASTM E 84.
  - 4. Smoke density: Maximum 450, per ASTM E 662.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- D. Slab moisture tests as per ASTM F 1869-98. Submit written copy of test results.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect roll materials from damage by storing on end.

1.06 FIELD CONDITIONS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

### 1.07 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Extra Materials: At time of completing installation, deliver stock of maintenance materials to the owner. Furnish products matching those actually installed, packaged for storage and clearly labeled.
  - 1. Resilient tile: 10 percent of each variety installed.
  - 2. Resilient base: 10 percent of each variety installed.
  - 3. Sheet flooring: 10 percent of each variety installed.

## PART 2 PRODUCTS

### 2.01 TILE FLOORING

- A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness, and:
  - 1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
  - 2. Size: 12 x 12 inch.
  - 3. Manufacturers:
    - a. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
    - b. Mannington Mills, Inc: [www.mannington.com](http://www.mannington.com).
    - c. Tarkett Inc: [www.tarkett.com](http://www.tarkett.com).
    - d. Substitutions: See Section 01600 - Product Requirements.

### 2.02 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
  - 1. Height: 6 inch.
  - 2. Thickness: 0.125 inch thick.
  - 3. Finish: Satin.
  - 4. Length: 4 foot sections.
  - 5. Color: Selected from full range of manufacturer's colors.
  - 6. Accessories: Premolded external corners, internal corners, and end stops.
  - 7. Manufacturers:
    - a. Burke Flooring: [www.burkemercer.com](http://www.burkemercer.com).
    - b. Johnsonite, Inc: [www.johnsonite.com](http://www.johnsonite.com).
    - c. Roppe Corp: [www.roppe.com](http://www.roppe.com).
    - d. Marley Flexco.
    - e. Substitutions: See Section 01600 - Product Requirements.

### 2.03 ACCESSORIES

- A. Subfloor Filler: Latex leveling and patching compound; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
- C. Filler for Coved Base: Plastic.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

## PART 3 EXECUTION

### RESILIENT FLOORING

**09650-2**

### 3.01 EXAMINATION

- A. General: Inspect substrates and conditions of installation to verify that work may properly commence. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.
- C. Verify that concrete sub-floor surfaces are dry enough and ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

### 3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is cured.
- C. Prepare concrete surface as per ASTM F 711 in conjunction with findings from the moisture test.
- D. Clean substrate.
- E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

### 3.03 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

### 3.04 SHEET FLOORING

- A. Install in accordance with manufacturer's instructions.
- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Use conventional full spread adhesive method unless otherwise indicated.
- D. Set flooring in place, press with heavy roller to attain full adhesion.

- E. Adhere sheet flooring to substrates using method approved by flooring manufacturer for type of sheet flooring and substrate condition indicated.
- F. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.
- G. Double cut sheet at seams.
- H. Lay flooring with tightly butted seams, without any seam sealer unless otherwise indicated.
- I. Double cut sheet; provide heat welded seams.
  - 1. Prepare seams in vinyl sheet flooring with manufacturer's special routing tool and heat weld with vinyl thread in accordance with manufacturer's instructions.
- J. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- K. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Before installation of flooring, secure metal strips with stainless steel screws. Secure resilient strips by adhesive.
- L. Coved Base: Install as detailed on drawings, using coved base filler as backing at floor to wall junction. Extend sheet flooring vertically to height indicated, and cover top edge with metal cap strip.
- M. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- N. Install flooring in recessed floor access covers. Maintain floor pattern.
- O. At movable partitions, install flooring under partitions without interrupting floor pattern.

### 3.05 TILE FLOORING

- A. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.
- C. Layout: Establish center of each space and lay tile from center point, so tiles at each edge will be not less than 1/2 tile and equal in width.
- D. Installation: Apply adhesive with notched trowel, following manufacturer's instructions. Install tile only after adhesive has developed sufficient tack, firmly butting tiles to achieve hairline joints. Roll each area of installation at regular intervals, to assure firm bonding of tiles to substrate.
- E. Spread only enough adhesive to permit installation of materials before initial set.
- F. Set flooring in place, press with heavy roller to attain full adhesion.
- G. Matching: In each space, use tiles from same production run, and lay tiles in same sequence as removed from cartons. Discard broken, chipped, or otherwise damaged tiles.
  - 1. Lay tile to achieve monolithic appearance, with pattern in all tiles oriented in same direction.
  - 2. Lay tile in patterns indicated on drawings.



- H. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
- I. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- J. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- K. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- L. Install flooring in recessed floor access covers. Maintain floor pattern.

### 3.06 RESILIENT BASE

- A. Apply base securely in locations indicated, using maximum lengths available to minimize joints. Adhere to substrate with full spread of adhesive, assuring continuous contact with vertical and horizontal surfaces. Provide preformed corner units at 90 degree intersections.
  - 1. Apply resilient base to columns and other fixed, freestanding elements in spaces where resilient base is scheduled.
  - 2. At irregular vertical surfaces where top edge of resilient base does not make continuous contact, fill voids with manufacturer's recommended adhesive compound.
- B. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- C. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- D. Install base on solid backing. Bond tightly to wall and floor surfaces.
- E. Scribe and fit to door frames and other interruptions.

### 3.07 STAIR COVERINGS

- A. Install stair coverings in one piece for full width and depth of tread.
- B. Adhere over entire surface. Fit accurately and securely.

### 3.08 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's instructions.
- C. Initial Cleaning: Remove excess and waste materials promptly, and sweep or vacuum clean resilient flooring as soon as installation has been completed in each area. After adhesive has had adequate time to set, mop each area with damp mop and mild detergent.
- D. Final Cleaning: Remove scuff marks, excess adhesive, and other foreign substances, using only cleaning products and techniques recommended by manufacturer of resilient products.
- E. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

### 3.09 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.
- B. Construction Period: Cover traffic routes across completed resilient flooring with plywood, hardboard, or other durable material to protect against damage from loaded dollies and other

construction traffic.

1. Polish: Apply protective polish to clean resilient flooring surfaces, unless manufacturer of resilient product recommends otherwise.
- C. Final Protection: Cover resilient floor surface with nonstaining building paper until substantial completion in each area.

**END OF SECTION**

**SECTION 09900 - PAINTS AND COATINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
- D. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  - 5. Floors, unless specifically so indicated.
  - 6. Glass.
  - 7. Concealed pipes, ducts, and conduits.
- E. Surface preparation, priming and finish coats specified in this section are in addition to shop priming and surface treatment specified under other sections, unless otherwise indicated.
- F. Paint exposed surfaces whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.
- G. Painting includes field painting exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment. Refer to mechanical and electrical contract documents and coordinate with Mechanical/Electrical Contractors/Subcontractors to determine extent of Work.
- H. Prefinished items not to be painted, unless otherwise indicated, include the following factory-finish components.
  - 1. Acoustic materials.
  - 2. Architectural woodwork and casework.
  - 3. Hospital or Laboratory casework.
  - 4. Prefinished mechanical and electrical equipment, except for panel boxes in finished areas.
  - 5. Light fixtures.
- I. Finished metal surfaces not to be painted include:
  - 1. Anodized aluminum.
  - 2. Stainless steel.
  - 3. Chromium plate.
  - 4. Copper.
  - 5. Bronze.
  - 6. Brass.
- J. Labels: Do not paint over Underwriter's Laboratories, Factory Mutual or other code- required

labels or equipment name, identification, performance rating, or nomenclature plates.

#### 1.02 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.

#### 1.03 DEFINITIONS

- A. Paint includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers and other applied materials whether used as prime, intermediate, or finish coats.
- B. Wall -vertical surfaces including interior fascias.
- C. Ceiling -horizontal surfaces including interior soffits.
- D. Conform to ASTM D 16 for interpretation of terms used in this section.

#### 1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on all finishing products. Manufacturer's technical information, label analysis and application instructions for each material proposed for use.
  - 1. List each material and cross-reference this specific coating and finish system and application. Identify each material by the manufacturer's catalog number and general classification.
  - 2. Provide color samples for each material and color indicated to verify compliance with Architect's color selections.
- C. Manufacturer's Instructions: Indicate special surface preparation procedures.
- D. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.
- B. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.
- C. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  - 1. Notify the Architect of problems anticipated using the materials specified.
- D. Material Quality: Provide the manufacturer's best quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.
- E. Proprietary names used to designate colors or materials are intended to convey the Architect's

Design Intent and do not imply that products named are required nor to exclude equal products of other manufacturers.

- F. Federal Specifications establish a minimum quality level of paint materials, except where other product identification is used. Provide written certification from the manufacturer that materials provided meet or exceed these criteria.
- G. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

#### 1.06 REGULATORY REQUIREMENTS

- A. Certifications of Regulatory Compliance: Submit written certifications from manufacturers of painting materials that all products proposed for use on this project will conform with the following:
  - 1. Will comply with local V.O.C. regulations and meet or exceed the quality and performance intent of these specifications.
- B. Conform to applicable code for flame and smoke rating requirements for products and finishes.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

#### 1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

#### 1.09 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Supply two gallons of each color; store where directed.
- C. Label each container with color in addition to the manufacturer's label.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

- B. Paints:
  - 1. Benjamin Moore & Co: [www.benjaminmoore.com](http://www.benjaminmoore.com).
  - 2. Devoe and Reynolds Co. (Devoe).
  - 3. The Glidden Company (Glidden).
  - 4. PPG Industries, Pittsburgh Paints (Pittsburgh).
  - 5. Pratt and Lambert(P & L).
  - 6. Sherwin Williams
  
- C. Manufacturers - Interior Finish Paint Material:
  - 1. Interior Semigloss Acrylic Latex Enamel: Acrylic latex semi-gloss enamel for use over a primer on ferrous and zinc-coated (galvanized) metal surfaces.
    - a. Devoe: Wonder-Tones Interior Acrylic Latex Semi-Gloss Enamel 38XX.
    - b. Glidden: Y-8200 Spred Ultra Semi-Gloss Enamel.
    - c. Moore: Moorcraft Super-Hide Latex Semi-Gloss Enamel 283.
    - d. Pittsburgh: Speedhide Semi-Gloss Latex Enamel 6-51.
    - e. P & L: Accolade Interior Semi-Gloss.
    - f. Sherwin Williams
  - 2. Latex-based, Interior Flat Paint: Ready-mix, latex based paint for use over insulating jackets on piping, ductwork and equipment.
    - a. Devoe: 36XX Wonder-Tones Latex Flat Wall Paint.
    - b. Glidden: 3400 Spred Satin Latex Wall Paint.
    - c. Moore: Regal Wall Satin #215.
    - d. Pittsburgh: 50-35 Latex Ceiling Paint.
    - e. P & L: Vapex Latex Flat Wall Finish.
    - f. Sherwin Williams
  - 3. Interior Satin Acrylic Latex Enamel: Acrylic latex satin enamel for use over a primer and undercoater on wood and over a primer on gypsum drywall:
    - a. Devoe: Wonder-Tones Interior Acrylic Latex Enamel 35XX.
    - b. Glidden: Y-4100 Spred Ultra Eggshell Latex Wall and Trim Paint.
    - c. Moore: Moorcraft Super-Hide Latex Eggshell Enamel 286.
    - d. Pittsburgh: Speedhide Eggshell Latex Enamel 6-411.
    - e. P & L: Accolade Interior Velvet.
    - f. Sherwin Williams
  
- D. Synthetic, Rust-Inhibiting Primer: Quick-drying, rust-inhibiting primer for priming ferrous metal surfaces under semi-gloss acrylic latex enamel.
  - 1. Devoe: 13101 Rust Penetrating Primer.
  - 2. S & W: Kem Kromik Universal Metal Primer.
  - 3. Moore: Iron Clad Retard-X-Rust Inhibitive Latex Primer 162.
  - 4. Pittsburgh: Speedhide Water Base Inhibitive Metal Primer 6-712.
  - 5. P & L: Interior/Exterior Latex Metal Primer.
  - 6. Sherwin Williams
  
- E. Galvanized Metal Primer: Primer used to prime interior and exterior zinc-coated (galvanized) metal surfaces under semi-gloss acrylic latex enamel:
  - 1. Moore: Ironclad Galvanized Metal Latex Primer 155.
  - 2. Pittsburgh: Speedhide Water Base Inhibitive Metal Primer 6-712.
  - 3. P & L: Interior/Exterior Latex Metal Primer.
  - 4. Sherwin Williams
  
- F. Primer Sealers: Same manufacturer as top coats.

1. Latex-Based Interior White Primer: Latex-based primer coating used on interior gypsum drywall flat and satin acrylic latex enamel.
2. Devoe: 50801 Wonder-Tones Latex Primer and Sealer.
3. Glidden: Y-5111 Spred Ultra Latex Primer - Sealer.
4. Moore: Moorcraft Super-Hide Latex Primer - Undercoat 284.
5. Pittsburgh: Speedhide Quick-Drying Latex Primer - Sealer 6-2.
6. P & L: Vinyl Acrylic Wall Primer.
7. Sherwin Williams

G. Substitutions: See Section 01600 - Product Requirements.

## 2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  2. Supply each coating material in quantity required to complete entire project's work from a single production run.
  3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
    - b. Architectural coatings VOC limits of State in which the project is located.
  2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

## 2.03 PAINT SYSTEMS - INTERIOR

- A. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
1. One coat of latex primer.
  2. Gloss: Two coats of latex enamel.
- B. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
1. Touch-up with latex primer.
  2. Gloss: Two coats of latex enamel.
- C. Paint GI-OP-3LA - Gypsum Board/Plaster, Latex-Acrylic, 3 Coat:
1. One coat of alkyd primer sealer.
  2. Semi-gloss: Two coats of latex-acrylic enamel.

## 2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Gypsum Wallboard: 12 percent.
  - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces which affect work of this section. 10
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- I. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- J. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
- K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.
- L. Materials Preparation: Carefully mix and prepare paint materials in accordance with manufacturer's directions.
- M. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.



- N. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

### 3.03 APPLICATION

- A. Apply products in accordance with manufacturer's instructions. Use applicators and techniques best suited for substrate type of material being applied and to produce a uniform appearance. Paint film must be free of runs, skips, sags and other defects.
- B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce an even smooth surface in accordance with the manufacturer's directions.
- E. Apply each coat to uniform appearance.
- F. Apply additional coats when undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform coverage, finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.
- J. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
- K. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, nonspecular black paint.
- L. Omit primer on metal surfaces that have been shop-primed and touch up painted, unless paint compatibility is questionable, then provide barrier coat and new prime coat.
- M. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
- N. Minimum Coating Thickness: Apply materials at not less than the manufacturer's recommended spreading rate. Provide a total dry film thickness of the entire system as recommended by the manufacturer.
- O. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- P. Prime Coats: Before application of finish coats, apply a prime coat of material as recommended by the manufacturer to material that is required to be painted or finished and has not been prime

coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to assure a finish coat with no burn through or other defects due to insufficient sealing.

- Q. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holiday, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- R. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.
- S. Pavement Marking Application:
  - 1. Provide uniform coating.
  - 2. Correct markings not having uniform appearance.
  - 3. Protect neatly painted surfaces until paint is sufficiently dry to permit vehicles to cross paint without damage.

#### 3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Refer to Section 15075 and Section 16075 for schedule of color coding of equipment, duct work, piping, and conduit.
- B. Paint shop-primed equipment, where indicated.
- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

#### 3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

#### 3.06 SCHEDULE - SURFACES TO BE FINISHED

- A. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically noted.
  - 2. Fire rating labels, equipment serial number and capacity labels.
- B. Paint the surfaces described inspection and.

#### 3.07 SCHEDULE - PAINT SYSTEMS

**END OF SECTION**

# D I V I S I O N 10

Applicable Portions Of The Conditions  
Of The Contract And Division 1 General  
Requirements Apply To The Work Of  
This Division.

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**SECTION 10171 - SOLID PHENOLIC TOILET COMPARTMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Solid phenolic toilet compartments.
- B. Solid phenolic urinal screens.

**1.02 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Show layout of partitions, screens, and compartments.
- C. Product Data: Manufacturer's catalog data on panels, pilasters, doors, hardware and fastening.
- D. Color Charts: Manufacturer's complete range of colors.
- E. Samples:
  - 1. Actual panel material, not less than 6 inches square.
  - 2. Actual hardware.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

- A. Capitol Partitions, Inc.
- B. Columbia Partitions.
- C. General Partitions.
- D. Rockville Partitions.
- E. Santana.
- F. Substitutions: See Section 01600 - Product Requirements.

**2.02 COMPARTMENTS AND SCREENS**

- A. Toilet Compartments: Solid phenolic.
  - 1. Overhead braced.
- B. Urinal Screens: Solid phenolic.
  - 1. Wall hung.
  - 2. Pilaster supported, floor braced.

**2.03 SOLID PHENOLIC MATERIALS**

- A. Panels: Solid phenolic core material, compression molded, single piece construction with integral plastic laminate surface and uniformly machined edges; no two-piece construction.
  - 1. Color: As selected from full range of standard plastic laminate colors.
  - 2. Panel Size: Nominal 3/4 inch thick by 58 inches high, of required depth.
- B. Doors: Same design and construction as specified for panels; nominal 3/4 inch thick by 58 inches high.
- C. Pilasters: Same design and construction as specified for panels and doors; nominal 3/4 inch thick.

1. For Urinal Screens: 5 inches wide by 54 inches high.
- D. Urinal Screens: Same design and construction as specified for panels; nominal 3/4 inch thick.
  1. Height: 42 inches.
  2. Depth: 18 inches.
  3. Provide pilasters for rigid support at exposed end.
- E. Panel Anchors: Type 304 stainless steel, brush finish.
  1. Panels to Pilasters: Three U-brackets.
  2. Panels to Wall: Three double ear brackets.
  3. Pilasters to Wall: Continuous single ear bracket (panel height).
- F. Overhead Braced: 80 inch high pilasters.
  1. Pilaster Floor Anchors: To mount pilasters 2 inches above finish floor; Type 304 stainless steel; 12 gage angle and two 5/16 inch threaded rods with leveling nuts and washers and lead double expansion shields.
  2. Top Bracing: Brite anodized aluminum channel 1-1/2 inch by 1 inch of anti-grip design to cap top of pilasters and secured on inside of compartment.
  3. Headrail Brackets: 18 gage stainless steel.
  4. Conceal floor fasteners with 4 inch high one-piece 20 gage Type 304 stainless steel floor shoe.
- G. Urinal Screen Anchors:
  1. To Wall: One full length double ear bracket, fastened with 8 wall fasteners.
  2. To Pilasters: Continuous U-channel.
  3. To Floor: 1/8 inch aluminum angle with No. 14 by 1-3/4 inch tamper-proof screws into conical plastic anchors.
  4. Conceal floor anchors with 4 inch high one-piece 20 gage Type 304 stainless steel shoes.

#### 2.04 HARDWARE

- A. Hardware: Provide all hardware and fasteners for a complete installation.
- B. Door Hinges: 1/8 inch thick heavy extruded brite anodized type 6463T5 aluminum hinges that wrap around both the door and pilaster.
  1. Solid Phenolic: Fasten hinges to door and pilaster with one-way head thru-bolts.
  2. Top Hinges: Opposing nylon cams factory set at 30 degrees open for in-swing and closed for out-swing.
  3. Reinforce top hinge with a 1/4 inch stainless steel rod.
- C. Strike-Keeper and Throw Latch: 16 gage formed Type 304 stainless steel strike-keeper with rubber stop and cast stainless steel slide bar and knob that does not require gripping or turning, brushed finish.
- D. Coat Hook and Wall Bumper: Heavy chrome-plated Zamac fastened with 5/8 inch stainless steel tamper-proof screws.
- E. Fasteners:
  1. Tamper-Proof.
  2. Floor and wall fasteners: No. 14 by 1-3/4 inch tamper-proof screws with conical plastic anchors.
  3. All other fasteners: 5/8 inch stainless steel tamper-proof screws or chrome plated brass tamper-proof brass thru-bolts.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install partitions rigid, straight, plumb and level in accordance with manufacturer's instructions.
- B. Set units with not more than 1/2 inch between pilasters and panels and not more than 3/4 inch between panels and walls.
- C. Overhead-Braced: Secure to structural concrete floor.
- D. Floor-Mounted: Secure to structural concrete floor.
- E. Hollow Stud Partitions: Secure panels to wood blocking inside partitions.
- F. Adjust and lubricate hardware for proper operation after installation.
  - 1. Set hinges on in-swing doors to hold doors in the open or closed position when unlatched as shown on drawings.
  - 2. Set hinges on out-swing doors to return to the fully closed position.
  - 3. Remove protective plastic coating.

**END OF SECTION**

**SECTION 10800 - TOILET, BATH, AND LAUNDRY ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Accessories for toilet rooms.
- B. Grab bars.

**1.02 REFERENCE STANDARDS**

- A. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- C. ASTM C1036 - Standard Specification for Flat Glass.
- D. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror.
- E. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration.

**1.03 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
- C. Schedule: Submit complete schedule of accessories indicated type and location where each item is to be installed in accordance with groups specified.
- D. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices and cut-out requirements in other work.
- E. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

**1.04 QUALITY ASSURANCE**

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. Deliver items in manufacturer's original unopened protective packages and store in these packages so as to prevent physical damage, soiling or wetting.
- B. Handle accessories so as to prevent damage to finished surfaces and install with manufacturer's protective covers in tact, as much as practical.
- C. Maintain protective covers until final cleaning. Upon removal clean exposed surfaces as recommended by manufacturer.

**PART 2 PRODUCTS**

## 2.01 MANUFACTURERS

- A. Products listed are made by Bobrick Washroom Equipment, Inc.
- B. Other Acceptable Manufacturers:
  - 1. American Specialties, Inc: [www.americanspecialties.com](http://www.americanspecialties.com).
  - 2. Bradley Corporation: [www.bradleycorp.com](http://www.bradleycorp.com).
  - 3. Substitutions: Section 01600 - Product Requirements.
- C. All items of each type to be made by the same manufacturer.

## 2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Provide 3 keys for each accessory to Owner; master key all lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269, Type 304 or 316.
- E. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 20-gage (.040") minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.
- F. Mirror Glass: Float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- G. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof.
- H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

## 2.03 FINISHES

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.
- B. Back paint components where contact is made with building finishes to prevent electrolysis.

## 2.04 TOILET ROOM ACCESSORIES

- A. Toilet Paper Dispenser: Double roll, surface mounted bracket type, satin finished cast aluminum brackets, eccentric-shaped plastic spindle for 1/2 revolution delivery designed to prevent theft of tissue roll.
  - 1. Product: B-2740 manufactured by Bobrick Washroom Equipment, Inc.
- B. Paper Towel Dispenser: Folded paper type, stainless steel, semi-recessed, with viewing slots on sides as refill indicator and tumbler lock.
  - 1. Capacity: 400 C-fold or 525 multifold minimum.
  - 2. Product: B-262 manufactured by Bobrick Washroom Equipment, Inc.
- C. Soap Dispenser: Wall mounted (by Owner); Contractor installed.
- D. Mirrors: Stainless steel framed, 6 mm thick float glass mirror.
  - 1. Size: As scheduled.
  - 2. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and



- tamperproof hanging system; No.4 finish.
3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
  4. Product: B-165 manufactured by Bobrick Washroom Equipment, Inc.
- E. Grab Bars: Stainless steel, nonslip grasping surface finish.
- F. Grab Bars: Stainless steel, 1-1/2 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
1. Length and configuration: As indicated on schedule.
  2. Product: B-6206 manufactured by Bobrick Washroom Equipment, Inc.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.
- D. See Section 09260 for installation of blocking, reinforcing plates, and concealed anchors in walls, and ceilings.

#### **3.02 PREPARATION**

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

#### **3.03 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

#### **3.04 ADJUSTING AND CLEANING**

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces after removing temporary labels and protective coatings.

#### **3.05 SCHEDULE**

- A. General: For the purpose of identifying the types of accessories and the expected minimum quality intended for this project
- B. Accessory Schedule
  1. Men 102
    - a. (1) Mirror
    - b. (1) Soap Dispenser.
    - c. (1) Toilet Paper Dispenser.
    - d. (1) 36" Grab Bar (Horizontal).

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- e. (1) 42" Grab Bar (Horizontal).
- f. (1) 18" Grab Bar (Vertical)
- g. (1) Paper Towel Dispenser.
- 2. Women 103
  - a. (2) Mirror
  - b. (2) Soap Dispenser.
  - c. (1) Toilet Paper Dispenser.
  - d. (1) 36" Grab Bar (Horizontal).
  - e. (1) 42" Grab Bar (Horizontal).
  - f. (1) 18" Grab Bar (Vertical)
  - g. (2) Paper Towel Dispenser.

**END OF SECTION**

**SECTION 15010 - GENERAL MECHANICAL**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work under Division 15 shall include furnishing of all labor, accessories, tools, equipment and material required to completely execute installation of the entire heating, ventilating and air conditioning systems, plumbing systems and fire protection systems as shown on the drawings and as specified. Work shall include but not be limited to the furnishing, unloading, handling distribution, setting, supporting and installation of all components required for the mechanical systems.
- B. Mechanical specification Sections 15000 through 15299 generally apply to all mechanical trades. Sections 15300 through 15399 apply generally to fire protection work. Sections 15400 through 15499 apply generally to plumbing work. Sections 15500 through 15999 apply generally to HVAC work.

1.02 REFERENCES

- A. FM P7825 - Approval Guide; Factory Mutual.
- B. NEMA MG 1 - Motors and Generators.
- C. NFPA 70 - National Electrical Code.
- D. SSPC-Paint 15 - Steel Joist Shop Paint; Steel Structures Painting Council.
- E. ASME American Society of Mechanical Engineers
- F. ASTM American Society for Testing Materials
- G. NEMA National Electrical Manufacturers Association
- H. NFPA National Fire Protection Association
- I. OSHA Occupational Safety and Health Act
- J. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Inc.
- K. IBC International Building Code
- L. IMC International Mechanical Code
- M. IPC International Plumbing Code
- N. IFC International Fire Code

1.03 Interpretation of Contract Documents:

- A. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.
- B. It shall be understood that the specifications and drawings are complimentary and are to be taken together for a complete interpretation of the work.
- C. No exclusions from, or limitations in, the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any

required system or item of equipment are to be omitted

- D. The drawings of necessity utilize symbols and schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the diagrammatic intent expressed on the drawings, and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.
- E. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.
- F. Certain details appear on the drawings which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the intended work.
- G. Information as to the general construction shall be derived from structural and architectural drawings and specifications only.
- H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Work shall be installed to conform with any City or State law, regulation, code, ordinance, ruling or Fire Underwriters requirement applicable to this class of work.
- B. All installations for construction purposes shall conform with the Department of Labor "Safety and Health Regulations for Construction".
- C. All equipment with electrical components shall bear the UL label.

#### 1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Documents will not be accepted for approval unless:
  - 1. They are listed in the specifications as an approved manufacturer or approval has been obtained prior to bid.
  - 2. They comply with the requirements of the supplement to the General Conditions.
  - 3. They include complete information pertaining to appurtenances and accessories.

#### 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

#### 1.07 WARRANTY

- A. See Section 01740 - Warranties and Bonds, for additional warranty requirements.

### PART 2 PRODUCTS

#### 2.01 Materials and Manufacturers:

- A. Equipment and materials installed under this contract shall be new and without blemish or defect.

- B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. ASME Code Ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible.
- C. In all cases the contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed.

#### 2.02 Electrical Equipment

- A. Within 60 days of award of contract, the person responsible for work in this division shall verify that the appropriate number of contacts have been provided in the starters or drives and if a control power transformer is required that it has been provided to control the equipment as described in Section 15940-HVAC Sequence of Operation.

#### 2.03 Substitution of Specified Materials:

- A. Throughout the drawings and specifications, equipment and systems have been selected and are referenced by name, manufacturer, model number, etc. These references are not intended to limit competition and in most cases materials and methods of construction equal to that specified will be accepted provided prior approval of any substitute item is obtained from the Architect/Engineer. Only products by the listed manufacturers will be acceptable. Contractors and other manufacturers may submit requests to be listed as an acceptable manufacturer on the specified item by submitting documentation in accordance with the requirements of Section 1600. All bidders will be notified by addendum of any approved substitutions. Under no circumstances will any substitutes be accepted after that date; and any item installed on the job which has not been approved in accordance with the noted procedure shall be removed and replaced with the appropriate approved item at the contractor's expense.
- B. In all cases the contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed.

### PART 3 EXECUTION

#### 3.01 Protection of Equipment:

- A. Protect all materials and equipment from damage during storage at the site and throughout the construction period.
- B. Protection from damage from rain, dirt, sun and ground water shall be accomplished by storing the equipment on elevated supports and covering them on all sides with protective rigid or flexible water proof coverings securely fastened.
- C. Piping shall be protected by storing it on elevated supports and capping the ends with suitable material to prevent dirt accumulation in the piping.

#### 3.02 COORDINATION OF WORK

- A. All work shall be coordinated to avoid conflict with other contractors.
- B. The contractor shall be responsible for checking to insure that the equipment to be installed will fit in the space shown on the drawings. If there is a conflict, the contractor shall notify the

Engineer before bid. By submitting a bid the contractor assures that the equipment to be installed will fit or that provisions have been included in the bid to move the equipment to a location where it can be installed without conflict.

- C. The Contractor shall review and coordinate the casework and millwork shop drawings to determine the location of sinks, range hoods, refrigerators, lab equipment, etc., and rough-in and install any and all items shown on the plans.

### 3.03 Contiguous Work:

- A. If any part of the Contractor's work is dependent for its proper execution or for its subsequent efficiency or appearance on the character or conditions of contiguous work not executed by him, this contractor shall examine and measure such contiguous work and report to the Architect in writing any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should the contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions and he shall be responsible.

### 3.04 Access to Equipment and Valves:

- A. All control devices, specialties, valves and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance, including removal of any interior components.
- B. Should any work, such as piping, ducts, conduit, etc. be installed without due regard to the accessibility of devices installed by other contractors, the installation shall be relocated, offset or rerouted without cost to the Owner.

### 3.05 Cutting and Patching:

- A. Perform all cutting and patching required for installation of the work.

### 3.06 Project Closeout:

- A. Maintenance Manuals: At the end of construction, furnish to the Architect three (3) bound and indexed sets of maintenance and operating instructions, parts lists, electrical wiring diagrams, balance data, and manufacturer's literature sufficient for operation and complete maintenance of all equipment by the Owner.
- B. Approved submittals and shop drawings may be included in the Maintenance Manuals instead of being separately furnished, if desired.
- C. It is intended that the documentation provided in maintenance manuals, along with as-built drawings, shall be complete and detailed enough to permit and facilitate troubleshooting, engineering analysis, and design work for future changes, without extensive field investigations and testing. Manuals shall be prepared so as to explain system operation and equipment to those not acquainted with the job.
- D. Manuals shall be durably bound and clearly identified on the front cover (and on the spine of thick volumes). Identification shall include the building or project name, applicable trade (such as HVAC, Plumbing, Fire Protection, etc.), approximate date of completion (month and year) and contractor's name.
- E. Manuals shall be organized into well defined and easy to locate sections, with index tabs or separators to divide the sections. A complete table of contents shall be provided at the front indicating the section or page number for each system, subsystem, or supplier/manufacturer.

- F. Manuals shall include complete information and diagrams on all controls, indicators, sensors, and signal sources. Control diagrams are to show the locations of components and major equipment by room number or other identification when room numbers are not applicable. Locations of out-of-sight components, such as duct mounted sensors, flow switches, etc. should be clearly indicated. Control diagrams must include identification of components by make and model number, operating ranges, recommended set points, reset schedules, and other job-specific data useful for troubleshooting, calibration and maintenance. Complete narrative descriptions of operating sequences of control systems and subsystems shall be included on the prints adjacent to the corresponding schematics. Catalog data and cuts shall be clearly marked to indicate model numbers, sizes, capacities, operating points, and other characteristics of each item used. This should include accessories or special features provided. Where various sizes or variations of a series or model are used, documents should clearly show which are used where. Where quantities are appropriate, schedule of usage should be provided. Maintenance literature shall include complete information for identifying and ordering replacement parts, such as illustrated parts breakdowns.
- G. Maintenance manuals must include complete balance data on all systems.

**3.07 Instructions to Owner:**

- A. Contractor shall conduct a maintenance and operational instruction session for the Owner. Where highly technical or complex equipment is supplied, such as chillers and control systems, manufacturer's representatives, controls subcontractors, and other appropriate personnel who are particularly qualified, shall conduct training sessions pertaining to their equipment, or systems. Such training shall be scheduled with the Owner in advance.

**3.08 Warranties:**

- A. This Contractor warrants the mechanical systems to be free of defects in materials and workmanship for a period of one year after date of final payment. The effective dates of this warranty apply to all components of the mechanical systems regardless of any equipment manufacturer's warranties which may expire at an earlier date. Any system malfunctions, or any previously undiscovered non-compliance with the plans and specifications, during the warranty period shall be repaired at no cost to the Owner.
- B. Deliver to Owner all warranties, guarantees, etc. and obtain written receipts.

**END OF SECTION**

**SECTION 15080 - MECHANICAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Duct insulation.
- B. Piping insulation.

**1.02 SCOPE OF WORK:**

- A. Provide insulation as specified for domestic hot and cold water piping systems, including valves, fittings, flanges, and mechanical couplings and ductwork.

**1.03 RELATED SECTIONS**

- A. Section 15075 - Mechanical Identification.
- B. Section 15145 - Plumbing Piping: Placement of hangers and hanger inserts.
- C. Section 15810 - Ducts.

**1.04 REFERENCES**

- A. ASTM C 195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 1995.
- B. ASTM C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- C. ASTM C 547 - Standard Specification for Mineral Fiber Pipe Insulation; 1995.
- D. ASTM C 553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
- E. ASTM C 592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 1980.
- F. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; 1993.
- H. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible.

**1.05 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures which ensure acceptable workmanship and installation standards will be achieved.
- D. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
  - 1. Shop drawings and product data

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type



specified in this section with not less than three years of documented experience.

#### 1.07 REGULATORY REQUIREMENTS

- A. Materials: Conform to maximum flame spread/smoke developed rating of 25/50 in accordance with ASTM E 84.

#### 1.08 DELIVERY, STORAGE, AND PROTECTION

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

#### 1.09 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

### PART 2 PRODUCTS

#### 2.01 DUCT INSULATION

- A. GLASS FIBER, FLEXIBLE
  - 1. Manufacturers.
    - a. Provide products complying with the specifications by one of the following manufactures.
      - 1) Certain Teed Corporation.
      - 2) Johns Manville
      - 3) Knauf Fiberglass GmbH.
      - 4) Owens-Corning Fiberglass Corporation.
  - 2. Insulation: ASTM C 553; flexible, noncombustible blanket.
    - a. 'K' value : ASTM C 518, 0.31 at 75 degrees F.
    - b. Maximum service temperature: 250 degrees F.
    - c. Maximum moisture absorption: 0.20 percent by volume.
  - 3. Vapor Barrier Jacket:
    - a. Moisture vapor transmission: ASTM E 96; 0.02 perm.
  - 4. Vapor Barrier Tape:
    - a. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

#### 2.02 PIPE INSULATION

- A. Insulation shall have composite (insulation jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings as tested by procedure ASTM E84, NFPA 255 or UL 723 not exceeding:
  - 1. Flame Spread: 25.
  - 2. Smoke Developed: 50.
- B. Insulation shall be glass fiber with a maximum K factor of .24 at 75 degrees F mean temperature with factory applied fire resistant vapor barrier jacket, for cold piping and fire retardant jacket for hot water.
  - 1. For fittings and valve bodies 3" and smaller, insulation shall be one-pound density glass

fiber blanket wrapped firmly under compression with No. 20 gauge galvanized annealed steel wire and given a smoothing coat of finishing cement.

- C. Accessories such as adhesives, mastics, cements, tapes and cloth for fittings shall have the same component rating as listed above. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed requirements. Treatment of jackets or facings to impart flame and smoke-safety shall be permanent. The use of water-soluble treatments are prohibited.
- D. GLASS FIBER
  - 1. Manufacturers.
    - a. Provide products complying with the specifications by one of the following manufactures.
      - 1) Certain Teed Corporation.
      - 2) Johns Manville
      - 3) Knauf Fiberglass GmbH.
      - 4) Owens-Corning Fiberglass Corporation.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that piping has been tested before applying insulation materials.
- C. Verify that surfaces are clean, foreign material removed, and dry.

#### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. DUCT INSULATION
  - 1. Insulated ducts conveying air below ambient temperature:
    - a. Provide insulation with vapor barrier jackets.
    - b. Finish with tape and vapor barrier jacket.
    - c. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
    - d. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- C. PIPE INSULATION
  - 1. Longitudinal lap and 4" wide vapor barrier joint seal strips shall be adhered neatly in place with BF 85-20 adhesive or approved equal and banded.
  - 2. The ends of pipe insulation shall be sealed off with BF 30-35 coatings at all flanges, valves and fittings and at intervals of not more than 21 feet on continuous runs or pipes.
  - 3. Fittings shall be vapor sealed by applying a layer of white open weave glass fabric (20 x 20 between two 1/16" thick coats of BF 30-35.
  - 4. Insulation shall be fastened in place with 16 gauge annealed wire on 18" centers maximum for piping runs and as required for a secure installation at fittings, valves, and appurtenances. Provide 8 ounce canvas jacket pasted in place and sized for all exposed piping.
  - 5. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

6. Glass fiber insulated pipes conveying fluids below ambient temperature:
  - a. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - b. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
7. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

### 3.03 SCHEDULES

#### A. DUCTWORK INSULATION

1. Supply Ducts.
  - a. Flexible Glass Fiber Duct Insulation: 1-1/2 inch thick.

#### B. PIPING INSULATION

1. Domestic hot, hot water recirculating and cold water piping (above ground):
  - a. Pipe sizes 1/2 - 3 inches: 1-inch Glass fiber insulation.

**END OF SECTION**

**SECTION 15145 - PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pipe, pipe fittings, valves, and connections for piping systems.
  - 1. Sanitary sewer.
  - 2. Domestic water.

**1.02 RELATED REQUIREMENTS**

- A. Section 15073 - Vibration and Seismic Control.
- B. Section 15080 - Mechanical Insulation.

**1.03 REFERENCE STANDARDS**

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 1996 (Reaffirmed 2003).
- B. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings; The American Society of Mechanical Engineers.
- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers (ANSI B16.18).
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers.
- E. Pipe.ASTM B 32 - Standard Specification for Solder Metal.
- F. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
- G. ASTM B302 - Standard Specification for Threadless Copper Pipe, Standard Sizes.

**1.04 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories.
- C. Project Record Documents: Record actual locations of valves.

**1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with State of South Carolina, standards.
  - 1. Maintain one copy on project site.
- B. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

**1.06 SEISMIC RESTRAINT**

- A. All piping and water heater shall be seismically restrained as per the International Building Code.
- B. Contractor shall submit plans by a licensed seismic engineer showing the recommended seismic design for the plumbing system. See section 15073 for detail information.

**1.07 REGULATORY REQUIREMENTS**

- A. Perform Work in accordance with State of South Carolina plumbing code.

#### 1.08 PIPE MARKERS

- A. Color: Conform to ASME A13.1.
- B. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### PART 2 PRODUCTS

#### 2.01 SANITARY SEWER PIPING, ABOVE GRADE

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
  - 1. Fittings: Cast iron.
  - 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

#### 2.02 WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B 88, Type L (B), Drawn (H).
  - 1. Fittings: ASME B16.22, wrought copper and bronze, or ASME B16.18 bronze sand castings. Fittings manufactured to copper tubing sizes, with grooved ends designed to accept grooved end couplings of the same manufacturer. (Flaring of tube and fitting ends to IPS dimensions is not allowed.)
  - 2. Joints: ASTM B 32, alloy Sn95 solder. Maximum lead content 0.10%

#### 2.03 FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 3 Inches and Under:
  - 1. Copper tube and pipe: Class 150 bronze unions with soldered joints.

#### 2.04 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
  - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  - 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
  - 3. Trapeze Hangers: Welded steel channel frames attached to structure.
  - 4. Vertical Pipe Support: Steel riser clamp.
- B. Plumbing Piping - Drain, Waste, and Vent:
  - 1. Conform to ASME B31.9.

2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
5. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
6. Vertical Support: Steel riser clamp.
7. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Plumbing Piping - Water:

1. Conform to ASME B31.9.
2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.05 BALL VALVES

A. Manufacturers:

1. Apollo
2. Conbraco Industries: [www.conbraco.com](http://www.conbraco.com).
3. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
4. Substitutions: See Section 01600 - Product Requirements.

- B. Construction 2 Inches and Smaller: Meets the intent of MSS SP-110, 300 psi CWP, forged brass body, two piece, chrome plated brass ball and stem, full port, Teflon seats, blow-out proof stem, lever handle, Vic Press 304™ ends.

PART 3 EXECUTION

3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel or groove plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges, grooved joint couplings or unions.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 15080.
- F. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08310.

- G. Install valves with stems upright or horizontal, not inverted.
- H. Install water piping to ASME B31.9.
- I. Sleeve pipes passing through partitions, walls and floors.
- J. Inserts:
  - 1. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  - 2. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.
- K. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9.
  - 2. Support horizontal piping as scheduled.
  - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches of each horizontal elbow.
  - 5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 6. Provide copper plated hangers and supports for copper piping.

### 3.03 APPLICATION

- A. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

### 3.04 TOLERANCES

- A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/8 inch per foot slope.
- B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

### 3.05 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- D. Maintain disinfectant in system for 24 hours.
- E. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- F. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- G. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

### 3.06 SCHEDULES

- A. Pipe Hanger Spacing:
  - 1. Metal Piping:
    - a. Pipe size: 1/2 inches to 1-1/4 inches:
      - 1) Maximum hanger spacing: 6.5 ft.

- 2) Hanger rod diameter: 3/8 inches.
- b. Pipe size: 1-1/2 inches to 2 inches:
  - 1) Maximum hanger spacing: 10 ft.
  - 2) Hanger rod diameter: 3/8 inch.
- c. Pipe size: 2-1/2 inches to 3 inches:
  - 1) Maximum hanger spacing: 10 ft.
  - 2) Hanger rod diameter: 1/2 inch.
- d. Pipe size: 4 inches to 6 inches:
  - 1) Maximum hanger spacing: 10 ft.
  - 2) Hanger rod diameter: 5/8 inch.

**END OF SECTION**



**SECTION 15146 - PLUMBING SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cleanouts.
- B. Water hammer arrestors.

1.02 RELATED REQUIREMENTS

- A. Section 15145 - Plumbing Piping.
- B. Section 15410 - Plumbing Fixtures.

1.03 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
- D. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- E. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
- F. Operating instructions
- G. Maintenance instructions, including preventative and corrective maintenance.
- H. Copies of warranties
- I. Shop drawings and product data

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.01 DRAINS

- A. Manufacturers:
  - 1. Jay R. Smith Manufacturing Company: [www.jayrsmith.com](http://www.jayrsmith.com).
  - 2. Zurn Industries, Inc: [www.zurn.com](http://www.zurn.com).
  - 3. Substitutions: See Section 01600 - Product Requirements.
- B. Floor Drains:
  - 1. Assembly: ASME A112.21.1M.
  - 2. Body: Lacquered cast iron two piece body with double drainage flange..

2.02 CLEANOUTS

A. Manufacturers:

1. Jay R. Smith Manufacturing Company: [www.jayrsmith.com](http://www.jayrsmith.com).
2. Josam Company: [www.josam.com](http://www.josam.com).
3. Wade
4. Zurn Industries, Inc: [www.zurn.com](http://www.zurn.com).
5. Watts

2.03 WATER HAMMER ARRESTORS

A. Manufacturers:

1. Jay R. Smith Manufacturing Company; Model 5000: [www.jayrsmith.com](http://www.jayrsmith.com).
2. Watts Regulator Company; Model Series 15: [www.wattsregulator.com](http://www.wattsregulator.com).
3. Zurn Industries, Inc; Model Z-1700: [www.zurn.com](http://www.zurn.com).
4. Josam 75000
5. Wade Model

B. Water Hammer Arrestors:

1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range -100 to 300 degrees F and maximum 250 psi working pressure.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install S.A. on CW water supply piping to group of fixtures see drawings.

**END OF SECTION**

**SECTION 15410 - PLUMBING FIXTURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES (See Plumbing Fixture Schedule on Drawing P0.0)**

- A. Water closets.
- B. Urinals.
- C. Lavatories.
- D. Electric water coolers.
- E. Faucets.

**1.02 RELATED REQUIREMENTS**

- A. Section 15145 - Plumbing Piping.
- B. Section 15146 - Plumbing Specialties.
- C. Section 15430 - Plumbing Equipment.

**1.03 REFERENCE STANDARDS**

- A. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration.
- B. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; The American Society of Mechanical Engineers.
- C. ASME A112.18.1 - Plumbing Supply Fittings; The American Society of Mechanical Engineers.
- D. ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use); The American Society of Mechanical Engineers.
- E. ISSFA-2 - Classification and Standards for Solid Surfacing Material; International Solid Surface Fabricators Association

**1.04 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Manufacturer's Instructions: Indicate installation methods and procedures.
- D. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- F. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
- G. Recommended spare parts
- H. Spare parts lists
- I. Operating instructions

- J. Maintenance instructions, including preventative and corrective maintenance.
- K. Copies of warranties
- L. Shop drawings and product data

#### 1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience, and service facility within 100 miles of Project.
- C. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

#### 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

#### 1.07 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

#### 1.09 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for electric water cooler.

### PRODUCTS

#### 2.01 MANUFACTURERS

- A. Plumbing Fixtures (Water Closets and Lavatories)
  - 1. American Standard; U.S. Plumbing Products
  - 2. Crane
  - 3. Kohler Co.
  - 4. Eljer Co.
- B. Faucets:
  - 1. American Standard
  - 2. Chicago Faucet
  - 3. T & S Brass
  - 4. Delta Faucet Co.
- C. Supplies and P-traps:
  - 1. American Standard
  - 2. Kohler Co.

3. T & S Brass
4. McGuire Manufacturing Co.

- D. ADA Trim Insulation
1. McGuire ProWrap
  2. Plumberex
  3. Tru Boro

## 2.02 ELECTRIC WATER COOLERS

- A. Electric Water Cooler Manufacturers:
1. Tri Palm International/Oasis: [www.tripalmint.com](http://www.tripalmint.com).
  2. Elkay Manufacturing Company: [www.elkay.com](http://www.elkay.com).
  3. Haws Corporation: [www.hawesco.com](http://www.hawesco.com).

## 2.03 MOP SERVICE BASIN

- A. MSB: Mop Basin Manufacturers:
1. Fiat
  2. Stern Williams

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

### 3.02 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

### 3.03 INSTALLATION

- A. Install components level and plumb.
- B. Install and secure fixtures in place with wall supports and bolts.

### 3.04 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

### 3.05 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

### 3.06 CLEANING

- A. Clean plumbing fixtures and equipment.

### 3.07 SCHEDULES

- A. Fixture Heights: Install fixtures to heights above finished floor as indicated.
1. Water Closet:
    - a. Standard: 15 inches to top of bowl rim.
    - b. Accessible: 18 inches to top of seat.
  2. Water Closet Flush Valves:

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- a. Standard: 11 inches min. above bowl rim.
  - b. Recessed: 10 inches min. above bowl rim.
  3. Lavatory: ( See Architectural Drawings.)
  4. Water Cooler:
    - a. Standard Adult: 40 inches to top of basin rim.
    - b. Accessible: 36 inches to top of spout.
- B. Fixture Rough-In**
1. Water Closet (Flush Valve Type):
    - a. Cold Water: 1 Inch.
    - b. Waste: 4 Inch.
    - c. Vent: 2 Inch.
  2. Lavatory:
    - a. Hot Water: 1/2 Inch.
    - b. Cold Water: 1/2 Inch.
    - c. Waste: 1-1/2 Inch.
    - d. Vent: 1-1/4 Inch.
  3. Water Cooler:
    - a. Cold Water: 1/2 Inch.
    - b. Waste: 1-1/4 Inch.
    - c. Vent: 1-1/4 Inch.

**END OF SECTION**

## SECTION 15810 - DUCTS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Metal ductwork.

#### 1.02 RELATED REQUIREMENTS

- A. Section 15086 - Duct Insulation: External insulation and duct liner.
- B. Section 15820 - Duct Accessories.
- C. Section 15950 - Testing, Adjusting, and Balancing.

#### 1.03 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.
- E. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; Sheet Metal and Air Conditioning Contractors' National Association.
- F. SMACNA (DCS) - HVAC Duct Construction Standards.

#### 1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for duct materials.
- C. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for \_\_\_\_\_ pressure class and higher systems.
- D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual.
- E. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.
- F. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
  - 1. Shop drawings and product data

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

#### 1.06 REGULATORY REQUIREMENTS

- A. Construct ductwork to NFPA 90A standards.

### 1.07 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

## PART 2 PRODUCTS

### 2.01 DUCT ASSEMBLIES

### 2.02 MATERIALS

- A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G90/Z275 coating.
- B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
  - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
  - 2. Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E84.
- C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
- D. All Ducts: Galvanized steel, unless otherwise indicated.
- E. Low Pressure Supply: 2 inch w.g. pressure class, galvanized steel.

### 2.03 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and as indicated.
- B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- C. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.
- D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- E. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA HVAC Duct Construction Standards.
- F. Clean shop fabricated ductwork of debris, oil and grease. Cover ends of ductwork with temporary closure material and tape. Protect ductwork from entry of dust and debris during shop storage, shipment and temporary storage at the job site.
- G. Wipe the inside of all ductwork to remove the debris, oil, grease, etc. Once ductwork is clean, cover with plastic or metal temporary closure material. Seal tight so that no water, moisture or debris can enter the ductwork. Protect ductwork from entry of dust and debris during shop storage, shipment and temporary storage at the job site.

### 2.04 MANUFACTURED DUCTWORK AND FITTINGS



- A. Flexible Ducts: Two ply vinyl film supported by helically wound spring steel wire.
  - 1. Insulation: Fiberglass insulation with polyethylene vapor barrier film.
  - 2. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
  - 3. Maximum Velocity: 4000 fpm.
  - 4. Temperature Range: -10 degrees F to 160 degrees F.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install, support, and seal ducts in accordance with SMACNA HVAC Duct Construction Standards.
- B. Install in accordance with manufacturer's instructions.
- C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- D. Flexible Ducts: Connect to metal ducts with adhesive.
- E. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- F. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- H. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- I. Use double nuts and lock washers on threaded rod supports.
- J. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.
- K. Leave temporary closures in place until ready for installation. At no time during the installation of the ductwork shall there be any openings that are not protected by temporary closures except for the section that is being installed at that time.
- L. Provide temporary closures on the face of all grilles, registers and diffusers.
- M. Seal all joints with sealant.
- N. Provide pressure testing on all isolation exhaust ductwork.

#### **3.02 Ductwork Seal Class:**

- A. Supply: Class A

**END OF SECTION**

**SECTION 15820 - DUCT ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Duct access doors.
- B. Duct test holes.
- C. Volume control dampers.

**1.02 REFERENCE STANDARDS**

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.
- B. SMACNA (DCS) - HVAC Duct Construction Standards.

**1.03 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.
- D. Manufacturer's Installation Instructions: Provide instructions for fire dampers.
- E. Project Record Drawings: Record actual locations of access doors and test holes.
- F. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
  - 1. Spare parts lists
  - 2. Operating instructions
  - 3. Maintenance instructions, including preventative and corrective maintenance.
  - 4. Copies of warranties
  - 5. Wiring diagrams
  - 6. Shop drawings and product data

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

**PART 2 PRODUCTS**

**2.01 DUCT ACCESS DOORS**

- A. Manufacturers:
  - 1. Nailor Industries Inc: [www.nailor.com](http://www.nailor.com).
  - 2. Ruskin Company: [www.ruskin.com](http://www.ruskin.com).
  - 3. SEMCO Incorporated: [www.semcoinc.com](http://www.semcoinc.com).
- B. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch thick insulation with sheet metal cover.
  - 1. Less Than 12 inches Square: Secure with sash locks.

2. Up to 18 inches Square: Provide two hinges and two sash locks.

C. Access doors with sheet metal screw fasteners are not acceptable.

## 2.02 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

## 2.03 VOLUME CONTROL DAMPERS

A. Manufacturers:

1. Louvers & Dampers, Inc: [www.louvers-dampers.com](http://www.louvers-dampers.com).

2. Nailor Industries Inc: [www.nailor.com](http://www.nailor.com).

3. Ruskin Company: [www.ruskin.com](http://www.ruskin.com).

4. Substitutions: See Section 01600 - Product Requirements.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards and as indicated.

C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.

1. Fabricate for duct sizes up to 6 x 30 inch.

2. Blade: 24 gage, minimum.

D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

1. Blade: 18 gage, minimum.

E. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

F. Quadrants:

1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.

2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

3. Where rod lengths exceed 30 inches provide regulator at both ends.

## PART 3 EXECUTION

### 3.01 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards. Refer to Section 15810 for duct construction and pressure class.

B. Provide duct test holes where indicated and required for testing and balancing purposes.

**END OF SECTION**

**SECTION 15850 - AIR OUTLETS AND INLETS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Diffusers.
- B. Registers/grilles.

**1.02 RELATED REQUIREMENTS**

**1.03 REFERENCE STANDARDS**

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc..
- B. ASHRAE Std 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets; American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc..
- C. SMACNA (DCS) - HVAC Duct Construction Standards.

**1.04 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.
- C. Project Record Documents: Record actual locations of air outlets and inlets.
- D. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
  - 1. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
  - 2. Shop drawings and product data

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Krueger: [www.krueger-hvac.com](http://www.krueger-hvac.com).
- B. Price Industries: [www.price-hvac.com](http://www.price-hvac.com).
- C. Titus: [www.titus-hvac.com](http://www.titus-hvac.com).

**2.02 SQUARE PLAQUE CEILING DIFFUSERS**

- A. Type: Provide square diffuser with precision formed, seamless, back cone with a removable inner plaque assembly. Inner plaque assembly shall be completely removable from the diffuser face.
- B. Connections: Round.
- C. Frame: Provide inverted T-bar type. In plaster ceilings, provide plaster frame and ceiling frame.
- D. Fabrication: Aluminum with baked enamel finish.

- E. Color: As selected by Architect from manufacturer's standard range.

### 2.03 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting.
- C. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish.
- D. Color: To be selected by Architect from manufacturer's standard range.
- E. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

**END OF SECTION**

**SECTION 15950 - TESTING, ADJUSTING, AND BALANCING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Testing, adjustment, and balancing of air systems.

**1.02 REFERENCE STANDARDS**

- A. AABC MN-1 - AABC National Standards for Total System Balance; Associated Air Balance Council.
- B. ASHRAE Std 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc..
- C. NEBB (TAB) - Procedural Standards for Testing Adjusting Balancing of Environmental Systems; National Environmental Balancing Bureau.

**1.03 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
  - 1. Include at least the following in the plan:
    - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
    - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
    - c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
    - d. Final test report forms to be used.
    - e. Procedures for formal deficiency reports, including scope, frequency and distribution.
- D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
  - 1. Submit under provisions of Section 01400.
  - 2. Revise TAB plan to reflect actual procedures and submit as part of final report.
  - 3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
  - 4. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
  - 5. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
  - 6. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
  - 7. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

8. Include the following on the title page of each report:
  - a. Name of Testing, Adjusting, and Balancing Agency.
  - b. Address of Testing, Adjusting, and Balancing Agency.
  - c. Telephone number of Testing, Adjusting, and Balancing Agency.
  - d. Project name.
  - e. Project location.
  - f. Project Architect.
  - g. Project Engineer.
  - h. Project Contractor.
  - i. Project altitude.
  - j. Report date.

- E. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 GENERAL REQUIREMENTS**

- A. Perform total system balance in accordance with one of the following:
  1. AABC MN-1, AABC National Standards for Total System Balance.
  2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
  3. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. TAB Agency Qualifications:
  1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
  2. Having minimum of three years documented experience.
  3. Certified by one of the following:
    - a. AABC, Associated Air Balance Council: [www.aabchq.com](http://www.aabchq.com); upon completion submit AABC National Performance Guaranty.
    - b. NEBB, National Environmental Balancing Bureau: [www.nebb.org](http://www.nebb.org).
- D. TAB Supervisor Qualifications: Certified by same organization as TAB agency.

### **3.02 EXAMINATION**

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
  1. Systems are started and operating in a safe and normal condition.
  2. Temperature control systems are installed complete and operable.
  3. Duct systems are clean of debris.
  4. Access doors are closed and duct end caps are in place.
  5. Air outlets are installed and connected.
  6. Duct system leakage is minimized.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

- C. Beginning of work means acceptance of existing conditions.

### 3.03 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

### 3.04 RECORDING AND ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

### 3.05 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static



pressure near the building entries.

- L. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

### 3.06 SCOPE

- A. Test, adjust, and balance the following:
  - 1. Air Handling Units
  - 2. Air Inlets and Outlets

### 3.07 MINIMUM DATA TO BE REPORTED

- A. Air Moving Equipment:
  - 1. Location
  - 2. Manufacturer
  - 3. Model number
  - 4. Serial number
  - 5. Arrangement/Class/Discharge
  - 6. Air flow, specified and actual
  - 7. Return air flow, specified and actual
  - 8. Outside air flow, specified and actual
  - 9. Supply air temperature
  - 10. Total static pressure (total external), specified and actual
  - 11. Inlet pressure
  - 12. Discharge pressure
  - 13. Sheave Make/Size/Bore
  - 14. Number of Belts/Make/Size
  - 15. Fan RPM
- B. Return Air/Outside Air:
  - 1. Identification/location
  - 2. Design air flow
  - 3. Actual air flow
  - 4. Design return air flow
  - 5. Actual return air flow
  - 6. Design outside air flow
  - 7. Actual outside air flow
  - 8. Return air temperature
  - 9. Outside air temperature
  - 10. Required mixed air temperature
  - 11. Actual mixed air temperature
  - 12. Design outside/return air ratio
  - 13. Actual outside/return air ratio
- C. Duct Traverses:
  - 1. System zone/branch
  - 2. Duct size
  - 3. Area
  - 4. Design velocity
  - 5. Design air flow
  - 6. Test velocity

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7. Test air flow
  8. Duct static pressure
  9. Air temperature
  10. Air correction factor
- D. Air Distribution Tests:
1. Air terminal number
  2. Room number/location
  3. Terminal type
  4. Terminal size
  5. Area factor
  6. Design velocity
  7. Design air flow
  8. Test (final) velocity
  9. Test (final) air flow
  10. Percent of design air flow

**END OF SECTION**

**SECTION 16010 - GENERAL ELECTRICAL REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Work included in these specifications and included on the drawings shall include furnishing all labor, materials, supplies, and equipment to perform all work required including cutting, channeling, chasing, excavating and backfilling, demolition (if any) to install a complete and working electrical system(s) in accordance with these sections of the specifications and the accompanying drawings. This shall include all required preparation work, demolition, raceways, coordination, etc. required to install the electrical system.
- B. It is recognized that separate subcontracts may be instituted by the General Contractor or the Division 16 Contractor with other contractors and/or suppliers. It is the responsibility of the Division 16 Contractor to completely inform, coordinate and advise those subs as to all of the other requirements, conditions and information associated with providing and installing the total job.
- C. The electrical work shall include, but in no way be limited to the following:
  - 1. Raceways Systems
    - a. Power
    - b. Lighting
    - c. Voice/Data
  - 2. Electrical Distribution System
  - 3. Lighting Systems
    - a. Interior
  - 4. Power Systems
    - a. Interior
  - 5. Wiring Devices
  - 6. CATV Cabling and Outlets
  - 7. Electrical Demolition
  - 8. Connection and/or Installation of Devices or Support for Installation of Systems furnished under other divisions of the Project Manual including but not limited to:

**1.02 RELATED SECTIONS**

- A. Drawings and specifications including General Conditions, Supplementary Conditions and Division 1 specification sections, apply to work of this and all sections in Division 16. Division 16 General Provisions described in this section apply to all sections of Division 16.

**1.03 SUBSTITUTION AND THE "OR EQUAL" CLAUSE**

- A. Where a manufacturer and/or model number is noted in a specification, that manufacturer and/or model number shall be the equipment used on the project. Substitutions may be allowed for some/all of the specified equipment where approved by the Architect/Engineer per the process as outlined in this section of the specifications. When an item, piece of equipment, method, etc. is specified or called for on the drawings or in the specifications, it shall establish a standard of quality which shall be used to evaluate all substitutions. It is not the intent of this specification to limit competition in any way, however; in some evaluations the decision of equality depends to a certain extent personal opinion and preference. In all evaluations, the opinion and decision of the engineer shall be final and binding to all parties.
- B. All substitutions to the specified equipment manufacturer, make, or model, shall be approved

before bid. Request to substitute a material, item, or method for a specified material, item, or method shall be made in writing and submitted so as to be received by the engineer at least ten (10) days before bid date. All approved request shall be noted in an addendum. Only the specified materials and items noted in the addendum as approved equals shall be used on the project.

- C. All submittals to request to substitute shall clearly describe the product. Request to substitute shall include catalog descriptive material, engineering data, and also list areas where the requested material exceeds or falls short of the specification for the specified material. If requested, provide samples (To be retained by the Engineer) of the proposed item.
- D. Incomplete submittals, or submittals that require the Engineer to spend considerable time researching the item, will not be considered for approval. The burden of proof that an item is equal to the specified item is on the party requesting the substitution. In all evaluations, the opinion and decision of the engineer shall be final and binding to all parties.
- E. Request to substitute or obtain approval to substitute for an item or material that has been previously turned down, will not be considered.
- F. When approval to substitute an item for the specified item is granted, the approval does not relieve the contractor from compliance with all system functions or equipment characteristics.
- G. When a substituted item requires additional work for another contractor or subcontractor to adjust his work to accommodate the substituted item, the contractor who made the substitution shall pay all cost for accommodation of the substituted item.
- H. As with any substituted item, it is the responsibility of the contractor making the substitution to make the item fit, function, and act as the specified item. If, in the opinion of the engineer, the substituted item does not comply, function, fit, or perform to the standards of the specified item, the contractor shall remove the substituted item and install the specified item, at no cost to the Owner.
- I. Contractor prices shall be based on only the specified items, materials, or methods (or approved equals). There shall be no increase in contract cost when a non-approved item is used in pricing and is not approved by the engineer.

#### 1.04 REFERENCES

- A. The Contractor is responsible for obtaining all required permits and complying with the current editions, or the editions referenced in the other individual sections of these specifications, of all applicable National (NEC, IBC, NFPA), State, County, and Municipal codes and regulations. This shall include, but not be limited to, the following:
  - 1. NFPA 70 - National Electrical Code; National Fire Protection Association.
  - 2. NFPA 72 - National Fire Alarm Code;
  - 3. Federal Occupational Safety and Health Act (OSHA)
  - 4. NFPA 101 (Life Safety Code);
  - 5. Americans with Disabilities Act (ADA).
  - 6. International Building Code (IBC);
  - 7. International Fire Code;
- B. Unless noted otherwise, the contractor shall comply with the latest edition and update of any and all codes and standards.
- C. Compliance with Underwriters Laboratories: All products installed under the contract shall

have the Underwriters Laboratories (UL) label where such marking is available. Products which are not UL labeled will not be acceptable if labeled products are available from another approved manufacturer.

- D. The above listed requirements are required of the electrical contractor by this contract whether these requirements are shown on the drawings, mentioned in the specifications or not.
- E. All work and equipment installed that does not comply with the codes and standards noted above shall be corrected and/or replaced (at engineer's option) at no cost to the Owner.
- F. The contractor(s) shall submit all items necessary to obtain all required permits to the appropriate Federal/State/County/City agencies, obtain all required permits, and pay for any and all required fees.

#### 1.05 DEFINITIONS

- A. Concealed - Embedded in masonry or installed within other building elements including but not necessarily limited to crawl spaces, spaces above ceilings, in walls, in chases, shafts . It shall also include conduit installed in the ground beneath a floor slab. Not visible.
- B. Exposed - Installed in such a manner that it can be seen. All exposed materials shall be installed in a neat manner. If in the engineer's opinion the installed materials are not installed in a neat manner, it shall be removed and reinstalled (at the Contractor's expense) to the satisfaction of the engineer, all at no increase cost to the Owner.
- C. Furnish - When used in the Division 16 plans and/or specifications the word "furnish" shall mean to purchase a piece of equipment or material and to have said equipment/material transported to the project site (or other location if so directed). All items to be furnished shall include any and all mounting hardware, support, and accessory required for installation and proper operation. Unless otherwise noted, when a piece of equipment or material is to be furnished by the contractor, it shall also be installed.
- D. Provide - When used in the Division 16 plans and/or specifications the word "provide" shall mean to furnish and install complete and ready for use and to put into operation. Include any and all options, accessories, and mounting/installation hardware required for a complete and operating system or element of the electrical system.
- E. Install - When used in the Division 16 plans and/or specifications the word "install" shall mean to unload and transport the equipment/material to the installation point of the job site. Any and all mounting hardware (whether specified or called for by name / model number, or not) shall be included. Perform every operation necessary, including any and all final adjustments, etc. required for proper operation.
- F. Controlled – When used in the Division 16 plans and/or specifications, the word “controlled” shall mean to govern delivery of operating voltage or power to equipment or systems by means of, but not limited to, feeders, disconnects, breakers, switches, starters, etc..

#### 1.06 COORDINATION OF WORK IN OTHER SECTIONS

- A. The Division 16000 contractor is responsible for including any and all work related to the electrical that is noted in any part of the specifications or any part of the drawings, including Divisions 1, 15 and any other sections.
- B. If any piece of equipment is shown on any part of the drawings ("A" (Architectural) drawings, "M" (Mechanical) drawings, "P" (Plumbing) drawings, or "E" (Electrical) drawings), it is the

responsibility of the Division 16 Contractor to furnish and install electrical service as required to that equipment. Do a complete review of all contract documents and include electrical service for all such equipment whether or not it is also shown in Electrical documents. Electrical service shall comply with all requirements of the equipment shop drawings and all codes.

- C. The Division 16 Contractor will supply power to equipment at the voltage indicated on the Division 16 drawings. The Division 16 Contractor and all other contractors will be held responsible for coordinating the equipment voltages, control equipment, wiring, and locations and type of terminations/connections and/or disconnects required to comply with the National Electrical Code, International Building Code, all local codes, and the equipment manufacturer's requirements. If equipment is furnished to the project at a voltage other than that shown on the Division 16 drawings, the contractor supplying the equipment and all other subcontractors will be held responsible for making any necessary adjustments to correct the conflict, to the satisfaction of the Electrical Engineer.

**1.07 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS (CONTRACT DOCUMENTS):**

- A. Refer to the section of the specifications which cover General Conditions, Division 1, and Instructions to bidders. These sections and their requirements are a part of this contract and are binding on this section of the work.
- B. Electrical Drawings are diagrammatic in nature except where specific dimensions, or specific details are shown on the electrical, mechanical, or architectural drawings. The Electrical Contractor shall refer to other drawings for exact locations of equipment, building dimensions, architectural details and conditions affecting the electrical work; however, field measurements take precedence over dimensioned drawings. The Electrical Contractor shall provide all labor and materials and all incidental elements; junction and pull boxes, filters, pull wires, connectors, support materials, fuses, disconnect switches, lamps, and labels, to install, connect, start-up and result in a complete and working system in accordance with the drawings and specifications. Unless noted otherwise on the plans or in these specifications, all final connections are the responsibility of the Division 16 Contractor.
- C. In order to show the electrical work required under this contract on the drawings, it is necessary to utilize symbols and schematic diagrams/details. These symbols and schematic diagrams/details do not have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the intent diagrammatically expressed on the drawings, and in conformity with the dimensions indicated on the final architectural and structural working drawings and on equipment shop drawings. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.
- D. When the details of specific and/or general installation requirements show specific dimensioning and/or positioning requirements of the items to be installed, these dimensions shall be field verified and followed. It is the intent of these details to only establish the general feasibility of the work required. These details in no way delete, reduce, or substitute the requirement of field coordination for the indicated work.
- E. The contractor is responsible for coordinating the installation of all electrical work with the work of other contractors and/or trades. This contractor shall refer to the other drawings (demolition, site, civil, architectural, kitchen, structural, plumbing, mechanical, etc.) to assure that the installed electrical work is installed in a coordinated fashion. Conflicts on installation

work due to the lack of proper coordination of this contractor shall result in the work being removed and coordinated and properly reinstalled at no increase cost to the Owner. Report to the Engineer any and all discrepancies that the contractor(s) find in the field between the electrical drawings and the other drawings.

- F. The installation of any and all equipment/systems is subject to clarification as indicated in the review comments of the Engineer on the shop drawings. The contractor shall be aware that if the equipment of an approved equal manufacturer is to be installed, the equipment, controls, functions, conduit routing, power requirements, etc. may be different. It is the responsibility of the electrical contractor to coordinate the installation requirements of the equipment to be installed with the electrical plans of the specified equipment/systems. If there are any additional equipment, power service, conduit, conductors, controls, etc. required to install the approved equal equipment, these additional requirements shall be furnished and installed at no additional cost to the Owner.
- G. The electrical drawings are such that the electrical service to equipment furnished and installed under other sections of the contract documents (examples, but not limited to: elevators, kitchen equipment, HVAC equipment, water heaters, fans, pumps, motors, etc) is coordinated for the specified equipment only. If the equipment installed under other divisions of the contract documents is not the specified equipment and is an approved equal to the specified equipment, it is possible that the equipment will require different electrical service/interface than that shown on the electrical plans for the specified equipment. In this case, it is the responsibility of the approved equal installing contractor / manufacturer to coordinate the electrical service/interface requirements with the electrical contractor. If the electrical service/interface requirements of the substituted equipment are greater than the specified equipment and result in an increased electrical cost, it is the responsibility of the furnishing/installing contractor to pay the electrical contractor for the increase in electrical cost.
- H. Submission of a proposal and ultimate acceptance of an agreement or contract for execution of this section of work will be construed as evidence that the Electrical Contractor and each interested Subcontractor and/or vendor has carefully read and accepts all conditions set forth in each Division under specification Divisions titled "Instructions To Bidders" and Division 1, "General Conditions", in so far as such conditions may affect both the bidding for and execution of this section of work.

#### 1.08 ELECTRICAL SYSTEMS

- A. All electrical systems shown on the plans or specified in the Construction Manual shall have equipment furnished and installed so that the system is a complete and functioning system that complies with the intent of the specifications, whether each and every element of each and every system is specified or not. Any and all equipment, options, and system elements necessary for proper operation shall be furnished and installed, whether specifically called for (specified by name or catalog number) or not.
- B. The wiring, connections, and support elements shown on the plans or noted in the specifications is for a complete and workable system(s). Any deviations from the wiring shown due to a particular manufacturer's requirements shall be made at no cost to either the contract or to the Owner. Changes in electrical service to equipment due to substitutions of equipment by any contractors shall be at the cost of that contractor.

#### 1.09 SPECIAL ELECTRICAL REQUIREMENTS

- A. Provide all wiring, connectors, fittings, connections, and all accessories for the complete

installation of, and final connections to, equipment furnished under other divisions of the specifications and where indicated on the electrical drawings or otherwise specified.

- B. The Electrical Contractor shall coordinate with all other contractors the electrical service provided as shown on the electrical plans with respect to voltage, phase, and ampacity. This coordination shall take place before any equipment is ordered and is for the purpose of the contractor providing equipment that requires electrical connection ordering the correct equipment to match the electrical service provided. Any changes in the characteristics of the circuits that serve any electrically operated equipment shall be made at no additional cost to the Owner.
- C. Make all final connections to all equipment, provided under the electrical contract and equipment provided under other sections, except where noted on the plans to provide "rough-in only". Where connections are to be made by someone other than the Division 16 contractor, coordinate with the equipment supplier to determine the rough-in requirements. In the case where rough-in is installed now but equipment unknown or is to be installed in the future, install outlet box sized for the conductors installed, install conductors and leave 8" of pigtails for each conductor. Tape all conductors, leave a note in the box as to the panel the circuit is connected, and install a cover plate over the outlet box. In the panel that the circuit terminates, do not connect the circuit to a breaker, tag the circuit with information as to the location of the outlet box, and leave enough pigtail in the panel so that connection can be made to any breaker space in the panel.
- D. The Electrical Contractor is hereby alerted that certain features of control, other functions, or systems may be specified in this division by performance, and as such, all elements of wiring or other materials and devices for the complete installation may not be shown on the drawings. The Electrical Contractor shall provide for the final and complete installation of all features called for by drawings or specifications.
- E. Where equipment is prewired, the power wiring shall extend to the power terminals of the pre-wired equipment. Control wiring for the mechanical equipment and temperature control wiring is covered under Division 15 and is not a part of Division 16 unless specifically noted.
- F. In order to comply with the seismic codes, all recessed light fixtures shall be supported with four (4) hanger wires which shall be tied to the structure.

#### 1.10 DIMENSIONS ON DRAWINGS, IN FIELD, VERIFICATION

- A. The contractor shall be responsible for visiting the site in order to become familiar with existing conditions and coordinating the required work as needed. No increase in contract cost will be considered due to the contractor not being aware of existing conditions.
- B. Do not scale drawings. Confirm all dimensions in the field. Coordinate all installations with shop drawings and other contractors work. Where discrepancies are found on the contract documents, the contractor shall include in the project cost any and all materials, items and labor required to make any and all changes required to install the work correctly. Where discrepancies are found on the project the contractor shall stop work in that area and contact the engineer.

#### 1.11 SUBMITTALS

- A. Unless otherwise noted, Submittals (formerly/also referred to as "shop drawings") shall be made in accordance with requirements as stated in Division 1. Submittals shall be submitted to the Engineer on all equipment within thirty (30) days of contract award. If submittals are not



received within the thirty day time limit the specified equipment shall be used (no exceptions).

- B. The Contractor shall not purchase any materials or equipment prior to the receipt of approved submittals from the Engineer. Any commitment to purchase or contract to purchase equipment or materials made between the Contractor and an equipment supplier and/or manufacturer before the receipt of approved submittals from the Engineer shall be at the risk of the Contractor. If submittals are not approved, any restocking charge or cancellation charge by a manufacturer and/or supplier shall be the responsibility of the Contractor and not reflect as an increase cost to the Owner
- C. Submittals shall contain all the necessary information required to prove that the equipment will fit and function correctly. Submittals shall be bound together and submitted as a complete package for each section. The Contractor shall review each submittal to confirm that the submittal meets the Contractor's requirements before the submittal is made to the Engineer.
- D. For some equipment/systems (examples: fire alarm, nurse call, security, CCTV, cable TV, etc.), the drawings only show the system elements and do not show the interconnection of these elements on a riser diagram. For equipment/systems such as these, the manufacturer shall include with the submittals a wiring/conduit riser diagram for the system.
- E. It is not unreasonable to expect a 14 to 21 day (or possibly longer) submittal turnaround from the Engineer. Therefore it is imperative that the Contractor comply with the 30 day requirement outlined in paragraph A. If the project is a "Fast Track" type project, it may be necessary to have submittals reviewed in a very short time period. In such cases, the contractor shall note on the cover sheet of the submittal the date in which submittals must be returned. Every effort will be made to comply with this date, but close coordination between Contractor and Engineer shall be required.
- F. The engineer reserves the right to refuse any equipment that in his opinion will not function as well as the specified equipment. The opinion of the engineer shall be final and shall bind all parties. The Engineer has the right to require the contractor to use the specified equipment if the second shop drawing submittal is not approved.
- G. Submittal review is only for verifying general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Provide equipment and/or devices for which the electrical service requirements matches that shown on the contract documents for the equipment and/or device in question. It is the responsibility of the contractor to submit a separate formal request to change voltages or other aspects of the electrical service for a given piece of equipment or device if a change is desired. It is not incumbent on the engineer to recognize changes in electrical service contained in the shop drawing submittal. The contractor is also responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction; and for coordination of the work of all trades.
- H. The Contractor shall review the submittals and make note of all dimensions of the equipment and shall make the necessary adjustments in equipment locations as required to install the equipment. **THE CONTRACTOR SHALL NOT INSTALL ANY EQUIPMENT OR PROVIDE ELECTRICAL ROUGH-INS BEFORE APPROVED SUBMITTALS ARE RETURNED BY THE ENGINEER AND DIMENSIONS ARE APPROVED.**
- I. Approval to substitute material, equipment, devices, processes, or any item as an "as/an equal" to the specified item does not relieve the Contractor of the full responsibility to make the substituted material, fit, function or appear as required in the Drawings and Specifications.

Contractor shall assume full responsibility for the satisfactory adaptability of a substituted item to those items specified or shown on the drawings.

- J. Required submittals are listed with each section of the electrical specifications.

#### 1.12 RECORD DRAWINGS

- A. The electrical contractor shall keep a set of construction drawings during the length of the project on which he shall note any and all changes from the original drawings. Of special importance is noting the actual location of all service entrances into the building and where conduit stub outs have been installed. This record set of drawings shall be updated daily. The drawings shall be neat, orderly and marked in a way to be clearly interpreted. The record drawings shall be turned over to the Architect to update drawing files for a final set of drawings for the owners record.
- B. When the submitted information has been deemed satisfactory and all information has been transferred by the architect to the drawing files, they shall be labeled as "RECORD DRAWINGS" and copies turned over to the owner. Only then will final approval and payment be approved.
- C. After the "RECORD DRAWINGS" have been approved by the Engineer, the contractor shall have one set of prints made from the "Record Drawings" and shall wall mount a 4" PVC tube with screw on cap in the main electrical room and place the set of prints in this tube.

#### 1.13 CHANGE ORDERS

- A. Change orders will not be issued for relocating electrical equipment or rerouting conduit and wiring. This section of the electrical specifications require that relocating of electrical equipment or rerouting of conduit/wiring be done at no additional cost to the Owner.
- B. When change orders are required for electrical work, the unit material and unit labor method shall be used. Unit values for material shall be contractors' net cost from distributor. Unit values for labor hours shall not be greater than those listed in the latest addition of Means mechanical/electrical cost data. Sales tax is to be added to materials and workman's compensation insurance is to be added to labor. Overhead and profit markup is to be added to the materials and labor subtotal per the instructions in Division 1..
- C. To calculate a credit for deleted work, the identical method of calculations shall be used for deleted work that is used for new work. No money will be allowed for lost scheduling time or estimation time. The Engineer agrees to expedite change orders as rapidly as possible to avoid construction delay. The contractor may be required to estimate a number of alternatives for change orders in order to arrive at the lowest cost for change orders.
- D. There shall be no additional cost for the contractor to estimate multiple alternatives for consideration.

#### 1.14 QUALITY ASSURANCE

- A. The contractor performing the electrical work shall employ craftsmen who are thoroughly experienced and trained in the installation of electrical systems and general installation coordination. All work shall be done in the highest level of standards for the trade. Any work installed at a level that is less than the highest level of standards for the trade shall be removed and reinstalled in the manner described above at NO additional cost to the Owner.
- B. All equipment shall be installed in compliance with the manufacturer's published installation

recommendations and requirements, with any and all required accessories and mounting hardware, and/or as approved by the Engineer. The manufacturer's published installation requirements and recommendations shall become a part of the Owner's Manual (See Paragraph 1.15)

**1.15 OPERATING AND MAINTENANCE MANUALS:**

- A. The Manuals generally include all project submittals updated to reflect actually installed conditions; operating instructions; maintenance schedules; training material; warranty and bonds; and contact information for sales, warranty and service of equipment. Refer to Division 1 of the specifications for complete requirements.
- B. Provide manuals for each product or system.

**1.16 TRAINING AND INSTRUCTIONS:**

- A. The Contractor shall provide training and instructions by knowledgeable representatives of the products installed to fully train and instruct representatives of the using agency in the location, function and operation of devices, equipment and systems installed under Division 16. The instruction shall include maintenance procedures for all such items. See specific sections in the Project Manual for devices, equipment and systems for detailed requirements for training and instructions.

**1.17 DELIVERY, STORAGE, AND PROTECTION**

- A. Where equipment is purchased by the electrical contractor to be installed in conformance with the contract documents, the contractor shall follow the following procedure as it relates to delivery, storage, and installation:
  - 1. Coordinate any and all information with any and all contractors who are to do work to accommodate the division 16 equipment/work.
  - 2. Coordinate delivery of equipment.
  - 3. Unload the equipment from delivery trucks.
  - 4. Inspect equipment for damage. Report damage immediately and arrange for the equipment to be repaired or replaced. No claims for time extensions or additional work related to the damage will be accepted if not made within ten days of the delivery of the equipment.
  - 5. Inspect the equipment to assure correct make, model number, voltage, etc.
  - 6. Provide for safe handling and field storage up to the time of permanent placement in the project.
  - 7. Provide for any and all field assembly and internal connection as may be necessary for proper operation.
  - 8. Install in place including any and all required mounting supports, connectors, fittings, connections, and accessories required for complete system operation.
- B. Where equipment is purchased by the Owner and is to be installed by the Division 16 contractor, the Division 16 contractor shall follow the following procedure as it relates to delivery, storage, and installation:
  - 1. Coordinate equipment shop drawings with any and all contractors who are to do work to accommodate the Division 16 equipment /work.
  - 2. Coordinate delivery of equipment.
  - 3. Unload the equipment from delivery trucks.
  - 4. Inspect equipment for damage. Report damage immediately and arrange for the equipment to be repaired or replaced. No claims for time extensions or additional work

related to the damage will be accepted if not made within ten days of the delivery of the equipment.

5. Inspect the equipment to assure correct make, model number, voltage, etc.
6. Provide for safe handling and field storage up to the time of permanent placement in the project.
7. Provide for any and all field assembly and internal connection as may be necessary for proper operation.
8. Install in place including any and all required mounting supports, connectors, fittings, connections, controls, and accessories required for complete system operation.

#### 1.18 NOTIFICATION OF EQUIPMENT TO BE USED BY THE ELECTRICAL CONTRACTOR

- A. The electrical bidder with the lowest bid shall provide a list to engineer within seventy-two (72) hours of bid award as to the manufacturer of equipment or devices that he intends to use on the project. If notification is not received within the time limit, only the specified equipment shall be used. (NO EXCEPTIONS). Notification shall be by standard mail, E-mail or fax.

#### 1.19 MANUFACTURER'S FIELD SERVICES:

- A. Provide manufacturers field services where required under the specific sections of the Project Manual using authorized and trained manufactures representatives of the equipment or systems in question. The field services shall include the following as a minimum:
  1. Inspect the installation to verify that the installation meets or exceeds all manufacturer's requirements and recommendations for proper operation.
  2. Start/energize the equipment and verify that the equipment/system is operating and functioning as required by these specifications and the manufacturer's requirements.
  3. Provide written certificaion that field services have been performed and that equipment/system is operating and functioning as required by these specifications and the manufacturer's requirements. Submit the certification as part of the closeout documents.
- B. Refer to specific sections of the Project Manual and provide all field service requirements listed in addition to these general requirements.

#### 1.20 WARRANTY

- A. All work, equipment, and materials shall be new and without defects or blemishes, and guaranteed to be free from defects for a period of one (1) year after the final date of project acceptance as defined by the Architect (NOT THE DATE OF INSTALLATION OR START-UP). All installation and installation materials shall also be guaranteed for the one (1) year period. This shall cover such items as equipment pads, supports, leaks from around equipment installation, etc and is intended to cover everything installed or provided under this division of the contract.
- B. Manufactured pieces of equipment shall have their guarantee also backed by the equipment manufacturer.
- C. During the guarantee period there shall be no charge to the Owner for items and work done under the guarantee clause (Service calls). This shall apply to replacement equipment, equipment shipping charges, mileage, labor, all taxes, etc.
- D. Refer to the other sections of the Project Manual for warranty requirements that may exceed these general requirements and follow those requirements for the equipment, devices, materials or systems in question.

1.21 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.

PART 2 PRODUCTS

2.01 GENERAL:

- A. All products shall be of new manufacturer (unless the plans and/or other sections of this specification call for existing or other identified products to be used), age of less than one year, and the latest model of a manufacturer. A new product shall not be used if the manufacturer has introduced a product as a replacement. All materials and apparatus for the work shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit into the building spaces in compliance with all code requirements.
- B. All equipment that is provided by the contractor, subcontractors, or specialty subcontractor (fire alarm, sound, CCTV, signal system, etc) to be installed at the project site, shall be purchased, installed and maintained by the local (to the project site) authorized, licensed, factory distributor/installer/supplier. The contractor shall include with the submittals, verification in writing from the manufacturer, that the supplier and/or distributor is a factory authorized and licensed by the manufacturer to provide, install, and maintain (throughout the entire length of the warranty period) the equipment. **THERE SHALL BE NO EXCEPTIONS TO THIS REQUIREMENT.**
- C. By providing equipment to the project, a manufacturer guarantees to provide replacement parts for the equipment for a period of ten (10) years, even if the item provided goes out of manufacture.
- D. Manufacturer's catalog numbers listed are not necessarily complete and are for general identification only. It is the responsibility of the Contractor to provide complete catalog numbers and to provide all accessories for installation as implied by the accompanying description of the equipment, material or device, the demonstrated use on the drawings, and the specifications contained herein. Products provided shall be a standard product which has a history of successful installation and operation for a minimum period of two years. Prototype or custom made equipment is not acceptable unless so specified herein.
- E. Manufacturer's instructions shall be obtained by the Contractor and used for the installation of all equipment and devices where such manufacturer's instructions are available.
- F. Where a substituted product is used instead of the specified product, the contractor will assume any and all responsibility for the product to fit, function and perform as well as the specified product. The opinion of the engineer will be binding and shall govern all parties as to a substituted product performing as well as the specified product.
- G. Completeness: Provide all boxes, off-sets, bends, raceways, devices, raceway supports, installation brackets and supports, flexible connections, wiring connectors, labels and terminals for the complete installation and operation of all products. Each unit of product shall be assembled and installed and all surfaces shall be clean and free of dents, scratches, and abrasions or marred areas.

2.02 IDENTIFICATION

- A. All equipment shall be marked and/or identified so that maintenance crews can locate equipment.

- B. All equipment items; for example switchboards, distribution, power, receptacle and lighting panelboards, transformers, disconnects, motor control centers, switches, lighting contactors and wiring gutters, of the electrical system shall be labeled. Each distribution switch and circuit breaker in a switchboard, or individually mounted, shall be labeled. Each starter in a motor control center shall be labeled with the load name and horsepower. These labels shall be engraved, black laminated plastic labels, with 1/2 inch white letters. For equipment connected to the emergency power system, the labels shall be red laminated plastic with white letters. Attach the labels to the equipment with two sheet metal screws or rivets.
- C. Circuit breakers in distribution panels (panels with hinged doors) shall be labeled by means of a typed circuit breaker directory. For all breakers serving lighting, receptacle, and HVAC circuits, the contractor shall include on the panel schedule by the breaker number the room number(s) served by the circuit. The room number(s) shall be the same number(s) as the room number(s) on the door, not the space number as shown on the plans. See Section 16160.
- D. Wire and cable identification shall be made so that all wire and cable can be identified by means of color coding as noted in Section 16120. Wiring marker for use in wire and terminal identification shall be white cloth backed with a rubber based, pressure sensitive adhesive labels. Each wire or cable in a feeder at its terminal points, and in each pull-box, junction box, and panel gutter through which it passes shall be identified. Where two or more feeders enter or leave a device or enclosure, the cable shall be tagged to indicate destination of cable run. Each common wire, common circuit or common loop of a system, fire alarm, public address system, intercom system, sound system, or TV system, shall be identified.
- E. Device plates for local toggle switches, toggle switch-type motor starters, pilot lights, and the like, whose function is not readily apparent shall be labeled suitably describing the equipment controlled or indicated. These labels shall be engraved, black laminated plastic labels, with 1/4 inch white letters. For equipment connected to the emergency power system, the labels shall be red laminated plastic with white letters. Attach the labels to the equipment cover plates with glue recommended by the manufacturer.
- F. Where used with an empty raceway for wires of a future system, each box or cabinet shall be identified on the inside by means of indelible markings indicating the system for which it is installed. Label any junction box, which includes wiring, with indelible markings on the outside showing system and voltage.

### **PART 3 EXECUTION**

#### **3.01 GENERAL**

- A. Before any work is started, the electrical contractor shall coordinate the work of other contractors that will affect the work of the electrical contractor. The electrical contractor shall inspect the work of all other trades to determine if the other work is ready for the electrical contractor to start his work.
- B. Any and all electrical installations shall be coordinated with other trades, contractors and the Owner.
- C. The contractor shall make himself familiar with existing conditions, site information, etc. so that conflicts are avoided.
- D. All work shall be installed per all applicable code, rules, regulations, shop drawings and manufacturer's installation recommendations.

- E. The electrical contractor shall be responsible for returning to original, pre-construction condition, any paved areas, sidewalks, planting, walls, and other areas disturbed during electrical installation work.
- F. The electrical equipment shall be installed as close as possible to the location as shown on the plans. If during the installation, it is required to install equipment in locations other than the one shown on the plans, the contractor shall make a sketch of the proposed changes, submit it to the Engineer, and after the Engineer has given approval, then proceed with the installation.
- G. Working spaces and clearances shall not be less than the required minimums in the National Electric Code (NEC).

### 3.02 EXAMINATION

- A. The Electrical Contractor is responsible for visiting and examining the site to determine those portions of the site or present buildings affected by this work so as to become familiar with existing conditions and difficulties that will attend the execution of the work, before submitting proposals.
- B. Submission of a proposal will be considered as evidence that such examination has been made and later claims for labor, equipment, or materials because of difficulties encountered, which could have been foreseen had such examination been made, will not be recognized.

### 3.03 ADDITIONS RENOVATIONS AND REMODELING

- A. All electrical work shall be coordinated and phased so as to assure electrical service to any other buildings or parts of buildings that require use during construction.
- B. All existing electrical system elements shall be protected from damage during any and all additions, renovations, and remodeling.
- C. All new electrical equipment and installations shall be installed and connected to existing work or existing electrical system elements in a neat and careful manner. Any existing electrical work or system elements that are disturbed or damaged shall be replaced or repaired to the pre-construction condition at no additional cost to the Owner.

### 3.04 LOCATIONS OF EQUIPMENT REQUIRING ELECTRICAL SERVICE AND CONNECTIONS:

- A. Coordinate the exact installed location of equipment that requires electrical connections that is furnished and installed by other contractors. The electrical drawings try to show the correct location of all of these items, but it is the responsibility of the electrical contractor to coordinate with all other contractors to determine the exact installed location of all equipment furnished and installed by other contractors and wired by the electrical contractor. Such coordination shall include, but not limited to exact location, location of electrical connection, type of connection required, and electrical characteristics.

### 3.05 OPENINGS, CUTTING AND PATCHING:

- A. Contractor shall arrange for openings in the building structure or components to allow for installation of electrical work or transport of electrical equipment as the project progresses.
- B. Any cut portion of the building, wall, sidewalk, paved drives, ceiling, floors, roofs, etc., install any raceway or apparatus or transport equipment, shall be restored in a manner such that the end product complies with the specification for that type of work. Where existing work is cut, restore to the original (pre-construction) condition. The electrical contractor shall be responsible for returning to original, pre-construction condition, any of the above noted areas or

other areas disturbed during electrical installation work.

- C. Structural, load bearing, or supporting device shall not be cut without approval in writing from the Architect.

### 3.06 LOCATIONS OF OUTLET BOXES FOR EQUIPMENT AND GENERAL WIRING:

- A. All outlets for lighting, power, and equipment, not specifically dimensioned are located diagrammatically on the drawings.
- B. Lighting fixtures shall be located in accordance with reflected ceiling plans or tile pattern outlines. If neither is indicated, lighting fixtures shall be symmetrical within the space in which they are located. The Contractor shall be responsible for coordinating with the architectural and mechanical plans and to the shop drawing of the equipment to be installed for the exact location of the outlets required for equipment installation.
- C. Lighting fixtures and convenience outlets shall be located so that they will be symmetrical with architectural details.
- D. Equipment outlets shall be located so as to serve the equipment directly. It is the Contractor's responsibility to coordinate outlet location with equipment so that all outlets are accessible and disconnect switches have clearance for operation.
- E. Where outlets are shown to be installed over casework or counters, the Contractor shall be responsible for coordinating the outlet box installation with the architectural details so that the bottom of the box is installed 6" above the counter/casework. Where a back splash is to be installed on the counter/casework, install the bottom of the box 4" above the top of the back splash.
- F. If so directed by the Architect / Engineer / Owner, any outlet box may be moved 10 feet in any direction without any additional cost to the Owner.

### 3.07 PAINTING:

- A. Exposed conduit, ungalvanized troughs, metal frames and support racks and wooden surfaces provided under this section shall be painted. Paint color shall match and be the same paint as the room finish paint unless noted elsewhere on the plans or in the specifications. Clean surfaces completely of all oil, wax, rust and old paint prior to repainting. Paint shall be applied to backup boards before switches, troughs, and devices are installed. Paint shall include a primer and two coats of finished paint. Touch-up scratched, or marred surfaces of lighting fixtures and equipment with paint obtained from the equipment manufacturer especially for that purpose.

### 3.08 ELECTRICAL SYSTEM TESTING:

- A. At the time of the final inspection, or at such times as parts of the system may be completed, all electrical systems shall be tested for compliance with the specifications. The Contractor shall provide all personnel and equipment; current, voltage and resistance measuring instruments, ladders and lights to assist the Engineer in conducting the tests. Authorized representatives of the manufacturer shall be present to demonstrate compliance with specifications of their specific system.
- B. The Contractor shall remove equipment covers as directed for inspection of internal wiring. Accessible ceiling shall be removed as directed for inspection of equipment above the ceilings. After inspection and correction of any problems found, the Contractor shall replace all cover



plates, access plates and removable ceiling.

- C. The life safety system shall be demonstrated to function in accordance with the specifications. Each device shall be tested for proper operation.

**3.09 CLEANING:**

- A. At completion of the work the Contractor shall clean all exposed elements of the electrical system so that all markings deteriorating the original finish appearance are removed. All lighting fixtures, lenses, and reflectors shall be cleaned inside and out and all lamps shall be left clear of dust, dirt, and grime.
- B. The Contractor shall specifically examine the interiors of panelboard cans, equipment cabinets, lighting fixtures, junction boxes, and like components where conduit and wire connections have been made, and all resulting wire ends, insulation cuttings, knock-out plugs, metal filings and any other trash shall be removed so that interiors and exteriors are left free of all debris.

**3.10 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing in accordance with Section 01400.

**END OF SECTION**

**SECTION 16060 - GROUNDING AND BONDING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.

**1.02 RELATED REQUIREMENTS**

- A. Section 16123 - Building Wire and Cable: Additional requirements for conductors for grounding and bonding, including conductor color coding.
  - 1. Includes oxide inhibiting compound.
- B. Section 16075 - Electrical Identification: Identification products and requirements.
- C. Section 16061 - High Frequency Signal Reference Grid

**1.03 REFERENCE STANDARDS**

- A. IEEE 81 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.
- C. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association.
- D. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association.
- E. NFPA 70 - National Electrical Code; National Fire Protection Association.
- F. UL 467 - Grounding and Bonding Equipment.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Verify exact locations of underground metal water service pipe entrances to building.
  - 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
  - 3. For signal reference grids, coordinate the work with access flooring furnished in accordance with Section 10270.
  - 4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

- C. Shop Drawings:
  - 1. Indicate proposed arrangement for signal reference grids. Include locations of items to be bonded and methods of connection.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Field quality control test reports.
- F. Project Record Documents: Record actual locations of grounding electrode system components and connections.
- G. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.

#### 1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Installer Qualifications for Signal Reference Grids: Company with minimum five years documented experience with high frequency grounding systems.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### PART 2 PRODUCTS

#### 2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
  - 1. Examine the existing grounding electrode system and bonding to determine if it meets current standards. Report any deficiencies to the engineer for further consideration.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- E. Grounding System Resistance:
  - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
  - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.

3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested according to IEEE 81 using "point-to-point" methods.
- F. Grounding Electrode System:
1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
    - a. Provide continuous grounding electrode conductors without splice or joint.
    - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
  2. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.
    - a. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.
    - b. Where ground bar location is not indicated, locate in accessible location as near as possible to service disconnect enclosure.
    - c. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.
  3. Ground Riser: Provide common grounding electrode conductor not less than 3/0 AWG for tap connections to multiple separately derived systems as permitted in NFPA 70.
- G. Grounding for Separate Building or Structure Supplied by Feeder(s) or Branch Circuits:
1. Provide equipment grounding conductor routed with supply conductors.
  2. For each disconnecting means, provide grounding electrode conductor to connect equipment ground bus to grounding electrode system.
  3. Do not make any connections and remove any factory-installed jumpers between neutral (grounded) conductors and ground.
- H. Separately Derived System Grounding:
1. Separately derived systems include, but are not limited to:
  2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
  3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
  4. Where common grounding electrode conductor ground riser is used for tap connections to multiple separately derived systems, provide bonding jumper to connect the metal building frame and metal water piping in the area served by the derived system to the common grounding electrode conductor.
  5. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
  6. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.
- I. Bonding and Equipment Grounding:

1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
  2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
  3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
  4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
  5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
  6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
  7. Provide bonding for interior metal air ducts.
  8. Provide bonding for metal building frame where not used as a grounding electrode.
- J. Communications Systems Grounding and Bonding:
1. Provide bonding jumper in raceway from intersystem bonding termination to each communications room or backboard and provide ground bar for termination.
    - a. Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.
    - b. Raceway Size: 1 inch unless otherwise indicated or required.
    - c. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.
    - d. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.

## 2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
  2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in addition to requirements of Section 16123:
1. Use insulated copper conductors unless otherwise indicated.
  2. Factory Pre-fabricated Bonding Jumpers: Furnished with factory-installed ferrules; size braided cables to provide equivalent gauge of specified conductors.
- C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
  2. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
  3. Manufacturers - Mechanical and Compression Connectors:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. Harger Lightning & Grounding: [www.harger.com](http://www.harger.com).
    - c. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
    - d. Substitutions: See Section 01600 - Product Requirements.
  4. Manufacturers - Exothermic Welded Connections:

- a. Burndy: [www.burndy.com](http://www.burndy.com).
- b. Cadweld, a brand of Erico International Corporation: [www.erico.com](http://www.erico.com).
- c. ThermOweld, a brand of Continental Industries, Inc: [www.thermoweld.com](http://www.thermoweld.com).
- d. Substitutions: See Section 01600 - Product Requirements.

**D. Ground Bars:**

1. Description: Copper rectangular ground bars with mounting brackets and insulators.
2. Size: As indicated.
3. Holes for Connections: As indicated or as required for connections to be made.
4. Manufacturers:
  - a. Erico International Corporation: [www.erico.com](http://www.erico.com).
  - b. Harger Lightning & Grounding: [www.harger.com](http://www.harger.com).
  - c. ThermOweld, a brand of Continental Industries, Inc: [www.thermoweld.com](http://www.thermoweld.com).
  - d. Substitutions: See Section 01600 - Product Requirements.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as shown on the drawings.
- C. Verify that conditions are satisfactory for installation prior to starting work.

**3.02 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- C. Make grounding and bonding connections using specified connectors.
  1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
  2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
  3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
  4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 16075.
- E. Provide a separate, insulated equipment grounding conductor in feeder and branch circuits. Terminate each end on a grounding lug, bus, or bushing.
- F. Ground interior lighting fixtures with grounding conductor to rigid metal raceways serving them. Flexible metal conduit shall have a ground wire installed with the power conductors.
- G. Where connections are made to motors or equipment with flexible metal conduit, grounding conductor shall be stranded copper conductor within the conduit, bonded to the equipment and

to the rigid metal raceway system..

- H. At each convenience outlet, install a grounding clip attached to the outlet box and leave a sufficient length of #12 wire with green colored insulation to connect to the grounding terminal of the receptacle. Grounding clip shall be equal to Steel City Type G.

### 3.03 ADDITIONAL COMMUNICATION SYSTEMS GROUNDING:

- A. Television Distribution System - Provide one No. 6 AWG THW in ½ inch conduit to nearest point on grounding electrode system.

### 3.04 FIELD QUALITY CONTROL

- A. Provide field inspection in accordance with Section 01400. Inspect grounding and bonding system conductors and connections for tightness and proper installation
- B. Inspect and test in accordance with NETA STD ATS except Section 4.
- C. Perform inspections and tests listed in NETA STD ATS, Section 7.13.
- D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.
- E. Submit detailed reports indicating inspection and testing results and corrective actions taken.

**END OF SECTION**

**SECTION 16070 - HANGERS AND SUPPORTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

**1.02 RELATED REQUIREMENTS**

- A. Section 16131 - Conduit: Additional support and attachment requirements for conduits.
- B. Section 16138 - Boxes: Additional support and attachment requirements for boxes.
- C. Section 16510 - Interior Luminaires: Additional support and attachment requirements for interior luminaires.
- D. Conduit and equipment supports including but not necessarily limited to:

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- D. MFMA-4 - Metal Framing Standards Publication; Metal Framing Manufacturers Association.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.
- F. NFPA 70 - National Electrical Code; National Fire Protection Association.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
  - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
  - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
  - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
  - 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.



**1.06 QUALITY ASSURANCE**

- A. Comply with NFPA 70.
- B. Comply with applicable building code.

**1.07 RECORD DRAWINGS**

- A. Comply with the applicable instructions in Section 16010.

**PART 2 PRODUCTS**

**2.01 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:
  - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
  - 2. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated, where applicable.
  - 3. Do not use products for applications other than as permitted by NFPA 70 and product listing.
  - 4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    - b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
  - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
  - 2. Conduit Clamps: Bolted type unless otherwise indicated.
  - 3. Manufacturers:
    - a. Cooper Crouse-Hinds, a division of Cooper Industries: [www.cooperindustries.com](http://www.cooperindustries.com).
    - b. Erico International Corporation: [www.erico.com](http://www.erico.com).
    - c. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com](http://www.emersonindustrial.com).
    - d. Substitutions: See Section 01600 - Product Requirements.
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
  - 1. Manufacturers:
    - a. Cooper Crouse-Hinds, a division of Cooper Industries: [www.cooperindustries.com](http://www.cooperindustries.com).
    - b. Erico International Corporation: [www.erico.com](http://www.erico.com).
    - c. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com](http://www.emersonindustrial.com).
- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
  - 1. Comply with MFMA-4.
  - 2. Channel Material:
    - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
  - 3. Minimum Channel Thickness: 12 gauge.

4. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
5. Manufacturers:
  - a. Cooper B-Line, a division of Cooper Industries: [www.cooperindustries.com](http://www.cooperindustries.com).
  - b. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
  - c. Substitutions: See Section 01600 - Product Requirements.
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
  1. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2 inch diameter.
    - b. Single Conduit up to 1 inch (27mm) trade size: 1/4 inch diameter.
    - c. Single Conduit larger than 1 inch (27mm) trade size: 3/8 inch diameter.
    - d. Outlet Boxes: 1/4 inch diameter.
- F. Anchors and Fasteners:
  1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
  2. Finish: Galvanized or painted steel.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
  1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
  2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
- H. Secure fasteners according to manufacturer's recommended torque settings.
- I. Remove temporary supports.

**3.03 FIELD QUALITY CONTROL**

- A. See Section 01400 - Quality Requirements, for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.
- E. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1 and fastended to the building structure.
  - 1. Do not use powder-actuated anchors
  - 2. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

**END OF SECTION**

**SECTION 16075 - ELECTRICAL IDENTIFICATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Field-painted identification of conduit.

**1.02 RELATED REQUIREMENTS**

- A. Section 09900 - Paints and Coatings.
- B. Section 16123 - Building Wire and Cable: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- C. Section 16140 - Wiring Devices: Device and wallplate finishes; factory pre-marked wallplates.
- D. Section 16710 - Structured Telecommunications Cabling and Enclosures: Identification for communications cabling and devices.

**1.03 REFERENCE STANDARDS**

- A. ASTM D 709 - Standard Specification for Laminated Thermosetting Materials.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
  - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
  - 2. Do not install identification products until final surface finishes and painting are complete.

**1.05 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements for submittals procedures.
- B. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.

**1.06 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.

**1.07 FIELD CONDITIONS**

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

## 2.01 IDENTIFICATION REQUIREMENTS

- A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.
- B. Identification for Equipment:
  - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
    - a. Panelboards:
      - 1) Name or label used on drawings (DP1, P1, LP1, e.g.)
      - 2) Branch: Normal or Emergency (Subdivided to Critical, Life Safety, Equipment branches where applicable).
      - 3) Identify ampere rating.
      - 4) Identify voltage and phase.
      - 5) Identify power source and circuit number. Include location when not within sight of equipment.
      - 6) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
      - 7) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
      - 8) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
- C. Identification for Conductors and Cables:
  - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 16123.
  - 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
  - 3. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
    - a. At each source and load connection.
    - b. Within boxes when more than one circuit is present.
    - c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
    - d. In cable tray, at maximum intervals of 20 feet.
    - e. Panelboard gutters, wiring gutters, pull boxes and wireways.
- D. Identification for Raceways:
  - 1. Use voltage markers or color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet.
    - a. Color-Coded Bands: Use field-painting or vinyl color coding electrical tape to mark bands 3 inches wide.
      - 1) Color Code:
        - (a) Emergency Power System: medium red.
        - (b) Security System: orange
        - (c) Data Systems: brown
        - (d) Voice Systems: green

- 2) Field-Painting: Comply with Section 09900.
  - 3) Vinyl Color Coding Electrical Tape: Comply with Section 16123.
  2. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
- E. Identification for Boxes:
1. Use voltage markers or color coded boxes to identify systems other than normal power system.
    - a. Color-Coded Boxes: Field-painted in accordance with Section 09900 per the same color code used for raceways.
  2. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
- F. Identification for Devices:
1. Identification for Communications Devices: Comply with Section 16710.
  2. Wiring Device and Wallplate Finishes: Comply with Section 16140.
  3. Factory Pre-Marked Wallplates: Comply with Section 16140.
  4. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
  5. Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.
  6. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.

## 2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
1. Manufacturers:
    - a. Brimar Industries, Inc: [www.brimar.com](http://www.brimar.com).
    - b. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com](http://www.kolbipipemarkers.com).
    - c. Seton Identification Products: [www.seton.com](http://www.seton.com).
    - d. Substitutions: See Section 01600 - Product Requirements.
  2. Materials:
    - a. Indoor Clean, Dry Locations: Use plastic nameplates.
  3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
    - a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.
- B. Identification Labels:
1. Manufacturers:
    - a. Brady Corporation: [www.bradyid.com](http://www.bradyid.com).
    - b. Brother International Corporation: [www.brother-usa.com](http://www.brother-usa.com).
    - c. Panduit Corp: [www.panduit.com](http://www.panduit.com).
    - d. Substitutions: See Section 01600 - Product Requirements.
  2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
  3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

- C. Format for Equipment Identification:
  - 1. Minimum Size: 1 inch by 2.5 inches.
  - 2. Legend:
    - a. System designation where applicable:
      - 1) Emergency Power System: Identify with text "EMERGENCY".
    - b. Equipment designation or other approved description.
    - c. Other information as indicated.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height:
    - a. System Designation: 1 inch.
    - b. Equipment Designation: 1/2 inch.
    - c. Other Information: 1/4 inch.
  - 5. Color:
    - a. Normal Power System: White text on black background.
    - b. Emergency Power System: White text on medium red background.
    - c. Security System: White text on orange background.
    - d. Data Systems: White text on brown background.
    - e. Voice Systems: White text on green background.
- D. Format for General Information and Operating Instructions:
  - 1. Minimum Size: 1 inch by 2.5 inches.
  - 2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 1/4 inch.
  - 5. Color: Black text on white background unless otherwise indicated.
- E. Format for Receptacle Identification:
  - 1. Minimum Size: 3/8 inch by 1.5 inches.
  - 2. Legend: Power source and circuit number or other designation indicated.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 3/16 inch.
  - 5. Color: Black text on white background.
- F. Format for Control Device Identification:
  - 1. Minimum Size: 3/8 inch by 1.5 inches.
  - 2. Legend: Load controlled or other designation indicated.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 3/16 inch.
  - 5. Color: Black text on clear background.

### 2.03 WIRE AND CABLE MARKERS

- A. Manufacturers:
  - 1. Brady Corporation: [www.bradyid.com](http://www.bradyid.com).
  - 2. HellermannTyton: [www.hellermanntyton.com](http://www.hellermanntyton.com).
  - 3. Panduit Corp: [www.panduit.com](http://www.panduit.com).
  - 4. Substitutions: See Section 01600 - Product Requirements.
- B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

- C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- D. Legend: Power source and circuit number or other designation indicated.
- E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- F. Minimum Text Height: 1/8 inch.
- G. Color: Black text on white background unless otherwise indicated.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

#### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
  - 1. Surface-Mounted Equipment: Enclosure front.
  - 2. Flush-Mounted Equipment: Inside of equipment door.
  - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
  - 4. Elevated Equipment: Legible from the floor or working platform.
  - 5. Branch Devices: Adjacent to device.
  - 6. Interior Components: Legible from the point of access.
  - 7. Conduits: Legible from the floor.
  - 8. Boxes: Outside face of cover.
  - 9. Conductors and Cables: Legible from the point of access.
  - 10. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing, or epoxy cement.
  - 1. Do not use adhesives on exterior surfaces except where substrate can not be penetrated.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Mark all handwritten text, where permitted, to be neat and legible.

#### **3.03 FIELD QUALITY CONTROL**

- A. See Section 01400 - Quality Requirements, for additional requirements.
- B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

**END OF SECTION**



**SECTION 16097 - ELECTRICAL DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electrical demolition.

**1.02 RELATED REQUIREMENTS**

- A. Section 01700 - Execution Requirements: Additional requirements for alterations work.

**1.03 ADMINISTRATION**

- A. It is not possible to delineate the full scope of the demolition work in the construction documents due to the inaccuracy of existing drawings and sometimes lack of drawings or other documentation entirely. Field work by the Architect and Engineer is also limited in scope and yields limited results from factors that include lack of existing documentation and limited access. Therefore the Contractor must make reasonable allowances for work not reflected by the Construction documents based on the Contractor's experience. Do not completely rely on the Demolition plans to identify circuiting and the safe removal of power from circuits to perform work. It is the responsibility of the Contractor to trace out and verify circuit conditions by taking voltage measurements, using circuit tracers or other methods to verify circuit status.

**PART 2 PRODUCTS**

**2.01 MATERIALS AND EQUIPMENT**

- A. Materials and equipment for patching and extending work: As specified in individual sections.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. All demolition work shall be performed with due care and diligence so as to prevent the unnecessary destruction and/or damage to systems that shall remain in operation at the conclusion of the project. Determine the exact location of all existing equipment, devices and wiring before commencing work.
- B. Preserve all portions of the existing electrical systems which shall remain.
- C. Verify field measurements and circuiting arrangements shown on Drawings.
- D. Verify that abandoned wiring and equipment serve only abandoned facilities.
- E. Demolition drawings are based on casual field observation and existing record documents. Equipment and circuits have been shown in an approximate way and have not been independently verified by the owner or engineer. Determine all work necessary to renovate, alter, change and repair existing systems based on the actual field conditions. Contractors will be expected to make reasonable assumptions about the work based on their experience with projects of similar scope and size.
- F. Conduit and wiring are not shown on the demolition plan but shall be considered fully a part of the work.
- G. Existing conduit and wiring may be re-used where they are of the type specified, meet the requirements for the new work as defined by the Contract Documents and remain in good condition.

- H. Existing circuitry without a separate grounding conductor shall not be re-used.
- I. Report discrepancies to Owner before disturbing existing installation.
- J. Beginning of demolition means installer accepts existing conditions and agrees to be fully responsible for any and all damages caused by a failure to exactly locate and preserve any and all existing portions of the electrical system.

### 3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
  - 2. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Notify Owner before partially or completely disabling system.
  - 2. Notify local fire service.
  - 3. Make notifications at least 24 hours in advance.
  - 4. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Notify Owner at least 24 hours before partially or completely disabling system.
  - 2. Notify telephone utility company at least 24 hours before partially or completely disabling system.
  - 3. Make temporary connections to maintain service in areas adjacent to work area.

### 3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction. Maintain the continuity of service and grounding to the existing circuits and other system elements contained within the area of construction that serve other areas of the facility and conceal them above ceilings and other building elements in the new construction.
- B. Remove abandoned wiring to source of supply or to the point on a shared circuit from where the equipment of device is served.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

- E. Remove and re-install or protect in place all existing equipment and devices shown to remain on or in walls, ceilings and floors which are exposed to demolition and construction activities and which may be damaged by dust, dirt, debris and painting. Where new walls are extended extend boxes and wiring to accommodate new finish.
- F. Replace existing devices shown to remain in operation and their associated coverplates which have been damaged.
- G. Disconnect and remove abandoned panelboards and distribution equipment.
- H. Coordinate disconnect and remove electrical devices and equipment serving utilization equipment that has been removed. Examine the demolition plans of all trades provide electrical demolition services for equipment and devices being removed.
- I. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- J. Provide all cutting and patching to repair any damage caused by construction activities including adjacent construction and finishes damaged during demolition and extension work.
- K. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- L. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

#### 3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide newly revised typed panelboard directories for existing panelboards to reflect new circuit conditions as a result of construction and demolition.
- C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.
- D. All equipment, devices and materials removed during demolition work and not indicated to be reused or turned over to the owner, shall become the responsibility of the Contractor for disposal.

**END OF SECTION**

**SECTION 16123 - BUILDING WIRE AND CABLE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Single conductor building wire.
- B. Wiring connectors.
- C. Electrical tape.
- D. Heat shrink tubing.
- E. Wire pulling lubricant.

**1.02 RELATED REQUIREMENTS**

- A. Section 07840 - Firestopping.
- B. Section 16060 - Grounding and Bonding: Additional requirements for grounding conductors and grounding connectors.
- C. Section 16075 - Electrical Identification: Identification products and requirements.

**1.03 REFERENCE STANDARDS**

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire.
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes.
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation.
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape.
- F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes.
- G. FS A-A-59544 - Cable and Wire, Electrical (Power, Fixed Installation); Federal Specification.
- H. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.
- I. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; National Electrical Manufacturers Association (ANSI/NEMA WC 70/ICEA S-95-658).
- J. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association.
- K. NFPA 70 - National Electrical Code; National Fire Protection Association.
- L. UL 44 - Thermoset-Insulated Wires and Cables.
- M. UL 83 - Thermoplastic-Insulated Wires and Cables.

- N. UL 486A-486B - Wire Connectors.
- O. UL 486C - Splicing Wire Connectors.
- P. UL 486D - Sealed Wire Connector Systems.
- Q. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
  - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
  - 3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. NEMA WC 3 - Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
- C. NEMA WC 5 - Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

#### 1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures and Section 16010.

#### 1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

#### 1.08 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

### PART 2 PRODUCTS

#### 2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.

- D. Underground feeder and branch-circuit cable is not permitted.
- E. Service entrance cable is not permitted.
- F. Armored cable is not permitted.
- G. Metal-clad cable is not permitted.
- H. Use stranded conductors for control circuits.
- I. Use conductor not smaller than 16 AWG for control circuits.
- J. Conductor sizes are based on copper unless indicated as aluminum or "AL".

## 2.02 CONDUCTOR AND CABLE MANUFACTURERS

- A. Cerro Wire LLC: [www.cerrowire.com](http://www.cerrowire.com).
- B. Encore Wire Corporation: [www.encorewire.com](http://www.encorewire.com).
- C. Industrial Wire & Cable, Inc: [www.iewc.com](http://www.iewc.com).
- D. Southwire Company: [www.southwire.com](http://www.southwire.com).
- E. Substitutions: See Section 01600 - Product Requirements.

## 2.03 ALL CONDUCTORS AND CABLES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose indicated.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Comply with FS A-A-59544 where applicable.
- F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- H. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.
- I. Conductor Material:
  - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
  - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
  - 3. Tinned Copper Conductors: Comply with ASTM B33.
- J. Minimum Conductor Size:
  - 1. Branch Circuits: 12 AWG.
    - a. Exceptions:
      - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.

- 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
- 3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
2. Control Circuits: 14 AWG.

**K. Conductor Color Coding:**

1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
2. Color Coding Method: Integrally colored insulation.
  - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
3. Color Code:
  - a. 208Y/120 V, 3 Phase, 4 Wire System:
    - 1) Phase A: Black.
    - 2) Phase B: Red.
    - 3) Phase C: Blue.
    - 4) Neutral/Grounded: White.
  - b. 240/120 V, 1 Phase, 3 Wire System:
    - 1) Phase A: Black.
    - 2) Phase B: Red.
    - 3) Neutral/Grounded: White.
  - c. Equipment Ground, All Systems: Green.
  - d. Travelers for 3-Way and 4-Way Switching: Pink.
  - e. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.
  - f. For control circuits, comply with manufacturer's recommended color code.

**2.04 SINGLE CONDUCTOR BUILDING WIRE**

- A. Description: Single conductor insulated wire.
- B. Conductor Stranding:
  1. Feeders and Branch Circuits: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation:
  1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.

**2.05 WIRING CONNECTORS**

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Wiring Connectors for Splices and Taps:
  1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
  2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- C. Wiring Connectors for Terminations:
  1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
  2. Provide compression adapters for connecting conductors to equipment furnished with

- mechanical lugs when only compression connectors are specified.
3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
  4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
  5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
  6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
  7. Conductors for Control Circuits: Use crimped terminals for all connections.
- D. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
1. Manufacturers:
    - a. 3M: [www.3m.com](http://www.3m.com).
    - b. Ideal Industries, Inc: [www.idealindustries.com](http://www.idealindustries.com).
    - c. NSI Industries LLC: [www.nsiindustries.com](http://www.nsiindustries.com).
- E. Push-in Wire Connectors: Rated 600 V, 221 degrees F.
1. Manufacturers:
    - a. Ideal Industries, Inc: [www.idealindustries.com](http://www.idealindustries.com).
    - b. NSI Industries LLC: [www.nsiindustries.com](http://www.nsiindustries.com).
    - c. Wago Corporation: [www.wago.us](http://www.wago.us).
- F. Mechanical Connectors: Provide bolted type or set-screw type.
1. Manufacturers:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. IlSCO: [www.ilSCO.com](http://www.ilSCO.com).
    - c. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
- G. Compression Connectors: Provide circumferential type or hex type crimp configuration.
1. Manufacturers:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. IlSCO: [www.ilSCO.com](http://www.ilSCO.com).
    - c. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
- H. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
1. Manufacturers:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. IlSCO: [www.ilSCO.com](http://www.ilSCO.com).
    - c. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).

## 2.06 WIRING ACCESSORIES

- A. Electrical Tape:
1. Manufacturers:
    - a. 3M: [www.3m.com](http://www.3m.com).
    - b. Plymouth Rubber Europa: [www.plymouthrubber.com](http://www.plymouthrubber.com).
    - c. Substitutions: See Section 01600 - Product Requirements.



2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
  3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
  4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
  5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
  6. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
  7. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
1. Manufacturers:
    - a. 3M: [www.3m.com](http://www.3m.com).
- C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that raceway installation is complete and supported.
- E. Verify that field measurements are as shown on the drawings.
- F. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 PREPARATION**

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

### **3.03 INSTALLATION**

- A. Circuiting Requirements:
  1. Unless dimensioned, circuit routing indicated is diagrammatic.
  2. When circuit destination is indicated and routing is not shown, determine exact routing required.
  3. Arrange circuiting to minimize splices.
  4. Include circuit lengths required to install connected devices within 10 ft of location shown.

5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is permitted, under the following conditions:
  - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
  - b. Increase size of conductors as required to account for ampacity derating.
  - c. Size raceways, boxes, etc. to accommodate conductors.
8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
9. Provide oversized neutral/grounded conductors where indicated and as specified below.
  - a. Provide 200 percent rated neutral for feeders fed from K-rated transformers.
  - b. Provide 200 percent rated neutral for feeders serving panelboards with 200 percent rated neutral bus.
- B. Install products in accordance with manufacturer's instructions.
- C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.
- D. Installation in Raceway:
  1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
  2. Pull all conductors and cables together into raceway at same time.
  3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
  4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
  1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
  2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.
- G. Terminate cables using suitable fittings.
- H. Install conductors with a minimum of 12 inches of slack at each outlet.
- I. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- J. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

- K. Make wiring connections using specified wiring connectors.
  - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
  - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
  - 3. Do not remove conductor strands to facilitate insertion into connector.
  - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
  - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
  
- L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
  - 1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
    - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
    - b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
  - 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
    - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
    - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
  - 3. Wet Locations: Use heat shrink tubing.
  
- M. Insulate ends of spare conductors using vinyl insulating electrical tape.
  
- N. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
  
- O. Identify conductors and cables in accordance with Section 16075.
  
- P. Color Code Legend: Provide identification label identifying color code for ungrounded conductors at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
  
- Q. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07840.
  
- R. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.
  
- S. Where a circuit home run or a feeder is shown on the plans without any conductor or raceway identification, it shall be a minimum of 2 # 12, 1 # 12 Ground, ½" Conduit unless additional information is available as follows:
  - 1. Where an overcurrent device is shown for the circuit in panelboards or otherwise noted,

size the conductor and raceway to match the overcurrent device rating. If the feeder or homerun is shown connected to a transformer, electric motor, mechanical equipment or other equipment for which load information is available on the plans or in the project manual, provide conductors and raceways sized to the load capacity of the equipment. Verify final sizes with the Engineer in such cases.

- T. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- U. Support cables or flexible metal conduits above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels. Provide braid rings or drive rings.
- V. Support cables above accessible ceilings to building structural elements, steel channel trapeze hangers, or other manufactured hangers or support systems fastened to or hung from the building structure. It is permissible to use the ceiling wire or separate support wire installed for the purpose to support the final six feet of cable connected to light fixtures. Do not lay cables on ceiling tiles or on duct work, piping or other system elements.
- W. Use a power distribution block as manufactured by IlSCO (sized for the size and number of conductors, and splice type) for splices and taps, 6 AWG and larger. Power distribution block shall be installed in a junction box, sized per NEC.

#### 3.04 CONDUCTOR/CABLE IDENTIFICATION

- A. Each wire or cable in a feeder at its terminal points, and in each pull box, junction box, and panel gutter through which it passes shall be identified to show the circuit number of the breaker to which it connects. Each common wire, common circuit to common loop of a system, fire alarm, sound system, TV system, or any signal system conductor, shall be identified. Refer to Section 16075 - IDENTIFICATION for additional instructions.

#### 3.05 FIELD QUALITY CONTROL

- A. Perform inspection, testing, and adjusting in accordance with Section 01400.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Torque test conductor connections and terminations to manufacturer's recommended values.
- D. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.
- E. Feeder Resistance Testing:
  - 1. All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500-volt megger. The procedures listed below shall be followed:
  - 2. Minimum readings shall be one million (1,000,000) or more ohms for #6 AWG wire and smaller, 250,000 ohms or more for #4 AWG wire or larger, between conductors and between conductor and the grounding conductor.
  - 3. After all fixtures, devices, and equipment are installed and all connections completed to each panel, the contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and the grounded enclosure. If this reading is less than 250,000 ohms, the contractor shall disconnect the branch circuit neutral wires from this neutral bar. He shall then test each one separately to the panel until source of the low reading is found. The contractor shall correct troubles, reconnect, and retest until at least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only

- the neutral feeder disconnected.
4. Document test by tabulating the readings with time of day, date, temperature and all pertinent test information. Submit documentation to the engineer prior to the final inspection and as a prerequisite for final acceptance of the project.
  5. At final inspection, the contractor shall furnish a megger and show the engineers and State Construction Office representatives that the panels comply with the above.
- F. Inspect and test in accordance with NETA STD ATS, except Section 4.
- G. Perform inspections and tests listed in NETA STD ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
- H. Correct deficiencies and replace damaged or defective conductors and cables.
- I. Perform inspections and tests listed in NETA STD ATS, Section 7.3.2.

**END OF SECTION**

**SECTION 16131 - CONDUIT**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Aluminum rigid metal conduit (RMC).
- C. Flexible metal conduit (FMC).
- D. Liquidtight flexible metal conduit (LFMC).
- E. Electrical metallic tubing (EMT).
- F. Conduit fittings.

1.02 RELATED REQUIREMENTS

- A. Section 07840 - Firestopping.
- B. Section 16060 - Grounding and Bonding.
- C. Section 16070 - Hangers and Supports.
- D. Section 16138 - Boxes.
- E. Section 16075 - Electrical Identification: Identification products and requirements.

1.03 DESCRIPTION OF WORK

- A. Unless otherwise noted on the drawings or specified elsewhere in Division 16, route all conductors in conduit. The electrical plans indicate the general location of circuiting, electrical devices, and/or outlet boxes. If approved by the Engineer, conduit runs may be modified at the time of construction to adapt to the construction conditions, but in no case shall a circuit be combined with another circuit or modified.

1.04 VOICE/DATA SYSTEM RACEWAYS

- A. Furnish a complete system of raceways, outlet boxes, backboards, grounds, etc., to accommodate the Owner furnished voice/data system wiring and outlets.
- B. Outlet boxes shall be minimum 4" x 4" x 2-1/2" with single gang opening.

1.05 ADDITIONAL EMPTY RACEWAY SYSTEMS

- A. Provide a system of raceways, pull boxes, outlet boxes, grounds and related raceway work to support installation of wiring, devices and equipment for the following systems: Sound Reinforcement System and Security System
- B. Refer to the Division 16 drawings and specifications and the drawings and specifications of the system(s) being considered for the full extent of raceway requirements.
- C. Unless otherwise noted all pull boxes, device or outlet boxes, and enclosures shall be furnished installed by the Division 16 Contractor. Special backboxes such as equipment cabinets, control unit backboxes and wiring racks shall be furnished by the System Contractor and installed by the Division 16 Contractor.
- D. The power requirements for the listed systems shall be provided by the Division 16 Contractor.

**1.06 REFERENCE STANDARDS**

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC).
- B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT).
- C. ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC).
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); National Electrical Contractors Association.
- F. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit; National Electrical Contractors Association.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association (ANSI/NEMA FB 1).
- H. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; National Electrical Manufacturers Association.
- I. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; National Electrical Manufacturers Association.
- J. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; National Electrical Manufacturers Association.
- K. NFPA 70 - National Electrical Code; National Fire Protection Association.
- L. UL 1 - Flexible Metal Conduit.
- M. UL 6 - Electrical Rigid Metal Conduit-Steel.
- N. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless Steel.
- O. UL 360 - Liquid-Tight Flexible Steel Conduit.
- P. UL 514B - Conduit, Tubing, and Cable Fittings.
- Q. UL 797 - Electrical Metallic Tubing-Steel.

**1.07 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements for submittals procedures.
- B. Project Record Documents: Accurately record actual routing of conduits larger than 2 inches. Show not only conduit routing but all pull boxes in the raceway system.

**1.08 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.

**1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

**PART 2 PRODUCTS**

**CONDUIT**

**2.01 CONDUIT REQUIREMENTS**

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- C. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
- D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

**2.02 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)**

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
  - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use steel or malleable iron.
  - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

**2.03 ALUMINUM RIGID METAL CONDUIT (RMC)**

- A. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.
- B. Fittings:
  - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use aluminum.
  - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

**2.04 FLEXIBLE METAL CONDUIT (FMC)**

- A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- B. Fittings:
  - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use steel or malleable iron.
- C. Fittings: NEMA FB 1. Fittings shall be two-screw, double clamp malleable iron, hot dipped galvanized.

**2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)**

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:



1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.
3. Fittings shall be of the type that uses a threaded grounding cone, a steel, nylon or plastic compression ring, insulated throat, and a gland for tightening. Fittings shall be made of steel, have insulated throats and have a male thread and locknut or male bushing with a ring seal. Each connector shall provide a low resistance ground connection between the flexible conduit and the outlet box, conduit or other equipment to which it is connected.

#### 2.06 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- B. Fittings:
  1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  2. Material: Use steel or malleable iron.
  3. Connectors and Couplings: Use compression (gland) or set-screw type.
    - a. Do not use indenter type connectors and couplings.
- C. Description: ANSI C80.3 [; galvanized tubing.]
- D. EMT connections shall be made tight to boxes and cabinets using insulated throat ferrous metal fittings specifically designed for use with EMT conduit. Use insulating insert at all joints to prevent any abrasion of wires during installation.
- E. For EMT installation encased in concrete, join EMT with moisture proof type fittings so as to be completely sealed against intrusion of moisture.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install aluminum rigid metal conduit (RMC) in accordance with NECA 102.
- E. Conduit Routing:
  1. Unless dimensioned, conduit routing indicated is diagrammatic.
  2. When conduit destination is indicated and routing is not shown, determine exact routing required.
  3. Conceal all conduits unless specifically indicated to be exposed.
  4. Conduits in the following areas may be exposed, unless otherwise indicated:
    - a. Electrical rooms.

- b. Mechanical equipment rooms.
  - c. Within joists in areas with no ceiling.
  5. Route conduits above water and drain piping where possible.
  6. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
- F. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 and Section 16070 using suitable supports and methods approved by the authority having jurisdiction.
  2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
  3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
  4. Use conduit strap to support single surface-mounted conduit.
    - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
  5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
  6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
  7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
  8. Use of wire for support of conduits is not permitted.
- G. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
  2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
  3. Use suitable adapters where required to transition from one type of conduit to another.
  4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
  5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
  6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
  7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- H. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
  2. Make penetrations perpendicular to surfaces unless otherwise indicated.
  3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
  4. Conceal bends for conduit risers emerging above ground.
  5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
  6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
  7. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07840.

- I. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
  - 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
- J. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
  - 1. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- K. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- L. Provide grounding and bonding in accordance with Section 16060.
- M. Identify conduits in accordance with Section 16075.

**3.03 COMMUNICATIONS RACEWAYS:**

- A. Special care shall be taken in installing raceways for voice and data applications. The requirements set forth in the applicable sections of EIA/TIA 569; NFPA Article 70, Chapter 8 (Communications) and NFPA Article 70, Section 770 (Fiber Optic Cable Assemblies) shall be referenced.
- B. No single run of conduit is allowed more than 180° of total bending radius. Install pull boxes in runs requiring more than 180° total bending radius.
- C. The maximum bending radius for conduit containing voice/data cabling is six times the diameter of the conduit for sizes 2" and smaller and ten times the diameter of the conduit for conduit sizes greater than 2".
- D. Conduit runs for installation of horizontal cable shall be no longer than 100 feet without a pull box.
- E. Install pull boxes in straight runs of conduit only.
- F. Size pull boxes in accordance with following table:

Conduit Size	Width	Length	Depth	Increased width per conduit	
.75"	4"	12"	3"	2"	2"
1"	4"	16"	3"	2"	2"
1.25"	6"	20"	3"	3"	3"
1.5"	8"	27"	4"	4"	4"
2"	8"	36"	4"	5"	5"
2.5"	10"	42"	5"	6"	6"
3"	12"	48"	5"	6"	6"
3.5"	12"	54"	6"	6"	6"
4"	15"	60"	8"	8"	8"

- G. Conduit bodies are prohibited for use in voice/data conduit runs.
- H. All conduit ends, including stub outs, must be terminated with a bushing.
- I. All conduit must be bonded at each end.

**3.04 CONDUIT SIZES**

- A. Size conduit for conductor type installed; ½ inch minimum size except all voice and data conduit shall be minimum ¾".
- B. For all sizes of conduit larger than 1-1/2 inches, use factory elbows, unless otherwise specified herein. In smaller sizes, field bends will be permitted but care must be taken not to damage the conduit. The radius of the inner curve of any bend shall not be less than that permitted by the NEC.
- C. Where conduit sizes are not shown on the drawings, provide conduit sizes in accordance with the 2002 National Electric Code and equipment manufacturers' recommendations.
- D. Minimum sizes of conduits where size is not shown on the plans shall be as follows:

1. Area Of Installation	Minimum Size
a. Framed walls	½"
b. Above accessible ceilings	½"
c. Concealed in floor slabs	¾"
d. In grade	¾"
e. Cast in concrete	¾"
f. Exposed	¾"
g. Flexible conduit	½"
- E. The outside diameter of any conduit buried in concrete shall not exceed one-third the thickness of the structural slab, wall or beam in which it is placed. Conduit shall be located within the middle of the member.

### 3.05 CONDUIT SUPPORTS

- A. Arrange supports to prevent misalignment during wiring installation.
- B. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- C. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- D. Fasten conduit supports to building structure and surfaces under provisions of Section 16070.
- E. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- F. Do not attach conduit to ceiling support wires.
- G. Support conduit maximum 5' on center.

### 3.06 CONDUIT SLEEVES AND OPENINGS THROUGH WATERPROOF WALLS, FLOORS AND MEMBRANES

- A. For exterior non-membrane openings, furnish and install cast iron pipe sleeves for conduits passing through non-membrane waterproofed exterior walls, footings, roofs or beams. Sleeves through exterior walls below grade shall have continuously welded center flange buried in construction. Make conduit watertight in sleeve with oakum packing and caulked lead joints on both sides of wall.
- B. For interior membrane openings, furnish and install cast iron sleeves passing through interior membrane water proofed floors with integral flashing flange and clamping ring. Adjust sleeves to floor construction with galvanized steel or wrought iron pipe nipples top and bottom,

extending two inches above finished floor. Clamp sleeves to flashing with clamping device.

- C. For exterior membrane openings, furnish and install cast iron sleeves passing through exterior membrane waterproofed walls, floors and roof with integral flashing flange and clamping ring, modified for the required thickness. Make conduit watertight in sleeve with oakum packing and caulked lead joint.

**3.07 CONDUIT SLEEVES AND OPENINGS THROUGH FIRE RATED WALLS, FLOORS AND MEMBRANES**

- A. Sleeves in slab or in fire rated walls shall be packed with incombustible compound and caulked at ends with an incombustible compound. Provide a watertight seal at top of sleeves in slab. Seal off excess areas of floor openings around conduit and cable risers at each floor slab.

**END OF SECTION**

**SECTION 16137 - WIRE MESH CABLE TRAYS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES:**

- A. Continuous, rigid, welded steel or stainless steel wire mesh cable management system.
- B. Cable tray systems are defined to include, but are not limited to, straight sections, supports and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 07840 - Firestopping: Firestopping around cable trays.
- B. Section 16060 - Grounding and Bonding.
- C. Section 16070 - Hangers and Supports.

**1.03 REFERENCES:**

- A. IEC 61537 (2001) - Cable Tray Systems and Cable Ladder Systems for Cable Management
- B. NEMA VE 1-2002/CSA C22.2 No. 126.1-02 - Metal Cable Tray Systems
- C. ANSI/NFPA 70 (2005) - National Electrical Code (NEC)
- D. TIA 569-A (1998) - Commercial Building Standard for Telecommunications Pathways & Spaces
- E. ASTM A 510 - Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel
- F. ASTM A 380 - Specification for Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
- G. ASTM B 633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- H. ASTM A 123 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- I. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.
- B. Furnish and install a complete cable tray system with supports, to form a rigid structural system used to support cables and/or raceways.
- C. Coordinate with any and all contractors that are installing items and equipment above the ceiling so that the location of the cable tray is coordinated and not blocked by other equipment.
- D. Furnish and install supports and stiffeners as required to allow the cable tray to support 100% of it's rating, whether the cables installed now equals that rating or not.
- E. The cable tray shall be for the support of communication and low potential cables above the ceilings of the areas shown on the plans. The electrical contractor shall coordinate the location of the tray with respect to other equipment above the ceiling so that the tray is installed so that it

does not block other equipment (junction boxes, access panels, HVAC equipment, etc.) and that the installation of other contractors equipment does not block the tray. If in the Engineer's opinion, the installed location of the cable tray is such that it does block other equipment, or that the installed location makes it difficult for the installation of cables at a later date, the contractor shall remove the cable tray and reinstall the tray at a location as directed by the Engineer, at no cost to the Owner.

- F. Communication conduits shall extend from the communication devices back box to the cable tray, and shall be connected to the tray with a conduit bushing dropout panel. Install a plastic bushing on all conduits terminated at the tray and in the back box.

#### 1.05 SUBMITTALS

- A. Comply with requirements of Section 01330 - Submittal Procedures.
- B. Product Data: Submit manufacturer's product data sheets for cable tray indicating dimensions, materials, and finishes, including UL Classification and NEMA/CSA Certification.
- C. Shop Drawings: Submit shop drawings indicating materials, finish, dimensions, accessories, layout, supports, splices, and installation details.
- D. Design Calculations: Verify loading capacities for supports.
- E. Coordination Drawings: Include floor plans and sections drawn to scale. Include scaled cable tray layout and relationships between components and adjacent structural and mechanical elements. Data presented on these drawings are as accurate as preliminary surveys and planning can determine. Field verification of all dimensions, routing, etc., is directed.
- F. Factory-certified test reports of specified products, complying with IEC 61537, NEC, and NEMA VE 1/CSA C22.2 No. 126.1.
- G. Submit manufacturer's certification indicating ISO 9001 quality certified.
- H. Project Record Documents: Record actual routing of cable tray and locations of supports.

#### 1.06 QUALITY ASSURANCE

- A. Source Limitations: Obtain cable tray components through one source from a single manufacturer.
- B. Approval and Labeling: Provide cable trays and accessories specified in this Section that are approved and labeled.
  - 1. The Terms "Classified" pertaining to cable trays (rather than "Listed") and "Labeled": As defined in NFPA 70, Article 100, including painted trays.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- C. Comply with NFPA 70, National Electrical Code, Article 392: Cable Trays; provide UL Classification and labels.
- D. Comply with IEC 61537, Cable Tray Systems and Cable Ladder Systems for Cable Management.

#### 1.07 DELIVERY, STORAGE AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

- B. Avoid breakage, denting and scoring finishes. Damaged products will not be installed. Store cable trays and accessories in original cartons and in clean dry space; protect from weather and construction traffic. Wet materials will be unpacked and dried before storage.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS: Subject to compliance with requirements, provide products by the following:

- A. Snake Tray 201 Series: [www.snaketray.com](http://www.snaketray.com)
- B. Cooper Industries B Line: [www.cooperindustries.com](http://www.cooperindustries.com)
- C. Hoffman: [www.hoffmanonline.com](http://www.hoffmanonline.com)

2.02 MATERIALS AND FINISHES:

- A. Cable Tray Materials: select one of the following:
  - 1. Carbon steel wire, ASTM A 510, Grade 1008. Wire welded, bent, and surface treated after manufacture.
- B. Cable Tray Finishes:
  - 1. Finish for Carbon Steel Wire after welding and bending of mesh; select one of the following:
    - a. Electrodeposited Zinc Plating: ASTM B 633, Type III, SC-1.
- C. Cable tray will consist of continuous, rigid, welded steel wire mesh cable management system, to allow continuous ventilation of cables and maximum dissipation of heat, with UL Classified splices where tray(including UL Classified painted tray) acts as Equipment Grounding Conductor (EGC). Wire mesh cable tray will have continuous welded top side wire designed and finished to eliminate sharp and rough edges what would harm cable insulation and installers.
- D. Provide splices, supports, and other fittings necessary for a complete, continuously grounded system.
  - 1. Mesh: 4 x 6 inches (101 x 152 mm).
  - 2. Straight Section Lengths: 98 inches (2,489 mm).
  - 3. Wire Diameter: Design to include varying wire sizes to meet application load requirements; to optimize tray strength; and to allow tray to remain lightweight.
  - 4. The tray assembly shall be designed and finished to protect cable insulation and installers' hands.
  - 5. Fittings: Wire mesh cable tray fittings are field-fabricated from straight tray sections, in accordance with manufacturer's instructions and Item 2.03.
  - 6. CM Series Cable Tray Size:
    - a. Depth: Cable tray depth will be 4 inches (unless otherwise shown on drawings).
    - b. Width: Cable tray width will be 7 inches (unless otherwise shown on drawings):
    - c. Length: Cable tray section length will be 98 inches (2,489mm) unless otherwise shown on drawings.
    - d. Fill Ratio: Cable tray may be filled to total fill capacity per NEC. Minimum 20% spare capacity recommended to accommodate future cabling changes or additions.
    - e. Load Span Criteria:
      - 1) Cable tray will be capable of carrying a uniformly distributed load of 50 pounds per foot on an 8 ft support span, according to load tests of standard shown in Item A above.
  - 7. Other cable tray options; select if applicable:



- a. G-shaped mini cable tray for direct surface attachment or for use in small spaces.
  - 1) G1: 2 inches (50mm) x 2 inches (50mm)
  - 2) G2: 2 inches (50mm) x 4 inches (100mm)
  - 3) G3: 2 inches (50mm) x 8 inches (200mm)
  - 4) G4: 4 inches (100mm) x 6 inches (150mm)

## 2.03 CABLE TRAY SUPPORTS & ACCESSORIES

- A. Fittings: Wire mesh cable tray fittings shall be field-fabricated from straight tray sections, in accordance with manufacturer's instructions.
- B. Supports: Provide support methods that will meet the load handling requirements of the cable tray system at all points. Support tray using 1/4", 3/8" or 1/2" threaded rods or wall brackets designed for the purpose that are solidly anchored and reinforced to support trays and tray loads. Support methods may include but not necessarily be limited to:
  1. Rod supported tray clips
  2. Single rod, center supported trapeze hangers
  3. Dual rod supported trapeze hangers
  4. "C" or "J" wall brackets
- C. Splices, shall be approved for electrical continuity (bonding), as recommended by cable tray manufacturer and manufactured and designed to be used for the manufacturer's product in question. Use the following except where otherwise shown:
  1. Toolless Splices: No hardware required
  2. Splice Washer Kits
  3. Splice Bars
  4. Splice Clamps
  5. Splice Plates
  6. Special splice hardware for sweeps, 90's at T's..
- D. Accessories: Where indicated or required to protect, support, and install a cable tray system where. Accessories shall include but not limited to the following:
  1. Covers, of same material and finish as cable tray; with optional cover clips.
  2. Divider Strips, of same material and finish as cable tray and matching cable tray depth.
  3. Cable Routing Accessories:
    - a. Dropout: Bolt to tray; slotted design.
    - b. Cablexit: No additional hardware needed.
    - c. Conduit Attachment: Plate or other device to allow termination of conduit at tray.
  4. Support Accessories:
    - a. Connector to mount tray to unistrut without additional hardware.
    - b. J-Bolt kit to mount tray to 19" or 23" racks.
    - c. Wire Cable Hanging Support.
    - d. Wall Termination Bracket
    - e. Beam Supports
  5. Grounding Clamp to ground cable tray.
  6. Seismic Bracing Kit; space 30' apart for most seismic conditions. Consult Cablofil for additional information.

## 2.04 EQUIPMENT GROUNDING CONDUCTOR FUNCTION & GROUNDING

- A. UL Classified cable trays (including painted tray) may act as Equipment Grounding Conductors.
  1. Use UL Classified splicing methods to ensure cable tray is electrically continuous and

bonded as recommended by Cablofil.

- a. Ground cable trays at end of continuous run.
- b. Ground continuous cable tray runs every 60 feet.
  - 1) Test cable tray system per NFPA 70B, Chapter 18 to verify grounding less than 1 ohm.
  - 2) Ground cable trays against fault current, noise, lightning, and electromagnetic interference by mounting grounding wire to each 10' cable tray section with grounding clamp.

### PART 3 EXECUTION

#### 3.01 EXAMINATION:

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of cable trays. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### 3.02 INSTALLATION

- A. Install metallic cable tray in accordance with NEMA VE 1 and the manufacturer's printed instructions.
- B. Support trays in accordance with Section 16070. Provide supports at each connection point, at the end of each run, and at other points to maintain spacing between supports of no less than 8 ft maximum. The support system shall be designed for maximum loading of the cable tray.
- C. Use expansion connectors where required.
- D. Provide firestopping under provisions of Section 07840 to sustain ratings when passing cable tray through fire-rated elements.
- E. Install cable tray level and plumb according to manufacturer's written instructions, Coordination Drawings, original design, and referenced standards.
- F. Cutting: Field-fabricate changes in direction & elevation by cutting & bending cable tray.
  1. Cut cable tray wires in accordance with manufacturer's instructions.
  2. Cable tray wires must be cut with side-action bolt cutters with offset head to ensure integrity of protective galvanic layer.
  3. Remove burrs and sharp edges from cable trays.
    - a. Certified Installers: Cable tray installers must have successfully completed Cablofil's Certified Installer program.
- G. Ground and bond cable tray under provisions of Section 16060.
  1. Provide continuity between tray components.
  2. Provide 2 AWG bare copper equipment grounding conductor through entire length of tray; bond to each component.
  3. Connections to tray may be made using mechanical or exothermic connectors.
- H. Install warning signs at 50 foot centers along cable tray, located to be visible.

**END OF SECTION 16137**

**SECTION 16138 - BOXES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

**1.02 RELATED REQUIREMENTS**

- A. Section 07840 - Firestopping.
- B. Section 16060 - Grounding and Bonding.
- C. Section 16070 - Hangers and Supports.
- D. Section 16131 - Conduit:
  - 1. Conduit bodies and other fittings.
  - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- E. Section 16075 - Electrical Identification: Identification products and requirements.
- F. Section 16140 - Wiring Devices:
  - 1. Wall plates.
  - 2. Additional requirements for locating boxes for wiring devices.

**1.03 REFERENCE STANDARDS**

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; National Electrical Contractors Association.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association (ANSI/NEMA FB 1).
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association (ANSI/NEMA OS 1).
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association.
- F. NFPA 70 - National Electrical Code; National Fire Protection Association.
- G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations.
- H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations.
- I. UL 514A - Metallic Outlet Boxes.
- J. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment,

- or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
  4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
  5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
  6. Coordinate the work with other trades to preserve insulation integrity.
  7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
  8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

#### 1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.

#### 1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### PART 2 PRODUCTS

#### 2.01 BOXES

- A. General Requirements:
  1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
  2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
  3. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
  4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
  5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
  1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
  2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
  3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal

- conduit is used.
4. Use nonmetallic boxes where exposed rigid PVC conduit is used.
  5. Use raised covers suitable for the type of wall construction and device configuration where required.
  6. Use shallow boxes where required by the type of wall construction.
  7. Do not use "through-wall" boxes designed for access from both sides of wall.
  8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
  9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
  10. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
  11. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
  12. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.
  13. Minimum Box Size, Unless Otherwise Indicated:
    - a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
    - b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
    - c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.
  14. Wall Plates: Comply with Section 16140.
  15. Manufacturers:
    - a. Cooper Crouse-Hinds, a division of Cooper Industries: [www.cooperindustries.com](http://www.cooperindustries.com).
    - b. Hubbell Incorporated; Bell Products: [www.hubbell-bell.com](http://www.hubbell-bell.com).
    - c. Hubbell Incorporated; RACO Products: [www.hubbell-raco.com](http://www.hubbell-raco.com).
    - d. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com](http://www.emersonindustrial.com).
    - e. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
  2. NEMA 250 Environment Type, Unless Otherwise Indicated:
  3. Junction and Pull Boxes Larger Than 100 cubic inches:
    - a. Provide hinged-cover enclosures unless otherwise indicated.
    - b. Boxes 6 square feet and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
  4. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
  5. Manufacturers:
    - a. Cooper B-Line, a division of Cooper Industries: [www.cooperindustries.com](http://www.cooperindustries.com).
    - b. Hoffman, a brand of Pentair Technical Products: [www.hoffmanonline.com](http://www.hoffmanonline.com).
    - c. Hubbell Incorporated; Wiegmann Products: [www.hubbell-wiegmann.com](http://www.hubbell-wiegmann.com).

## 2.02 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
  - 1. Material: Cast aluminum.
  - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
  - 3. UL listed: RAIN TIGHT

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide separate boxes for emergency power and normal power systems.
- E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- H. Box Locations:
  - 1. Locate boxes to be accessible. Provide access panels in accordance with Section 08310 as required where approved by the Architect.
    - a. Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
  - 2. Unless dimensioned, box locations indicated are approximate.
  - 3. Locate boxes as required for devices installed under other sections or by others.
    - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 16140.
      - 1) Particular attention should be given to coordinate location of boxes for devices mounted above counters, benches and backsplashes.
      - 2) Adjust box locations up to 10 feet if required to accommodate intended purpose. Review the Contract Documents, especially Architectural Elevations and millwork shop drawings to determine appropriate locations for boxes.
    - b. Locate boxes for light fixtures according to lighting plans and reflected ceiling plans.
  - 4. Locate boxes so that wall plates do not span different building finishes.
  - 5. Locate boxes so that wall plates do not cross masonry joints.

6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
  7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
  8. Fire-Resistance-Rated Walls: Install flush-mounted boxes such that the required fire-resistance will not be reduced.
    - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
    - b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
  9. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 16131.
  10. Junction and pull boxes are not generally shown on the plans. Install as required for splices, taps, wire pulling, equipment connections and as required by code. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
    - a. Concealed above accessible suspended ceilings.
    - b. Within joists in areas with no ceiling.
    - c. Electrical rooms.
    - d. Mechanical equipment rooms.
    - e. In other unfinished utility areas where approved.
- I. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 16070 using suitable supports and methods approved by the authority having jurisdiction.
  2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
  3. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.
  4. Installation Above Suspended Ceilings: Do not provide sole support of box from ceiling grid or ceiling support system. Adjustable steel channel fasteners may be used where supplemental or independent support of the ceiling or box is employed.
  5. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Use stamped steel bridge supports for outlet boxes installed between studs. Repair or replace supports for boxes that permit excessive movement.
- J. Install boxes plumb and level.
- K. Flush-Mounted Boxes:
1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
  2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
  3. Repair rough openings around boxes in noncombustible materials such as concrete, tile,

gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

- L. Install boxes as required to preserve insulation integrity.
- M. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- N. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07840.
- O. Close unused box openings.
- P. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- Q. Provide grounding and bonding in accordance with Section 16060.
- R. Identify boxes in accordance with Section 16075.
- S. Coordinate installation of outlet boxes for equipment connected under Section 16155.
- T. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- U. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- V. Use 4" square outlet box with plaster ring for single device outlets.

### 3.03 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

### 3.04 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

**END OF SECTION**



**SECTION 16140 - WIRING DEVICES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Wall plates.

1.02 RELATED REQUIREMENTS

- A. Section 16060 - Grounding and Bonding.
- B. Section 16138 - Boxes.
- C. Section 16075 - Electrical Identification: Identification products and requirements.
- D. Section 16155 - Equipment Wiring: Cords and plugs for equipment.

1.03 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; Federal Specification.
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); Federal Specification.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; National Electrical Contractors Association.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association.
- F. NEMA WD 2 - Semiconductor Dimmers for Incandescent Lamps.
- G. NEMA WD 5 - Specific-Purpose Wiring Devices.
- H. NEMA WD 6 - Wiring Device -- Dimensional Requirements; National Electrical Manufacturers Association.
- I. NFPA 70 - National Electrical Code; National Fire Protection Association.
- J. UL 20 - General-Use Snap Switches.
- K. UL 498 - Attachment Plugs and Receptacles.
- L. UL 514D - Cover Plates for Flush-Mounted Wiring Devices.
- M. UL 943 - Ground-Fault Circuit-Interrupters.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
  - 2. Coordinate wiring device ratings and configurations with the electrical requirements of

- actual equipment to be installed.
  - 3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
  - 4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
  - 5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.
- B. Sequencing:
- 1. Do not install wiring devices until final surface finishes and painting are complete.

#### 1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures and Section 16010 - General Electrical Requirements.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Field Quality Control Test Reports.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Operation and Maintenance Data:
  - 1. GFI Receptacles: Include information on status indicators and testing procedures and intervals.
- F. Project Record Documents: Record actual installed locations of wiring devices.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01600 - Product Requirements, for additional provisions.
  - 2. Screwdrivers for Tamper-Resistant Screws: Two for each type of screw.
  - 3. Extra Wall Plates: Two of each style, size, and finish.

#### 1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

#### 1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Leviton Manufacturing Company, Inc: [www.leviton.com](http://www.leviton.com).
- B. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us](http://www.legrand.us)

- C. Substitutions: See Section 01600 - Product Requirements.
- D. Source Limitations: Where possible, for each type of wiring device furnish products produced by a single manufacturer and obtained from a single supplier.

## 2.02 APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide GFI protection for all receptacles installed within 6 feet of sinks.
- D. Provide GFI protection for all receptacles installed in kitchens.
- E. Provide GFI protection for all receptacles serving electric drinking fountains.
- F. Unless noted otherwise, do not use combination switch/receptacle devices.

## 2.03 ALL WIRING DEVICES

- A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- B. Finishes:
  - 1. All Wiring Devices: Ivory with ivory nylon wall plate unless otherwise indicated.
  - 2. Wiring Devices Installed in Finished Spaces: Ivory with ivory nylon wall plate unless otherwise indicated.
  - 3. Wiring Devices Installed in Unfinished Spaces: Gray with galvanized steel wall plate unless otherwise indicated.
  - 4. Wiring Devices Installed in Wet or Damp Locations: Ivory with specified weatherproof cover unless otherwise indicated.
  - 5. Wiring Devices Connected to Emergency Power: Red with red nylon wall plate.

## 2.04 WALL SWITCHES

- A. Manufacturers:
  - 1. Leviton Manufacturing Company, Inc; : [www.leviton.com](http://www.leviton.com).
  - 2. Pass & Seymour, a brand of Legrand North America, Inc; : [www.legrand.us](http://www.legrand.us)
- B. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- C. Standard Wall Switches: Commercial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.
  - 1. Products:

## 2.05 RECEPTACLES

- A. Manufacturers:
  - 1. Leviton Manufacturing Company, Inc; : [www.leviton.com](http://www.leviton.com).
  - 2. Pass & Seymour, a brand of Legrand North America, Inc; : [www.legrand.us](http://www.legrand.us)

- B. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring and screw activated terminals for back wiring with separate ground terminal screw.
  - 2. NEMA configurations specified are according to NEMA WD 6.
- C. Convenience Receptacles:
  - 1. Standard Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
  - 2. Self grounding devices without an accompanying ground screw terminal is prohibited.
- D. GFI Receptacles:
  - 1. All GFI Receptacles: Provide with feed-through protection, light to indicate ground fault tripped condition and loss of protection, and list as complying with UL 943, class A.
    - a. Provide test and reset buttons of same color as device.
  - 2. Standard GFI Receptacles: Commercial specification grade, duplex, 20A, 125V, NEMA 5-20R.

## 2.06 WALL PLATES

- A. Manufacturers:
  - 1. Leviton Manufacturing Company, Inc; : [www.leviton.com](http://www.leviton.com).
  - 2. Lutron Electronics Company, Inc: [www.lutron.com](http://www.lutron.com).
- B. All Wall Plates: Comply with UL 514D.
  - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
  - 2. Size: Standard; Use jumbo size for brick or block construction.
  - 3. Screws: Metal with slotted heads finished to match wall plate finish.
  - 4. Color: Verify and obtain approval at submittal review.
- C. Nylon Wall Plates: Smooth finish, high-impact thermoplastic.
- D. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
- E. Brass Wall Plates: Brushed satin finish, factory-coated to inhibit oxidation.
- F. Aluminum Wall Plates: Smooth satin finish, clear anodized, factory-coated to inhibit oxidation.
- G. Chrome Wall Plates: Smooth finish, chrome plated steel.
- H. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.
- I. Premarked Wall Plates: Factory labeled as indicated; hot stamped for nylon wall plates and engraved for metal wall plates.
- J. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum base plate fastened with corrosion resistant screws, with a hinged, heavy duty, clear, polycarbonate cover with corrosion-resistant pins and hinges; listed as suitable for use in wet locations while in use with attachment plugs connected. Minimum 3.25" depth to allow use of most standard straight connected cord ends.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that floor boxes are adjusted properly.
- F. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- G. Verify that core drilled holes for poke-through assemblies are in proper locations.
- H. Verify that openings in access floor are in proper locations.
- I. Verify that conditions are satisfactory for installation prior to starting work.

### 3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### 3.03 INSTALLATION

- A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 16138 as required for installation of wiring devices provided under this section.
  - 1. Mounting Heights: Unless otherwise indicated, as follows:
    - a. Wall Switches: 48 inches above finished floor.
    - b. Wall Dimmers: 48 inches above finished floor.
    - c. Fan Speed Controllers: 48 inches above finished floor.
    - d. Receptacles: 18 inches above finished floor or 6 inches above counter.
  - 2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
  - 3. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
  - 4. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
  - 5. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not

connect more than one conductor to wiring device terminals.

- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Provide GFI receptacles with integral GFI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.
- I. Where split-wired duplex receptacles are indicated, remove tabs connecting top and bottom receptacles.
- J. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- K. Install wall switches with OFF position down.
- L. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- M. Do not share neutral conductor on branch circuits utilizing wall dimmers.
- N. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- O. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- P. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- Q. Identify wiring devices in accordance with Section 16075.
- R. Install protective rings on active flush cover service fittings.
- S. Corridor receptacle shall be hospital grade.
- T. Quadraplex outlets shall be two outlets installed in a common outlet box with a common wall plate.

### 3.04 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 16138 to obtain mounting heights specified.

### 3.05 FIELD QUALITY CONTROL

- A. Perform field inspection, testing, and adjusting in accordance with Section 01400.
- B. Inspect each wiring device for damage and defects.
- C. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- D. Test each receptacle to verify operation and proper polarity.

- E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- F. Correct wiring deficiencies and replace damaged or defective wiring devices.

**3.06 ADJUSTING**

- A. Adjust devices and wall plates to be flush and level.
- B. Adjust presets for wall dimmers according to manufacturer's instructions as directed by Architect.

**3.07 CLEANING**

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

**END OF SECTION**

**SECTION 16510 - INTERIOR LUMINAIRES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior luminaires.
- B. Exit signs.
- C. Ballasts.
- D. Lamps.
- E. Luminaire accessories.

1.02 RELATED REQUIREMENTS

- A. Section 16138 - Boxes.
- B. Section 16140 - Wiring Devices: Manual wall switches and wall dimmers.

1.03 REFERENCE STANDARDS

- A. ANSI C78.379 - American National Standard for Electric Lamps -- Reflector Lamps -- Classification of Beam Patterns.
- B. ANSI C82.1 - American National Standard for Lamp Ballast - Line Frequency Fluorescent Lamp Ballast.
- C. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts - Supplements.
- D. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.
- F. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association.
- G. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association.
- H. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; National Electrical Manufacturers Association.
- I. NEMA WD 6 - Wiring Devices - Dimensional Requirements; National Electrical Manufacturers Association.
- J. FS W-F-414 - Fixture, Lighting.
- K. NFPA 70 - National Electrical Code; National Fire Protection Association.
- L. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association.
- M. UL 935 - Fluorescent-Lamp Ballasts.
- N. UL 1598 - Luminaires.



- O. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products.

#### 1.04 ADMINISTRATIVE REQUIREMENTS

##### A. Coordination:

1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations. Do not rely on catalog numbers for such information.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
4. If only one fixture shown on the plans in a room or within a group of fixtures is labeled the remainder of the fixtures in the room or within the group shall be considered to be the same except where obvious to the contrary.
5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

#### 1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.

##### B. Shop Drawings:

1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
2. Provide photometric calculations where luminaires are proposed for substitution upon request.

##### C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IESNA LM-63 standard format upon request.
2. Ballasts: Include wiring diagrams and list of compatible lamp configurations.
3. Lamps: Include rated life, color temperature, color rendering index (CRI), and initial and mean lumen output.
4. Fluorescent Emergency Power Supply Unit: Include list of compatible lamp configurations and associated lumen output.

##### D. Additional information required on submitted data sheet:

1. Fixture Type
2. Catalog Number
3. Color photograph or isometric drawings
4. Plan and elevation views
5. Ballast Type
6. Lamp Type
7. Coefficients of Utilization

8. Candle power distribution charts
9. Zonal Lumen Summary charts
10. Options selected
11. Description of fixture construction

In addition to a paper copy of the data or specification sheet provide on a CD-ROM a PDF of the technical specification sheet and the product brochure for each light fixture.

- E. Light Fixture Systems: For lighting systems such as continuous cove or strip lights, recessed perimeter systems, and linear suspended systems provide complete layout drawings and installation details. Describe the system completely and show elevations, sections and other details required to completely delineate the product and installation.
- F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- G. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01600 - Product Requirements, for additional provisions.
  2. Extra Lenses and Louvers: Two percent of total quantity installed for each type, but not less than two of each type.
  3. Extra Lamps: Ten percent of total quantity installed for each type, but not less than two of each type.
  4. Extra Ballasts: Two percent of total quantity installed for each type, but not less than two of each type.
- I. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

#### 1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

#### 1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

#### 1.08 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

#### 1.09 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Provide two year manufacturer warranty for all linear fluorescent ballasts.

- C. Provide five year pro-rata warranty for batteries for emergency lighting units.
- D. Provide ten year pro-rata warranty for batteries for self-powered exit signs.
- E. Provide three year full warranty for fluorescent emergency power supply units.
- F. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Light Fixtures:
  - 1. As scheduled on the drawings.
- B. Lamps:
  - 1. General Electric
  - 2. Sylvania
  - 3. Phillips Lighting
  - 4. Osram
  - 5. Venture
- C. Ballasts:
  - 1. Advance Transformer Co.
  - 2. Magnetec, Inc.
  - 3. Valmont Electric
- D. Substitutions: See Section 01600 - Product Requirements.

### **2.02 LUMINAIRE TYPES**

- A. Furnish products as indicated in luminaire schedule included on the drawings.
- B. Catalog numbers are for general identification of fixtures only. It is the responsibility of the Contractor to provide complete catalog numbers and to provide all accessories for installation as implied by the accompanying description of the fixture, the demonstrated use on the drawings, and the specifications contained herein.

### **2.03 LUMINAIRES**

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. The voltages of all light fixtures shall be determined by the circuit to which each light fixture is connected. Refer to the circuiting requirements shown on the drawings, in particular the

lighting plans and panelboard schedules, to determine the voltage required. While in most cases light fixtures require only one voltage, there are cases where a light fixture must be provided in multiple voltages. It is the responsibility of the Contractor to determine where this occurs and provide fixtures in the voltages required.

- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- H. Sheet Metal:
  - 1. Shall be formed to prevent warping and sagging. Housing, trim and lens frame shall be true straight (unless intentionally curved), and parallel to each other as designed. Pre-painted metal is not acceptable.
  - 2. Wireways and fittings shall be free of burrs and sharp edges and shall accommodate internal and branch circuit wiring without damage to the wiring.
  - 3. When installed any exposed fixture housing surface, trim frame, door frame and lens frame shall be free of light leaks; lens doors shall close in a light tight manner.
  - 4. Hinged door closure frames shall operate smoothly without binding when the fixture is in the installed position, and latches shall function easily by finger action without the use of tools.
- I. Lamp Sockets:
  - 1. Fluorescent sockets shall be the biting edge type or phosphorous-bronze with silver flash contact surface type and shall conform to the applicable requirements of UL 542 and ANSI C-81. Lamp holders for bi-pin lamps, with the exception of those for "U" type lamps, shall be of the telescoping compression type, or of the single slot entry type requiring a one-quarter turn of the lamp after insertion.
  - 2. Incandescent: Shall have porcelain enclosures and conform to the applicable requirements of UL 496.
  - 3. High Intensity Discharge (HID): Shall have porcelain enclosures and conform to the applicable requirements of ANSI C-81.
- J. Metal Components:
  - 1. The manufacturer shall apply his standard finish (unless otherwise specified) over a corrosion resistant primer, after cleaning to free the metal surfaces of rust, grease, dirt and other deposits. Fixture finish shall be free of stains or evidence of rusting, blistering, or flaking.
  - 2. Fixture shall be painted after fabrication. Pre-painted metal is not acceptable.
  - 3. Interior light reflecting finishes shall be white with not less than 85 percent reflectances except where otherwise shown on the drawings.
  - 4. Exterior finishes shall be as shown on the drawings.
- K. Recessed Luminaires:
  - 1. Ceiling Compatibility: Comply with NEMA LE 4.
  - 2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
  - 3. Recessed incandescent, compact fluorescent or HID light fixtures installed in other than "lay-in" grid type ceilings shall be prewired type with an UL wiring junction box accessible through the fixture aperture. Where such light fixtures utilize a ballast, the ballast shall be removable through the fixture aperture.
  - 4. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.
- L. Damp Location Luminaires: Light fixtures installed in wet or damp locations shall be UL listed

and appropriately labeled for such use.

- M. Fluorescent Luminaires:
  - 1. Provide ballast disconnecting means complying with NFPA 70 where required.
  - 2. Fluorescent Luminaires Controlled by Occupancy Sensors: Provide programmed start ballasts.
  - 3. Fluorescent Luminaires Controlled by Dual-Level Switching: Provide with two ballasts.
    - a. Luminaires with Two Lamps: Each ballast controls one lamp.
    - b. Luminaires with Three Lamps: One ballast controls two outer lamps and one ballast controls inner lamp.
- N. LED Luminaires: Listed and labeled as complying with UL 8750.
- O. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

#### 2.04 EXIT SIGNS

- A. All Exit Signs: Internally illuminated with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
  - 1. Number of Faces: Single or double as indicated or as required for the installed location.
  - 2. Directional Arrows: As indicated or as required for the installed location.
- B. Self-Powered Exit Signs:
  - 1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
  - 2. Battery: Sealed maintenance-free nickel cadmium unless otherwise indicated.
  - 3. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
  - 4. Provide low-voltage disconnect to prevent battery damage from deep discharge.
  - 5. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.
- C. Accessories:
  - 1. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
  - 2. Provide compatible accessory wire guards where indicated.
- D. Exit Signs: Exit sign fixture suitable for use as emergency lighting unit.
  - 1. Provide fixtures complying with NFPA 101.
  - 2. Lamps: LED.
  - 3. Mounting: As indicated.

#### 2.05 BALLASTS

- A. Manufacturers:
  - 1. Manufacturer Limitations: Where possible, for each type of luminaire provide ballasts produced by a single manufacturer.
  - 2. Where a specific manufacturer or model is indicated elsewhere in the luminaire schedule or on the drawings, substitutions are not permitted unless explicitly indicated.

B. All Ballasts:

1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
3. Ballasts shall be accessible for servicing without removing or dismantling the fixtures. Each fluorescent ballast serving lamps 30 watts and larger shall be bolted to the fixture body or housing with four studs or captive screws.
4. Ballasts shall be equipped with color coded QUICK-CONNECT horizontal wiretap connectors on each end of the ballast housing for ease of installation. Ballasts shall be serviceable while the fixture is in its normally installed position, and shall not be mounted to removable reflectors or wireway covers unless so specified.

C. Fluorescent Ballasts:

1. All Fluorescent Ballasts: Unless otherwise indicated, provide high frequency electronic ballasts complying with ANSI C82.11 and listed and labeled as complying with UL 935.
  - a. Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
  - b. Total Harmonic Distortion: Not greater than 20 percent.
  - c. Power Factor: Not less than 0.95.
  - d. Ballast Factor: Normal ballast factor between 0.85 and 1.15, unless otherwise indicated.
  - e. Thermal Protection: Listed and labeled as UL Class P, with automatic reset for integral thermal protectors.
  - f. Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
  - g. Lamp Compatibility: Specifically designed for use with the specified lamp, with no visible flicker.
  - h. Lamp Operating Frequency: Greater than 20 kHz, except as specified below.
    - 1) Do not operate lamp(s) within the frequencies from 30 kHz through 40 kHz in order to avoid interference with infrared devices.
  - i. Lamp Current Crest Factor: Not greater than 1.7.
  - j. Lamp Wiring Method:
    - 1) Instant Start Ballasts: Parallel wired. (All fixtures except where not available or compatible with installation requirements.)
    - 2) Rapid Start Ballasts: Series wired.
    - 3) Programmed Start Ballasts: Provide parallel or series/parallel wired where available; otherwise series wired is acceptable.
  - k. Provide automatic restart capability to restart replaced lamp(s) without requiring resetting of power.
  - l. Provide end of lamp life automatic shut down circuitry for T5 and smaller diameter lamp ballasts.
  - m. Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.
  - n. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of CFR, Title 47, Part 18, for Class A, non-consumer application.
  - o. Provide high efficiency T8 lamp ballasts certified as NEMA premium.
  - p. Provide lamp striation reduction circuitry.
  - q. Ballast Marking: Include wiring diagrams with lamp connections.
2. Non-Dimming Fluorescent Ballasts:

- a. Lamp Starting Method:
  - 1) T8 Lamp Ballasts: Instant start unless otherwise indicated.
  - 2) T5 Lamp Ballasts: Programmed start unless otherwise indicated.
  - 3) Compact Fluorescent Lamp Ballasts: Programmed start unless otherwise indicated.
- b. Lamp Starting Temperature: Capable of starting standard lamp(s) at a minimum of 0 degrees F, and energy saving lamp(s) at a minimum of 60 degrees F unless otherwise indicated.

## 2.06 LAMPS

- A. Manufacturers:
  1. Manufacturer Limitations: Where possible, provide lamps produced by a single manufacturer.
- B. All Lamps:
  1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
  2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
  3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
  4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Architect to be inconsistent in perceived color temperature.
- C. Compact Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire.
  1. Low Mercury Content: Provide lamps that pass the EPA Toxicity Characteristic Leaching Procedure (TCLP) test for characteristic hazardous waste.
  2. Correlated Color Temperature (CCT): 3,500 K unless otherwise indicated.
  3. Color Rendering Index (CRI): Not less than 80.
  4. Average Rated Life: Not less than 10,000 hours for an operating cycle of three hours per start.
- D. Linear Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire.
  1. Low Mercury Content: Provide lamps that pass the EPA Toxicity Characteristic Leaching Procedure (TCLP) test for characteristic hazardous waste.
  2. T8 Linear Fluorescent Lamps:
    - a. Correlated Color Temperature (CCT): 3,500 K unless otherwise indicated.
    - b. Color Rendering Index (CRI): Not less than 80.
    - c. Average Rated Life: Not less than 20,000 hours for an operating cycle of three hours per start.
  3. T5 Linear Fluorescent Lamps:
    - a. Correlated Color Temperature (CCT): 3,500 K unless otherwise indicated.
    - b. Color Rendering Index (CRI): Not less than 80.
    - c. Average Rated Life: Not less than 20,000 hours for an operating cycle of three hours per start.

## 2.07 LUMINAIRES IN FIRE RATED ASSEMBLIES

- A. Provide a fire rated cover or enclosure for light fixtures shown installed in fire rated assemblies,

especially fire rated ceilings, that match the rating of the assembly and maintains the integrity of the assembly's fire rating. Coordinate with Contractor to install covers or enclosures. As an alternative, a fire rated fixture matching the specified fixture may be submitted for consideration.

## 2.08 ACCESSORIES

- A. Stems for Suspended Luminaires: Steel tubing None-N/A, factory finished to match luminaire or field-painted as directed.
- B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.
- C. Provide accessory plaster frames.
- D. Tube Guards for Linear Fluorescent Lamps: Provide clear virgin polycarbonate sleeves with endcaps where indicated.
- E. Substitutions: See Section 01600 - Product Requirements.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

### 3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### 3.03 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 16138 as required for installation of luminaires provided under this section.
- B. Install products according to manufacturer's instructions.
- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).
- D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- E. Suspended Ceiling Mounted Luminaires:
  - 1. Do not use ceiling tiles to bear weight of luminaires.
  - 2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.



3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members, or to building structure.
  4. Secure pendant-mounted luminaires to building structure.
  5. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
  6. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.
- F. Recessed Luminaires:
1. Install trims tight to mounting surface with no visible light leakage.
  2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
- G. Suspended Luminaires:
1. Unless otherwise indicated, specified mounting heights are to bottom of luminaire.
  2. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
  3. Provide minimum of two supports for each luminaire equal to or exceeding 4 feet in length, with no more than 4 feet between supports.
  4. Install canopies tight to mounting surface.
  5. Unless otherwise indicated, support pendants from swivel hangers. Provide pendant length to suspend the light fixtures at the indicated height.
- H. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.
- I. Additional Support Requirements:
1. Anchoring: Anchor light fixtures to channels of the ceiling construction, to the structural slab or to structural members within a partition, or above a suspended ceiling.
  2. Supports or anchors shall maintain the fixture positions after cleaning and relamping.
  3. Support the lighting fixtures without causing the ceiling or partition to deflect.
  4. All light fixtures shall be attached to suspended ceiling grid systems at two opposing ends using screws and/or clips approved for the seismic rating of the ceiling. Follow state and local codes that may require fixtures to be screwed to the ceiling supports instead of using clips.
  5. Fixtures weighing less than 10 pounds shall be directly supported with a minimum of one #12 gage hanger wire to the structure above. This wire may be slack.
  6. Fixtures weighing between 11 to 55 pounds shall be directly supported with a minimum of two #12 gage hanger wires connected from the fixture housing to the structure above. Connect the hangers at diagonal opposite corners of the light fixtures. These wires may be slack.
  7. Where fixtures weigh over 56 pounds they shall be independently supported from the building structure by approved hangers. Two-way angular bracing of hangers shall be provided to prevent lateral motion.
  8. Pendant hung fixtures must be independently supported from the structure above without using the ceiling grid system for direct support.
  9. Where ceiling cross runners are installed for support of lighting fixtures, they must have a carrying capacity equal to that of the main ceiling runners and be rigidly secured to the main runners.
  10. Surface mounted lighting fixtures:
    - a. Fixtures shall be bolted against the ceiling independent of the outlet box at four points

- spaced near the corners of each unit. The bolts (or stud-clips) shall be minimum 1/4-20- secured to main ceiling runners and/or secured to cross runners. Non-turning studs may be attached to the main ceiling runners and cross runners with special non-friction clip devices designed for the purpose, provided they bolt through the runner, or are also secured to the building structure by 12 gage safety hangers. Studs or bolts securing fixtures weighing in excess of 56 pounds shall be supported directly from the building structure.
- b. Where ceiling cross runners are installed for support of lighting fixtures they must have a carrying capacity equal to that of the main ceiling runners and be rigidly secured to the main runners.
  - c. Fixtures less than 15 pounds in weight and occupying less than two square feet of ceiling area may, (when designed for the purpose) be supported directly from the outlet box when all the following conditions are met.
    - 1) Screws attaching the fixture to the outlet box pass through round holes (not key-hole slots) in the fixture body.
    - 2) The outlet box is attached to a main ceiling runner (or cross runner) with approved hardware.
    - 3) The outlet box is supported vertically from the building structure.
  - d. Fixtures mounted in open construction shall be secured directly to the building structure with approved bolting and clamping devices.
11. Outlet boxes for support of lighting fixtures where permitted) shall be secured directly to the building structure with approved devices or supported vertically in a hung ceiling from the building structure with a nine gage wire hanger, and secured by approved device to a main ceiling runner or cross runner to prevent any horizontal movement relative to the ceiling.
- J. Install accessories furnished with each luminaire.
  - K. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within fixture; use flexible conduit.
  - L. Connect luminaires and exit signs to branch circuit outlets provided under Section 16138 using flexible conduit.
  - M. Bond products and metal accessories to branch circuit equipment grounding conductor.
  - N. Exit Signs:
    - 1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
    - 2. Install lock-on device on branch circuit breaker serving units.
  - O. Install lamps in each luminaire.
- 3.04 FIELD QUALITY CONTROL
- A. See Section 01400 - Quality Requirements, for additional requirements.
  - B. Inspect each product for damage and defects.
  - C. Mask the trims and bottoms of all lighting fixtures if necessary to protect the fixture during construction.
  - D. Operate each luminaire after installation and connection to verify proper operation.

- E. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
- F. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

### 3.05 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.
- B. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.

### 3.06 CLEANING

- A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.
- B. Clean electrical parts to remove conductive and deleterious materials. This shall include but not necessarily be limited to fixture bottoms, trims, lenses, baffles, reflector cones and lamps.
- C. Remove dirt and debris from enclosures.
- D. Clean photometric control surfaces as recommended by manufacturer.
- E. Clean finishes and touch up damage.

### 3.07 CLOSEOUT ACTIVITIES

- A. See Section 01780 - Closeout Submittals, for closeout submittals.
- B. See Section 01820 - Demonstration and Training, for additional requirements.
- C. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.
- D. Just prior to Substantial Completion, replace all lamps that have failed.

### 3.08 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

### 3.09 ATTACHMENTS

- A. Luminaire schedule.

**END OF SECTION**

**SECTION 16711 - STRUCTURED TELECOMMUNICATIONS CABLING AND ENCLOSURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cabling and pathways inside building(s).
- B. Distribution frames, cross-connection equipment, enclosures, and outlets.
- C. Grounding and bonding the telecommunications distribution system.

**1.02 SCOPE**

- A. The contractor shall provide all equipment specified in this section. The installation and testing of all devices and cable sections shall be performed by the contractor. The work includes all materials, all labor, and all information required to provide the system specified. It shall include but not necessarily be limited to all cables, jacks, punch blocks, patch panels, supports and equipment as shown on the drawings and as herein specified to provide complete communications system cabling.

**1.03 RELATED REQUIREMENTS**

- A. Section 07840 - Firestopping.
- B. Section 16450 - Grounding and Bonding: Electrical system grounding and bonding.
- C. Section 16111 - Conduit.
- D. Section 16134 - Cable Trays.

**1.04 REFERENCE STANDARDS**

- A. EIA-310 - Cabinets, Racks, Panels, and Associated Equipment; Electronic Industries Association.
- B. CEA-310 - Cabinets, Racks, Panels, and Associated Equipment; Consumer Electronics Association.
- C. ICEA S-90-661 - Category 6 Individually Unshielded Twisted Pair Indoor Cable for Use in General Purpose and LAN Communications Wiring Systems; Insulated Cable Engineers Association.
- D. NFPA 70 - National Electrical Code.
- E. TIA-492CAAA - Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers.
- F. TIA-526-7 - OFSTP-7 - Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
- G. TIA/EIA-568-B.1 - Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements.
- H. TIA/EIA-568-B.2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components.
- I. TIA/EIA-568-B.3 - Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling Components Standard, and Addendum 1 - Additional Transmission

Performance Specifications for 50/125 um Optical Fiber Cables.

- J. TIA-569 - Commercial Building Standard for Telecommunications Pathways and Spaces.
- K. TIA/EIA-606 - Administration Standard for the Telecommunications Infrastructure.
- L. ANSI/J-STD-607 - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
- M. UL 444 - Communications Cables.
- N. UL 497 - Standard for Protectors for Paired-Conductor Communications Circuits.
- O. UL 514C - Standard for Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers.
- P. UL 1581 - Reference Standard for Electrical Wires, Cables, and Flexible Cords.
- Q. UL 1863 - Standard for Communications-Circuit Accessories.

#### 1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Storage and handling requirements and recommendations.
  - 2. Installation methods.
- C. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
- D. Provide a floor plan layout identifying each outlet with respect to the label requirements specified in Paragraph 3.03 herein.
- E. Test Plan: Complete and detailed plan, with list of test equipment, procedures for inspection and testing, and intended test date; submit at least 60 days prior to intended test date.
- F. Field Test Reports: Provide USC University Technology Services, Infrastructure Planner with a copy of all test results.
- G. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
  - 1. Record actual locations of outlet boxes and distribution frames.
  - 2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
  - 3. Identify distribution frames and equipment rooms by room number on contract drawings.
- H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

#### 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.
- B. The complete system (excluding raceway, fittings, boxes, grounding and power service to this system) shall be installed by a Contractor who specializes in the installation of such systems and meets the minimum requirements as stated in Section C below.

- C. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
1. Employing a BICSI Registered Communications Distribution Designer (RCDD).
  2. Supervisors and installers factory certified by manufacturers of products to be installed.
  3. Can show evidence that they maintain a fully equipped service organization that has been in operation for at least 2 years and can provide testing, service, maintenance and spare parts for the system.
  4. Employing BICSI Registered Cabling Installation Technicians (RCIT) for all work.
  5. Provide information to demonstrate sound financial condition of the company and that the company is adequately bonded and insured.
  6. Employing experienced technicians for all work; show at least 3 years experience in the installation of the type of system specified, with evidence from at least 3 projects of similar size and scope that have been in use for at least 18 months; submit project name, address, and written certification by user.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep stored products clean and dry.

#### 1.08 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 2 year period after Date of Substantial Completion.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Cabling and Equipment:
  1. Equipment material and devices:
    - a. Hubbell: [www.hubbell-premise.com](http://www.hubbell-premise.com)
  2. Cable only:
    - a. Commscope: [www.commscope.com](http://www.commscope.com)
    - b. Belden: [www.belden.com](http://www.belden.com)

#### 2.02 SYSTEM DESIGN

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
  1. Comply with TIA/EIA-568 and TIA/EIA-569, latest editions.
  2. Provide fixed cables and pathways that comply with NFPA 70 and ANSI/J-STD-607 and are UL listed or third party independent testing laboratory certified.
  3. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
  4. In this project, the term plenum is defined as return air spaces and all other spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. Capacity:
  1. Horizontal Cabling: Copper.
    - a. Offices and Work Areas: See Plans
    - b. General: Unless otherwise noted on the plans provide a minimum of one Category 6

- cables (Blue) for each outlet. regardless or type, shown on the plans.
- c. Offices and Work Areas: See plans.
  - d. Labs and Classrooms: See Plans.
  - e. Wireless access points:
    - 1) Unless otherwise noted on the plans install one Category 6 cable (Green) to each wireless access point (AP) in the building.
    - 2) Install wireless access point devices where shown on the plans with antennas.
  - f. Television (TV) outlets: Unless otherwise noted on the plans Install one RG6 Quad Shield coaxial cable and two Category 6 cables.
2. Provide additional outlets and cables where indicated on drawings.

### 2.03 PATHWAYS

- A. Conduit: As specified in Section 16111; provide pull cords in all conduit.
- B. Cable Ties: Use velcro style cable ties. Cable runs are to be bundled loosely to minimize cross-talk. All cables must be supported of the ceiling grid.
- C.
  1. Bat wing/bridle ring supports can be attaced to ceiling grid wires that are spaced 4 to 5 feet apart and not filled beyond capacity.
- D.
  2. Do not attach cable to pipes.
- E. Lab system raceways.
  1. Install individual cables in lab system raceways to each individual work station or seated position in classroom and install a jack or jacks at each location.

### 2.04 COPPER CABLE AND TERMINATIONS

- A. Copper Horizontal Cable: TIA/EIA-568 Category 6 solid conductor unshielded twisted pair (UTP), 23 AWG, 100 ohm; 4 individually twisted pairs; pairs separated within jacket with an isolator;covered with green jacket (Except where otherwise noted) and complying with all relevant parts of and addenda to latest edition of TIA/EIA-568 and UL 444.
  1. In locations other than in plenums, provide NFPA 70 type CMG general purpose, CMR riser-rated, or type CMP plenum-rated cable.
  2. In plenums, provide NFPA 70 type CMP plenum-rated cable.
- B. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.
- C. Jacks and Connectors: RJ-45, non-keyed, terminated with 110-style insulation displacement connectors; high impact thermoplastic housing; complying with same standard as specified horizontal cable and UL 1863.
  1. Performance: 500 mating cycles.
  2. Voice and Data Jacks: Hubbell, Green, HXJ6GN, Xceleraor, Category 6 jack terminate using T568-B pin-out configuration.
  3. The data jacks shall be terminated in the the labs, lab raceways, and office areas. Voice and data connections in the office areas shall be terminated in Hubbell IFP1xOW, Office white faceplate. The "x" indicates the number of ports 1 through 4 and 6.

### 2.05 CROSS-CONNECTION EQUIPMENT

- A. Patch Panels for Copper Cabling: Sized to fit EIA standard 19 inch wide equipment racks; 0.09 inch thick aluminum; cabling terminated on Type 110 insulation displacement connectors; printed circuit board interface. Hubbell Category 6 type.

1. Jacks: Non-keyed RJ-45, suitable for and complying with same standard as cable to be terminated; maximum 48 ports per standard width panel.
2. Capacity: Provide ports sufficient for cables to be terminated plus 25 percent spare.
3. Labels: Factory installed laminated plastic nameplates above each port, numbered consecutively; comply with TIA/EIA-606 using encoded identifiers.
4. Provide incoming cable strain relief and routing guides on back of panel.

**B. Patch Cords:**

1. Provide one patch cord for each pair of patch panel ports. Furnish Category 6 plenum rated cable (Black) in appropriate lengths.

**2.06 ENCLOSURES**

- A. Outlet Boxes:** For flush mounting in walls; depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
1. Size, Unless Otherwise Indicated: 4 inches square by 2-1/8 inches deep.
  2. Single-gang plaster ring cover
  3. Minimum 1-inch diameter conduit from outlet box, stubbed out above ceiling grid
  4. Wall-Mounted Telephones: 4 inches high by 2 inches wide by 2-1/8 inches deep.
  5. Faceplates: High impact thermoplastic, complying with system design standards and UL 514C.
  6. Labels: Comply with TIA/EIA-606 using encoded identifiers; label each jack on the face plate as to its function with a unique numerical identifier.
- B. Firestop:** Sleeve and Firestop all wall and floor or ceiling penetrations. Fire stop shall be EZ Path Fire Rated Pathway at fire walls where cables will pass through. Reference link [www.stifirestop.com/ezpath](http://www.stifirestop.com/ezpath).

**PART 3 EXECUTION**

**3.01 INSTALLATION - GENERAL**

- A.** Comply with latest editions and addenda of TIA/EIA-568, TIA/EIA-569, ANSI/J-STD-607, NFPA 70, and SYSTEM DESIGN as specified in PART 2.

**3.02 PATHWAYS**

- A.** Install with the following minimum clearances:
1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
  2. 12 inches from power conduits and cables and panelboards.
  3. 5 inches from fluorescent and high frequency lighting fixtures.
  4. 6 inches from flues, hot water pipes, and steam pipes.
- B.** Conduit: Install a grommet at the end of the conduit to protect the cable from damage.
- C.** No more than two 90-degree bends between pull points in conduit.
1. Leave pull cords in place where cables are not initially installed.
  2. Minimum of 6 times the conduit diameter for conduit up to 2 inch trade size.
  3. Minimum of 10 times the conduit diameter for larger diameters
  4. Do not use 90-degree condulets because they over bend the cable.
  5. Conceal conduit under floor slabs and within finished walls, ceilings, and floors except where specifically indicated to be exposed.
    - a. Conduit may remain exposed to view in mechanical rooms, electrical rooms, and



telecommunications rooms.

- b. Treat conduit in crawl spaces and under floor slabs as if exposed to view.
  - c. Where exposed to view, install parallel with or at right angles to ceilings, walls, and structural members.
  - d. Under floor slabs, locate conduit at 12 inches, minimum, below vapor retarder; seal penetrations of vapor retarder around conduit.
- D. Grounding and Bonding: Perform in accordance with ANSI/J-STD-607 and NFPA 70.
- E. Firestopping: Seal openings around pathway penetrations through fire-rated walls, partitions, floors, and ceilings in accordance with Section 07840.

### 3.03 INSTALLATION OF EQUIPMENT AND CABLING

- A. Cabling:
1. Install transmission media without damaging conductors, shield, or jacket.
  2. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
  3. Do not over-cinch or crush cables.
  4. Do not exceed manufacturer's recommended cable pull tension.
  5. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
  6. Use pulling means; including fish tape, cable, rope, and basket weave wire/cable grips that will not damage media or raceway. Install cable simultaneously where more than one cable is to be installed in a raceway.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
1. At Distribution Frames: 120 inches.
    - a. Do not make a circular coil with cables.
  2. At Outlets - Copper: 10 inches (254 mm).
  3.
    - a. Install slack above ceiling not in outlet box.
  4.
    - b. Do not tie wrap the slack above the ceiling.
- C. Copper Cabling:
1. Category 6: Maintain cable geometry; do not untwist more than 1/2 inch from point of termination.
  2. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.
  3. Copper Cabling Not in Conduit: Use only type CMP plenum-rated cable as specified.
  4. Install exposed cable, parallel, and perpendicular to surfaces or exposed structural members, and follow surface contours where possible.
  5. No splices are allowed in the cables unless explicitly shown on the drawings.
  6. Use splices and tap connectors that are compatible with media material.
  7. Tighten connectors and terminals, including screws and bolts, in accordance with manufacturer's published instructions or torque tightening values.
  8. All CAT6 cable shall be within the 300 ft installation standard.
- D. Field-Installed Labels: Comply with TIA/EIA-606 using encoded identifiers.
1. Cables: Install color coded labels on both ends. Identify each cable with respect to each jack, punch panel, terminal block, and other connection point. The cable connections shall be identified on one end by labeling it with respect to the room number, the specific outlet, and the specific jack to which it is connected. It shall be labeled on the other end with

respect to the punch panel, terminal block, or other connection to which it is terminated. Using the color code of each individual wire or fiber within a multi-conductor or multifiber cable, the specific terminal number to which each is connected shall be identified.

2. Outlets: Label each jack on its face plate as to its type and function, with a unique numerical identifier. Hand written labels are not acceptable.

### 3.04 FIELD QUALITY CONTROL

- A. Comply with inspection and testing requirements of specified installation standards.
- B. Visual Inspection:
  1. Inspect cable jackets for certification markings.
  2. Inspect cable terminations for color coded labels of proper type.
  3. Inspect outlet plates and patch panels for complete labels.
- C. Testing - The complete cabling system shall be tested to Category 6 (see EIA/TIA TSB 67) standards and as follows:
  1. Test operation of shorting bars in connection blocks.
  2. Category 6 Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay for all copper cables. Record results for each cable and turn over document to owner.

### 3.05 WARRANTY

- A. Provide a written twenty-five year warranty for all equipment provided under this section. Warranty period shall begin on the date of official final acceptance of the system by the USC Planner. The USC Planner shall complete the "Date of Final Acceptance" on the warranty form and forward a copy to the contractor.
- B. Submit "true" as-built drawings for the complete system. The USC Planner will check the system to ensure accuracy of these drawings.
- C. Provide completed test forms and a letter to the USC Planner certifying that every cable has been tested and was found to function properly.
- D. The system will not be accepted until Paragraphs A, B and C above have been completed and received by the USC Planner.

**END OF SECTION**