ADVERTISEMENT FOR BIDS

Sealed bids will be received by Southern University, Shreveport, Louisiana, in the Purchasing Office, Leonard C. Barnes Building, Room A-18, 1st Floor until the time and date(s) indicated in the following:

Replace Temperature Controls in Library
Leonard C. Barnes Building - Room A-23 Conference Room
11:00 A.M., Thursday, May 20, 2010

MANDATORY PRE-BID CONFERENCE – 10:00 A.M., Thursday, April 22, 2010 –Room A-23 Conference Room, Leonard C. Barnes Building

ANY PERSON REQUIRING SPECIAL ACCOMMODATIONS SHOULD NOTIFY THE PURCHASING OFFICE OF THE TYPE(S) OF ACCOMMODATION REQUIRED NOT LESS THAN SEVEN (7) DAYS BEFORE THE BID OPENING.

Bids may be withdrawn by written, telegraphic or fax notice received at the address designated in the Invitation to Bid prior to the time set for bid opening, as recorded by date stamp at the Purchasing Office. Bids received after closing time will be returned **unopened**. Evidence of authority to submit the bid shall be required in accordance with R.S. 38:2212 (a)(1)(c) and /or R.S. 39:1594 (c)(2)(d).

All bids must be accomplished by bid security equal to five (5%) of the total bid amount. A bid bond, cashier's check or certified check is acceptable made payable to Southern University at Shreveport. Bid bonds shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A-rating in the latest printing of the A. M. Best's Key Rating Guide to write individual bonds of up to ten percent of policyholders' surplus as shown in the A. M. Best's key rating guide.

The successful bidder shall be required to furnish a Performance and Payment Bond in an amount equal to 100% of the contract amount from a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with a least an A-rating in the latest printing of the A. M. Best's Key Rating Guide to write individual bonds of up to ten percent of policyholders' surplus as shown in the A. M. Best's key rating guide or by an insurance company that is either domiciled in Louisiana or owned by Louisiana residents and is licensed to write surety bonds.

Bid proposal forms information and specifications may be obtained from the Purchasing Office, Room A-18, Southern University at Shreveport, 3050 Martin Luther Jr. Drive, Shreveport, LA 71107.

Southern University at Shreveport is a participant in the Louisiana for the Small Entrepreneurships Program (the Hudson Initiative) and the Louisiana Initiative for Veterans and Service-Connected Disabled Veterans-Owned Business Small Entrepreneurships. Bidders are encouraged to consider participation. A list of certified vendors and additional information can be obtained from website http: www.ledsmallbiz.com. Potential participants may also register at the website.

All bid specifications can be obtained by using website www.doa.la.gov/osp (click on LaPac).

The University reserves the right to reject any and all bids and to waive and informalities incidental thereto. Bids will be accepted only from Contractors who are licensed under Louisiana R.S. 39:2150-2173 for the classification of **BUILDING CONSTRUCTION**.

AN EQUAL OPPORTUNITY EMPLOYER

SOUTHERN UNIVERSITY AT SHREVEPORT

SOUTHERN UNIVERSITY AT SHEVEPORT
PURCHASING DEPARTMENT
3050 MARTIN LUTHER KING JR. DRIVE
SHREVEPORT, LA 71107

INVITATION TO BID (ITB):
Replace Temperature Controls in Library

Bids will be received at the above office until 11:00 a.m., Thursday, May 20, 2010 and at that time publicly opened. Bids received after above specified time will be returned **unopened**.

BID OF: _____

ADDRESS: _____

TO: PURCHASING DEPARTMENT
SOUTHERN UNIVERSITY AT SHREVEPORT
3050 Martin Luther King Jr., Drive
Shreveport, LA 71107

The undersigned certifies that he or she has (or they have) carefully examined the **instructions to bidders, the general conditions and specifications** hereto attached and made part thereof, and agreed to comply with such instructions. The undersigned proposed to furnish any and all items hereto attached upon which prices are requested at prices as stated for each item.

The undersigned certifies that he/she is licensed under R.S. 37:2150-2173 and show the license number on the bid envelope.

Bidder: _____
Company's Name

By: _____
Evidence of authority to submit the bid shall be required in accordance with R.S. 38:2212(a)(1)(c) and/or R.S 39:1594 (c)(2)(d).

Date: _____

Telephone Number _____

Fax Number _____

State License Number _____

Bid No. 000255

Bidder Inquiries:
No negotiations, decisions, or actions will be executed by any bidder as a result or any oral discussion with any University employee or State Consultant. **Only those transactions which are in writing, signed by the Purchasing Office will be considered as valid.** Likewise, the University will only consider communication from bidder, signed and in writing, to the attention of the **Purchasing Office, 3050 Martin Luther King Jr. Drive, Shreveport, Louisiana 71107, Attention: Sophia Lee. Please note that all inquiries sent via mail/fax/email should be sent seven (7) calendar days prior to bid opening.**

Scope of Work:
Furnish all necessary labor, materials, tools and equipment to provide the required renovations to **Replace Temperature Controls in Library.**

Prosecution of Work:
The work is to be done when Southern University at Shreveport is in operation. The contractor shall, therefore, plan the repairs and installation in specification so as not to interfere with normal operations of the building and shall exert effort to expedite completion of the work once is has started.

It is intended that the work shall be done during normal working hours, however, should be work require overtime (Saturday, Sunday and/or night working hours), the cost must be borne by the contractor at no extra compensation for the Owner (Southern University at Shreveport).

Guarantee
It is the intention of the specifications to secure a first-class permanent material and construction and to this end, Contractor will be held responsible for and must correct defects discovered in the work within one (1) year from acceptance. Should any materials or methods be called for, of such nature to render this guarantee impossible, written notice to this effect should be given Owner (Southern University at Shreveport) before signing contract and/or beginning of work; failure to do this will be construed as agreement to the strictest terms of the guarantee.

Clean-Up
The Contractor will be directed during the progress of work to remove and properly dispose of the resultant and debris. Upon completion, Contractor shall remove all equipment, unused materials and debris and will leave the premises in a clean and first-class condition.

Examination of Site
Each bidder will visit the site of the proposed project and will fully acquaint himself with conditions relating to construction and labor so that he may fully understand the facilities, difficulties and restrictions attending the execution of work under this contract by contacting Mr. Layne Chenevert at (318) 670-6377. No consideration or allowance will be granted the Contractor for failure to visit the site ore for any alleged misunderstanding of the materials to be furnished or the work to be done.

Note to Vendors:

All bids must be accompanied by bid security equal to five percent (5%) of the base bid and all additive alternates and must be in the form of a Certified Check, Official Check or Bid Bond written by a company licensed to do business in Louisiana.

THE UNIVERSITY RESERVES THE RIGHT TO REQUIRE A PERFORMANCE AND PAYMENT BOND ON ANY AWARD MORE THAN $25,000.

BID FORM

BID NO 000255__

INVITATION TO BID FOR:
Remodeling of Academic Advising Center and
Financial Aid Renovations

SOUTHERN UNIVERSITY AT SHREVEPORT
SHREVEPORT, LOUISIANA 71107

PURCHASING OFFICE
Southern University at Shreveport
3050 Martin Luther King Jr. Drive
Shreveport, LA 71107

Gentlemen/Madam:

I/We hereby declare that I/We have carefully examined the specifications and/or plan and general conditions of the Contract documents and having personally inspected the site; and that I/We have a clear understanding of the said documents. I/We hereby propose to provide the necessary tools, machinery, apparatus, and other means of construction, and to furnish all labor and materials specified in the Contract, or called for by the specifications necessary to complete and finish in a thoroughly workmanlike manner, **the proposed:**
Replace Temperature Controls in Library

11:00 A.M.- Thursday, May 20, 2010

We acknowledge receipt of the following numbered addenda: No. _____ Date _____

No. _____ Date _____ No. _____ Date _____

BID SECURITY: Attached is the sum of **(5% of the total base bid):**
_____ Dollars $ _____
which will become the property of the Owner (Southern University) in the event the awardee fails to furnish required insurance certificate and a performance and payment bond **(if required)** within the time set forth. The **Bid Security** will serve as liquidated damages for the delay and additional work caused thereby.

BASE BID: I/We agree to perform all work described in the specification under base bid heading for the sum of:
_____ Dollars $ _____

COMPLETION TIME

The Bidder agrees to commence work under this contract on a date specified in a written "Notice to Proceed and/or Purchase Order" by the Owner to fully complete the project within Ninety (90)_____ Consecutive calendar days thereafter, or within the time as may be extended as stipulated in the Contract Documents.

LIQUIDATED DAMAGES: The Bidder hereby also agrees to pay as liquidated damages the sum of

One Hundred---------- DOLLARS ($100.00_____)
for each consecutive calendar day which the work not complete beginning with the first day beyond the completion time stated above.

AWARD AND EXECUTION OF CONTRACT: The owner shall incur no obligation to the Contractor until the contract between the owner and contractor is duly executed. If the bidder is notified of the acceptance of the bid within thirty (30) days of the opening of the bids, he agrees to execute and deliver the owner the "Contract between owner and contractor, Performance and Payment Bond and Certificate of Insurance: a copy of which is attached to the Contract Documents, within ten (10) working days after notice from the owner that instrument is ready for signature.

If the bidder fails to complete **all requirements** for executing the "Contract between Owner and Contractor, performance and Payment Bond and Certificate of Insurance" within then (10) working days after notification, the owner may reject the Bid, retain the Bid Bond, call in the surety for payment, and award the contract to the next lowest responsive bidder.

LICENSE CERTIFICATION: The Bidder certified that he meets all licensing requirement of this State and is duly and currently licensed under R.S. 37:2150-2173 of the State of Louisiana, and this Louisiana Contractor License Number is _____ for any bid submitted in the amount of fifty thousand dollars **($50,000.00)** and **show contractor's license number on bid envelope.**

Evidence of authority to submit the bid shall be required in accordance with R.S. 38:2212 (A)(1)(C) and/or R.S. 39:1594 (C)(2)(D).

COMPANY _____

By _____

Title _____

Address _____

Telephone/Fax Number(s) _____

State License Number (If applicable) _____

JOB SITE VISIT

SOUTHERN UNIVERSITY AT SHREVEPORT
SHREVEPORT, LOUISIANA

Vendor should inspect the job site prior to submitting a bid price on this project. If vendor finds conditions that disagree with the specifications as described in this proposal, or other features of the specifications that appear to be in error, same shall be note ***three (3) working days prior to bid opening.***

Vendor may contact: ***Layne Chenevert at (318) 670-6377*** *to schedule inspection prior to bid opening.*

The signed statement certifies the vendor's name below has visited the proposed site and is familiar with all conditions surrounding fulfillment of the specifications for this project.

COMPANY _____

BY _____
Evidence of Authority to submit the bid shall be in accordance with R.S. 38:2212(a)(1)(c) and/or R.S. 39:1594(c)(2)(d)

DATE _____

JOB SITE VERIFIED BY: _____

BID NUMBER 000255__

INSURANCE AND INDEMNIFICATION

Before commencing work, (vendor/contractor and/or subcontractor) shall obtain at its own cost and expense the following insurance in insurance companies authorized in the State, with an **A.M. Best** rating of **A-:VI or higher** and shall provide evidence of such insurance to Southern University, as may be required by the Southern University. The policies or certificates thereof, shall provide that thirty (30) days prior to cancellation notices of same shall be given to Southern University Purchasing Department by return receipt requested, for all of the following stated insurance policies. All notices shall name the other party and identify the agreement or contract number.

A. **Worker's Compensation** – Statutory – in compliance with the Compensation law of the State. Exception: Employers Liability is to be **$1,000,000** when work is to be over water and involves maritime exposure. (A.M. Best's rating requirement mentioned may be waived for workers compensation coverage only).

B. **Commercial General Liability Insurance** with a minimum limit of liability per occurrence of **$1,000,000** for bodily injury and property damage. This insurance shall include the following coverage's:

1. Premises – Operations
2. Broad Form Contractual Liability
3. Products and Completed Operations
4. Use of Contractors and Subcontractors
5. Personal Injury
6. Broad Form Property Damage

C. **Automobile Liability Insurance** with a minimum limit of liability per occurrence of **$1,000,000** for bodily injury and property damage unless otherwise indicated in the contract specifications. This insurance shall include for bodily injury and property damage the following coverages:

1. Owned automobiles
2. Hired automobiles
3. Non-owned automobiles

Note: If the vendor/contractor does not own an automobile and an automobile is utilized in the execution of the contract, then only hired and non-owned coverage is acceptable. If an automobile is not utilized in the execution of the contract, then automobile coverage is not required.

Southern University at Shreveport shall be named as additional insured on all liability policies. A Thirty (30) day prior notice of cancellation must be given to the University for all required coverage. Insurance must be from a company with an A.M. Best's rating for no less than A-:VI who is authorized to do business in the State of Louisiana. The A.M. Best's rating requirement may be waived for Worker's Compensation only.

The successful contractor is to provide the owner with a certificate of insurance prior to commencement of work.

Location of All Operations Shall Be "All Locations".

SPECIAL CONDITIONS
BIDDER'S CERTIFICATION OF EEOC AND ADA COMPLIANCE

Southern University at Shreveport of the State of Louisiana is an equal opportunity employer and looks to its contractors, sub-contractors, vendors, and suppliers to take affirmative action to effect this commitment in its operations.

By submitting and signing this bid, the bidder certifies that he agrees to adhere to the mandates dictated by Title VI and VII of the Civil Rights Act of 1964, as amended; the Vietnam Era Veterans' Readjustment Assistance Act of 1974; Section 503 of the Rehabilitation Act of 1973; Section 202 of Executive Order 11246, as amended; and the Americans with Disabilities Act of 1990. Bidder agrees that he will not discriminate in the rendering of services to and/or employment of individuals because of race, color, religion, sex, age, national origin, handicap, disability, veteran status, or any other non-merit factor.

Bidder further agrees to keep informed of and comply with all Federal, State, and local laws, ordinances, and regulations which affect his employees or prospective employees.

Any person who is a "Qualified Individual with a Disability" as defined by 42 USC12131 of the American with Disabilities Act who has submitted a bid on this procurement and who desires to attend the bid opening, must notify this office in writing no later than seven(7) working days prior to the bid opening date of their need for special accommodations. If the requested accommodations cannot be reasonably provided, the individual will be so informed prior to the bid opening.

R.S. 39:1594 (Act 121)

Evidence of authority to submit the bid shall be required in accordance with R.S. 38:2212 (A)(1)(C) and/or

R.S. 39:1594 (C)(2)(D).

"Signature Authority: In accordance with L.R.S. 39:1594 (Act 121) the person signing the bid must be:

1. A current corporate officer, partnership member or other individual specifically authorized to submit a bid as reflected in the appropriate records on file with the Secretary of State; or

2. An individual authorized to bind the vendor as reflected by an accompanying corporate resolution, certificate or affidavit; or

3. An individual listed on the State of Louisiana Bidder's Application as authorized to execute bids.

By signing the bid, the bidder certifies compliance with the above".

VENDOR PREFERENCES

In accordance with the Louisiana Revised Statutes 39:1595, a preference of 10% may be allowed for products produced, manufactured, grown or assembled in Louisiana of equal quality.

Do you claim this preference? Yes _____ No _____

SPECIFY ITEM NUMBER(S)
FAILURE TO SPECIFY ABOVE INFORMATION MAY CAUSE ELIMINATION FROM PREFERENCES.

SPECIAL CONDITIONS

Tax Information/State of Louisiana

In accordance with Act Number 1029 of the 1991 Regular Session, effective September 1, 1991 state agencies will no longer be required to pay state sales tax.

BID BOND

A bid bond, official/cashier's check, or certified check, in the amount of 5% of the total bid, unless another amount is specified, made payable to Southern University at Shreveport, must accompany each bid.

If a bid bond is used, it shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A-rating in the latest printing of the A.M. Best's Key Rating Guide to write individual bonds up to ten percent (10%) of policyholders' surplus as shown in the A.M. Best's Key Rating Guide.

REQUIRED: Yes ___X___ No _____

PERFORMANCE AND/OR PAYMENT BOND

The successful vendor will be notified by letter to secure a Performance and/or Payment Bond equal to the contract sum, from a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service List of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A-rating in the latest printing of the A.M. Best's Key Rating Guide or by an insurance company that is either domiciled in Louisiana or owned by Louisiana residents and is licensed to write surety bonds.

In addition, any performance and/or payment furnished shall be written by a surety or insurance company that is currently licensed to do business in the State of Louisiana.

The Performance and Payment Bond must be received within twelve (12) days from the date of notification.

If the Performance and Payment Bond is not received within this period of time, Southern University at Shreveport reserves the right to award to the next acceptable low bidder, or to reject all bids and re-advertise, whichever is in the best interest of Southern University at Shreveport and the State of Louisiana.

REQUIRED: Yes ___X___ No _____

GENERAL TERMS & CONDITIONS

BIDDERS MUST COMPLY WITH ALL REQUIREMENTS ON THESE PAGES. THESE PAGES SHOULD BE RETURNED WITH BID, (CONFIRMATION THAT YOU ARE COMPLYING WITH ALL REQUIREMENTS STATED ON SHEETS).

SOUTHERN UNIVERSITY AT SHREVEPORT

Southern University Purchasing Department will receive sealed bids until the time and date specified in this Invitation for Bid (IFB). No bid will be considered if receive by the Purchasing Department after the specified time and date. Beginning at that time, bids will be publicly opened, and read in the Conference Room-1st floor of the Leonard C. Barnes Building Room A-23, 3050 Martin Luther King Jr. Drive, Shreveport, Louisiana 71107, or another designated area.

Bids shall be mailed to:
Southern University at Shreveport
Purchasing Department
3050 Martin Luther King Jr. Drive
Shreveport, LA 71107

As an alternative, bids may be hand delivered to:
Southern University at Shreveport
Purchasing Department
1st Floor- Martin Luther King Jr. Drive
Room A-23 Leonard C. Barnes Building
Shreveport, LA 71107

Bids submitted are subject to provisions of La. R.S. 39:1551-1736; Purchasing Rules and Regulations; Executive Orders; the General Conditions; and Special Condition; and Specifications listed in this Invitation for Bid.

INSTRUCTIONS TO BIDDERS

1. Bid Forms

All written bids, unless otherwise provided for, must be submitted on, and in accordance with forms provided and properly signed. Bid submitted in the following manner will not be accepted:

1. Bid contains no signature indicating intent to be bound;
2. Bid filled out in pencil
3. Bid not submitted on University standard forms.

Bids must be received at the address specified in the Invitation for Bids prior to bid opening time in order to be considered. Telegraphic and fax alterations to bids received before bid opening time will be considered provided formal bid and written alteration have been received and time-stamped before bid opening time.

2. Special Envelopes

To assure consideration, all bids should be submitted in the special envelope if furnished for that purpose, or an envelope of your choice that is clearly marked identifying the **company's name, complete address, bid number, time of bid opening and the scheduled opening date.**

3. Standard of Quality

Any product or service bids shall conform to all applicable Federal, State and Local laws, regulations and the specifications contained in the IFB. Unless otherwise specified in the IFB, any manufacturer's name, trade name, brand name, or catalog number used in the specifications is for the purpose of describing the quality level, performance and characteristic required. Bidder must specify the brand and model number of the product offered in his/her bid. Bids not specifying brand and model numbers will be considered as offering the exact product(s) specified in the IFB.

4. Descriptive Information

Bidders proposing an equivalent brand or model should submit the bid information (such as illustrations, descriptive literature, technical data) sufficient for the University to evaluate quality, suitability, and compliance with the specifications in the IFB. Failure to submit descriptive information may cause bid to be rejected. Any change made to a manufacturer's published specification submitted for a product shall be verifiable by the manufacturer. If item(s) bid do not fully comply with specifications (including brand and/or product number), bidder must state in what respect the item(s) deviate. Failure to note exceptions on the bid form will not relieve the successful bidder(s) from supplying the actual products requested.

5. Bid Opening

Bidders may attend the bid opening but no information or opinions concerning the ultimate contract award will be given at the bid opening or during the evaluation process. Bids may be examined 72 hours after request is made. Information pertaining to completed files may be secured by visiting the Purchasing Department during normal working hours. Written bid tabulations will not be furnished.

Initialed by: _____

ALL FORMS MUST BE RETURNED AND SIGNED/INITIALED WHERE INDICATED

GENERAL TERMS & CONDITIONS

Southern University at Shreveport reserves the right to award items separately, grouped or on all or none basis and to reject any or all bids and waive any information.

6. Prices
Unless otherwise specified by the Purchasing Department in the IFB, bid prices must be complete, including transportation, prepaid by bidder to destination. Bids other than FOB destination may be rejected. In the event of extension errors, the unit price shall prevail.

7. Payment Terms
Payment is to be made within 30 days after receipt of properly executed invoice or delivery and acceptance, whichever is later. Delinquent payment penalties are governed by **L.R.S. 39:1695.**

8. Deliveries
Bids may be rejected if the delivery time indicated is longer that that specified in the IFB.

9. Vendor Invoices
Invoices shall reference the Southern University purchase/release order number, vendor's packing list/delivery ticket number, shipping/delivery date, etc. Invoices are to be itemized and billed in accordance with the order and should show the amount of any prompt payment discount and submitted on the vendor's own invoice form. Invoices submitted by the vendor's supplier will not be accepted.

10. Taxes
Vendor is responsible for including all applicable taxes in the bid prices. Southern University is exempt from all Louisiana state and local sales and use taxes. By accepting an award, resident and non-resident firms acknowledge their responsibility for the payment of all taxes duly accessed by the State of Louisiana and its political subdivisions for which they are liable, including but not limited to: franchise taxes, privilege taxes, sales taxes, use taxes, ad valorem taxes, etc.

11. New Products
Unless specifically called for in the IFB, all products for purchases must be new, (never previously used) and the current model and/or packaging. The manufacturer's standard warranty will apply unless otherwise specified in the IFB.

12. Contract Renewals
Upon agreement of Southern University at Shreveport and the contractor, an open-ended requirements contract may be extended for two (2) additional twelve (12) month periods at the same prices, terms and conditions. In such cases, the total contract term cannot exceed thirty-six (36) months.

13. Contract Cancellation
Southern University has the right to cancel any contract, in accordance with Purchasing Rules and Regulations, for cause, including but not limited to, the following: (1) failure to deliver within the time specified in the contract; (2) failure of the product or service to meet specifications, conform to sample quality or to be delivered in good condition; (3) misrepresentation by the contractor; (4) fraud, collusion, conspiracy or other unlawful means of obtaining any contract with the state; (5) conflict of contract provisions with constitutional or statutory provision of state or federal law; (6) any other breach of contract.

14. Fiscal Funding Clause
In accordance with LA R.S. 39:1615 (c)and (e), any contract entered into by the State of Louisiana and Southern University shall include the following Fiscal Funding Clause:
C. Termination due to unavailability of funds in succeeding years. When funds are not appropriated to support continuation of performance in a subsequent year of a multiyear contract, the contract for such subsequent year shall be terminated. When a contract is terminated under these conditions, no additional funds shall be paid to the contractor as a result of such action.
E. With respect to all multiyear contracts, there shall be no provisions for a penalty to the state for the cancellation or early payment of the contract.
The continuation of this contract is contingent upon the appropriation of funds to fulfill the requirements of the contract by the legislature.
All proposers should be aware that our legislative process is such that it is often impossible to give prior notice of the non-appropriation of funds.

Initialed by: _____

ALL FORMS MUST BE RETURNED AND SIGNED/INITIALED WHERE INDICATED

GENERAL TERMS & CONDITIONS

15. Default of Contractor
Failure to deliver within the time specified in the bid will constitute and default and may cause cancellation of the contract. Where the state had determined the contractor to be in default, the state reserves the right to purchase any or all products or services covered by the contract on the open market and to charge the contractor with cost in excess of the contract price. Until such assessed charges have been paid, no subsequent bid from the defaulting contractor will be considered.
16. Order of Priority
In the event there is a conflict between the Instructions to Bidder or General Conditions and the Special Conditions, the Special Condition shall govern.
17. Applicable Law
All contracts shall be constructed in accordance with and governed by the laws of the State of Louisiana.
18. Equal Opportunity
By submitting and signing this bid, bidder agrees that he will not discriminate in the rendering of services to and/or employment of individuals because of race, color, religion, sex, age, national origin, handicap, disability, veteran status, or any other non-merit factor.
19. Certification of No Suspension or Debarment
By signing and submitting this bid, bidder certifies that its company, any subcontractors, or principals thereof, are not suspended or debarred under federal or state laws or regulations. A list of parties who have been suspended or debarred by federal agencies is maintained by the General Services Administration and can be viewed on the internet at www.epls.gov

_____ Federal Funded **___X___ Non-Federal Funded**

20. Prohibited Contractual Arrangements
Per Louisiana R.S. 42:1113.a, no public servant, or member of such public servant's immediate family, or legal entity in which he is a controlling interest shall bid on or enter into any contract, subcontract, or other transaction that is under the supervisions or jurisdiction of the agency of such public servant. See statute for complete law, exclusions and provisions.
21. Mutual Indemnification
Each party hereto agrees to indemnify, defend and hold the other, its officers, directors, agents and employees harmless from and against any and all losses, liabilities and claims, including reasonable attorney's fee arising out of or resulting from the willful act, fault, omission, or negligence of the indemnifying party or of its employees, contractors, or agents in performing its obligations under this agreement, provided however, that neither party hereto shall be liable to the other for any consequential damages arising out of its willful act, fault, omission, or negligence.
22. Bidder Inquiries
No negotiations, decisions, or actions will be executed by any bidder as a result or any oral discussion with any University employee or State Consultant. **Only those transactions which are in writing, signed by the Purchasing Office will be considered as valid.** Likewise, the University will only consider communication from bidder, signed and in writing, to the attention of the **Purchasing Office, 3050 Martin Luther King Jr. Drive, Shreveport, Louisiana 71107, Attention: Sophia Lee. Please note that all inquiries sent via mail/fax/email should be sent seven (7) calendar days prior to bid opening.**
23. Fair Labor Standards Act
Contractor shall be in compliance with the Fair Labor Standards Act 29 USC 201-6; Established minimum wage, overtime pay, equal pay, recordkeeping, and child labor standards for employees or in the production of goods for interstate commerce. **By signing and submitting this bid, bidder certifies that its company, any subcontractors, or principals thereof is in accordance with said compliance. United States Department of Labor website: www.dol.gov/esa**

24. Davis-Bacon Act ($2,000 or more)
Contractor shall be in compliance with the Davis-Bacon Act, 40 USC 276A-7; Ensures that laborers and mechanics employed pursuant to federally funded construction contracts, subcontracts and construction under Federal grants, will be paid wages as determined by the U.S. Secretary of Labor. **By signing and submitting this bid, bidder certifies that its company, any subcontractors, or principals thereof is in accordance with said compliance.**
United States Department of Labor website: www.dol.gov/esa

_____ Federal Funded **___X___ Non-Federal Funded**

Initialed by: _____

ALL FORMS MUST BE RETURNED AND SIGNED/INITIALED WHERE INDICATED

25. Small Business Entrepreneurship Programs

The Southern University at Shreveport is a participant in the Louisiana for the Small Entrepreneurships Program (the Hudson Initiative) and the Louisiana Initiative for Veterans and Service-Connected Disable Veterans-Owned Business Small Entrepreneurships. Bidders are encouraged to consider participation. A list of certified vendors and additional information can be obtained from website http: www.ledsmallbiz.com. Potential participants may also register at this website.

All bid specifications can be obtained by using the website **www.doa.la.gov/osp** (click on LaPac).

Initialed by: _____

ALL FORMS MUST BE RETURNED AND SIGNED/INITIALED WHERE INDICATED

Company _____

By (name printed) _____

Address _____
Street/Box Number **City/State/Zip Code**

Telephone Number ( ) _____ **Facsimile ( )**_____

NOTE: By accepting a purchase order resulting from this Invitation to Bid, non-resident firms certify that they have paid all taxes dully assessed by the State of Louisiana and its political subdivisions, including franchise taxes, privilege taxes, sales taxes and all other taxes for which they are liable to the state and its political subdivisions.

Initialed by: _____

ALL FORMS MUST BE RETURNED AND SIGNED/INITIALED WHERE INDICATED

EXHIBIT "A"
INDEMNIFICATION AGREEMENT

The _____ agrees to protect, defend, indemnify, save,
(Contractor/Subcontractor/Lessee/Suppliers)

and hold harmless the State of Louisiana, all State Departments, Agencies, Boards and Commissions, its officers, agents, servants and employees, including volunteers, from and against any and all claims, demands, expenses and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur or in any way grow out any act or omission of _____, its agents, servants, and employees, or any and
(Contractor/Subcontractor/Lessee/Supplier)

all costs, expenses and/or attorney fees incurred by _____ as a result of any claims,
(Contractor/Subcontractor/Lessee/Supplies)

demands, and/or causes of action except those claims, demands, and/or causes of action arising out of the negligence of the State of Louisiana, all State Departments, Agencies, Boards, Commissions, its agents, representatives, and/or employees.

_____ agrees to investigate, handle, respond to,
(Contractor/Subcontractor/Lessee/Supplies)

provide defense for and defend any such claims, demands, or suits at its sole expense and agrees to bear all other costs and expenses related thereto, even if they (claims, etc.) are groundless, false or fraudulent.

Accepted by _____
Company Name

_____
Signature

_____
Title

Date Accepted _____

Is Certificate of Insurance Attached? _____ Yes _____ No

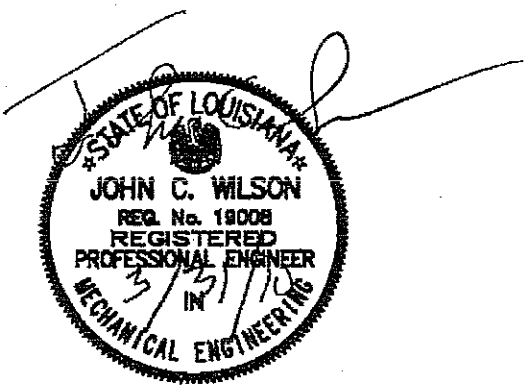
Contract No _____ for Southern University at Shreveport_____

PURPOSE OF CONTRACT: Replace Temperature Controls in Library_____

_____

PROJECT MANUAL

Replace Temperature Controls in Library
Southern University
Shreveport, Louisiana



John J. Guth Associates, Inc.
208 Milam Street
Shreveport, Louisiana 71101
(318) 221-8638

March 31, 2010

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Southern University
Shreveport, Louisiana

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AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
Replace Temperature Controls in Library
Southern University
Shreveport, Louisiana

THE OWNER:
(Name, legal status and address)
Southern University
Martin Luther King, Jr. Drive
Shreveport, Louisiana 71107

THE ARCHITECT:
(Name, legal status and address)
John J. Guth Associates, Inc.
208 Milam Street
Shreveport, Louisiana 71101

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, 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 publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 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 otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 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 evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or

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the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 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. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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 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 Order 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. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor 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 Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

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§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other

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facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. 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. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume

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the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

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§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be

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required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

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§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general 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. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known 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. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

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§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION
Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

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§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, 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 prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise 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

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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.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that

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the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- **.1** The change in the Work;
- **.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.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- **.1** Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** Unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

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.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine 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 the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, 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:

.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;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. 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.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

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ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of 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 insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 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 Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, 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.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, 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 if provided for in the Contract Documents.

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§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;

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.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or a separate contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, 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 date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect,

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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 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.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. 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.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 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 will promptly make such inspection and, when the

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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.

§ 9.10.2 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 and (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. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed 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. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents; or
- **.3** terms of special warranties required by the Contract Documents.

§ 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 previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), 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.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

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§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- **.7** Claims for bodily injury or property damage arising out of completed operations; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, 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

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of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, 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.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner 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 without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or

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otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE
The Owner 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 be named insureds.

§ 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. 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.

§ 11.3.4 If the Contractor 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 Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor 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 Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION
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 covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the

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Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. 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 after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner 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 Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 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.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

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§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. 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.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

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§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 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 all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

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.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; or

.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, 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, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 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;

.2 fails to make payment to Subcontractors for materials or labor in accordance with 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.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

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§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 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; and

.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.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 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 Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party 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.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, 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 prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

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§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker 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 Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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§ 15.2.7 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.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an

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additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

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PAGE 1

Replace Temperature Controls in Library
Southern University
Shreveport, Louisiana

...

Southern University
Martin Luther King, Jr. Drive
Shreveport, Louisiana 71107

...

John J. Guth Associates, Inc.
208 Milam Street
Shreveport, Louisiana 71101

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_____

(Signed)

_____

(Title)

_____

(Dated)

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(1966175599)

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions modify, change, delete from, or add to the General Conditions of the Contract for Construction, AIA Document A201, 2007 Edition. Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause shall remain in effect.

Articles, Paragraphs, Subparagraphs or Clauses modified or deleted have the same numerical designation as those occurring in the General Conditions.

ARTICLE 1

GENERAL PROVISIONS

1.1 DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

In Subparagraph 1.1.1 delete the third sentence, and add the following sentence:

"The Contract Documents shall include the Bidding Documents as listed in the Instructions to Bidders and any modifications made thereto by addenda."

1.6 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS, AND OTHER DOCUMENTS [*R.S.38:2317*]

1.6.1 In the third sentence: delete the remainder of the sentence starting with "and unless otherwise indicated ..."

ARTICLE 2

OWNER

2.2.1 Delete this paragraph.

2.2.2 In the first sentence, delete: all before "the Owner shall secure"

2.4.1 In the first sentence, delete: all after "the owner" to the end
In the second sentence, delete: all before "the owner may"

ARTICLE 3

CONTRACTOR

3.4.2 Delete this paragraph

3.7 PERMITS, FEES AND NOTICES (R.S. 40:1724[A])

Delete Subparagraph 3.7.1 and 3.7.2 and add the following Subparagraph 3.7.2

The Contractor shall comply with and give notices required by laws, rules, ordinances, regulations, and lawful orders of state authorities bearing on performance of the Work.

3.8 ALLOWANCES

Delete Subparagraph 3.8.1, 3.8.2 and 3.8.3 in their entirety and add the following new Subparagraph 3.8.1:

3.8.1 Allowances shall not be made on any of the Work.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

3.10.1 Add the following: For projects with a contract sum greater than $1,000,000.00, the Contractor shall include with the schedule, for the Owner's and Architect's information, a network analysis to identify those tasks which are on the critical path, i.e. where any delay in the completion of these tasks will lengthen the project timescale, unless action is taken.

ARTICLE 4

ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

Delete Subparagraph 4.1.1 and substitute the following:

4.1.1 "The term Architect, when used in the Contract Documents, shall mean the prime Designer (Architect, Engineer or Landscape Architect), or his authorized representative, lawfully licensed to practice architecture, engineering or landscape architecture in the State of Louisiana, identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number."

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.10 Add the following sentence to the end of Subsection 4.2.10:

"There will be no restriction on the owner having a Representative."

4.3. CLAIMS AND DISPUTES

Delete paragraph 4.3.7.2 and substitute the following:

If adverse weather conditions are the basis for a claim for additional time, the Contractor shall document that weather conditions had an adverse effect on the scheduled construction. An increase in the contract time due to weather shall not be cause for an increase in the contract sum.

4.3.7.3 Add the following Subparagraph:

The following are considered reasonably anticipated days of adverse weather on a monthly basis:

January	11	days	May	5	days	September	4	days
February	10	days	June	6	days	October	3	days
March	8	days	July	6	days	November	5	days
April	7	days	August	5	days	December	8	days

The Contractor shall ask for total adverse weather days, the Contractor's request shall be considered only for days over the allowable number of days stated above. *Note: Contract is on a calendar day basis.*

4.4.1 In the second sentence, delete the words "mediation, arbitration or"

4.4.5 In the second sentence, delete all after "the parties"

4.4.6 Delete paragraph

4.4.8 In the first sentence, delete "by mediation or by arbitration."

4.5 MEDIATION

Delete Article 4.5

4.6 ARBITRATION

Delete Article 4.6

ARTICLE 5

SUBCONTRACTORS

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

Delete Subparagraph 5.2.1, and substitute the following:

5.2.1 Unless otherwise required by the Contract Documents, the Contractor shall furnish at the Pre-Construction Conference, to the Owner and the Architect, in writing, the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the work. No Contractor payments shall be made until this information is received."

Delete Subparagraph 5.2.2 and substitute the following:

5.2.2 The Contractor shall be solely responsible for selection and performance of all subcontractors. The Contractor shall not be entitled to claims for additional time and/or an increase in the contract sum due to a problem with performance or non-performance of a subcontractor.

Delete Subparagraph 5.2.3 and 5.2.4 and add the following:

5.2.3 The contractor shall notify the owner when a subcontractor is to be changed and substituted with another subcontractor.

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

Delete Subparagraph 5.4.1 and 5.4.2.

ARTICLE 7

CHANGES IN THE WORK

7.1 GENERAL

Add the following paragraph:

7.1.4 As part of the pre-construction conference submittals, the contractor is to submit the following prior to the commencement of work.

Fixed job site overhead cost itemized with documentation to support daily rates.
Bond Premium Rate with supporting information from the General Contractor's carrier.
Labor Burden by trade for both Subcontractors and General Contractor.
Internal Rate Charges for all significant company owned equipment.

7.2 CHANGE ORDERS

Delete Subparagraph clauses 7.2.1, and 7.2.2, and substitute the following paragraphs:

7.2.1 "A Change Order is a written order to the Contractor signed by the Owner and the Architect, issued after execution of the Contract, authorizing a change in the work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time."

7.2.2 "Cost of the Work" for the purpose of Change Orders shall be costs required to be incurred in performance of the work and paid by the Contractor and Subcontractors which shall consist of:

1. Wages paid direct labor personnel, delineating a labor burden markup for applicable payroll taxes, worker's compensation insurance, unemployment compensation, and social security taxes.
2. Cost of all materials and supplies, including the identification of each item and its cost.
3. Identify each necessary piece of machinery and equipment and its individual cost.
4. Other documented direct costs.

Credit will not be required for overhead and profit.

7.2.3 "Overhead and profit" The Contractor and Subcontractor shall be due job-site and home office fixed overhead and profits on the Cost of the Work, but shall not exceed a total of 25 percent of the direct cost of any portion of work:

The credit to the Owner resulting from a change in the work shall be the sum of those items above, except credit will not be required for overhead and profit. Where a change

results in both credits to the Owner and extras to the Contractor for related items, overhead and profit will only be computed on the net extra cost to the Contractor.

7.2.4 The cost to the Owner resulting from a change in the work shall be the sum of:

"Cost of the Work" (as defined at 7.2.2) and "Overhead and profit" (as defined at 7.2.4), and shall be computed as follows:

7.2.4.1 When all of the work is General Contract work; 15 percent markup on the Cost of the work.

7.2.4.2 When the work is all Subcontract work; 15 percent markup on the Cost of the Work for Subcontractor's Overhead and Profit, plus 10 percent markup on the Cost of the Work, not including the Subcontractor's Overhead and Profit markup, for General Contractor's Overhead and Profit.

7.2.4.3 When the work is a combination of General Contract work and Subcontract work; that portion of the direct cost that is General Contract work shall be computed per 7.2.4.1 and that portion of the direct cost that is subcontract work shall be computed per 7.2.4.2

Bond premiums may be included, but after the markup is added to the cost of the work.

7.2.4.4 "Subcontract cost shall consist of the items in 7.2.2 above plus overhead and profit as defined in 7.2.4."

7.2.5 "Before a Change Order is prepared, the Contractor shall provide and deliver to the Architect the following information concerning the Cost of the Work, not subject to waiver, within a reasonable time after being notified to prepare said Change Order:

A detailed itemized list of labor, material and equipment costs for the General Contractor's work including quantities and unit costs for each item of labor, material and equipment.

An itemized list of labor, material and equipment costs for each Subcontractor's and/or Sub-Subcontractor's work including quantities and unit costs for each item of labor, material, and equipment.

7.2.6 "After a Change Order has been approved, no future requests for extensions of time or additional cost shall be considered for that Change Order."

7.2.7 The Contractor will be due extended fixed job-site overhead for time delays only when complete stoppage of work occurs causing a contract completion extension, and the Contractor is unable to mitigate financial damages through replacement work. The stoppage must be due to acts or omissions solely attributable to the Owner. In all cases, the Contractor is to notify the Designer in writing as required by Article 4.3.2. Reasonable proof may be required by the architect that alternate work could not be preformed. Reasonable proof may be required by the architect that the stoppage affected the Completion Date.

7.2.8 "Cost of the work whether General Contract cost or Subcontract cost shall not apply to the following:

Salaries or other compensation of the Contractor's personnel at the Contractor's principal office and branch offices.
Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the work.
Overhead and general expenses of any kind or the cost of any item not specifically and expressly included above in cost of the work.
Cost of supervision not specifically required by the Change Order.

7.2.9 "When applicable as provided by the Contract, the cost to Owner for Change Orders shall be determined by quantities and unit prices. The quantity of any item shall be as submitted by the Contractor and approved by the Architect. Unit prices shall cover cost of Material, Labor, Equipment, Overhead, and Profit."

7.3.3 At the end of the first sentence add:

", but not to exceed a specified amount.'

7.3.6 replace the five cost of work descriptions with the following four:

1. Wages paid direct labor personnel, with a labor burden markup for applicable payroll taxes, worker's compensation insurance, unemployment compensation, and social security taxes.
2. Cost of all materials and supplies.
3. Cost of necessary machinery and equipment.
4. Other documented direct costs.

7.3.8 Delete the second and third sentences.

ARTICLE 8

TIME

8.1 DEFINITIONS

Add the following:

8.1.5 The Contract Time shall not be changed by the submission of a schedule that shows an early completion date unless specifically authorized by change order.

8.2 PROGRESS AND COMPLETION

Delete Subparagraph 8.2.1 and substitute the following:

"Time is of the essence and completion of the work must be within the Time for Completion stated in the Agreement, subject to such extensions as may be granted under Section 8.3. The Contractor agrees to commence work not later than fourteen (14) days after the transmittal date of Written Notice to Proceed from the Owner and to substantially complete the project within the time stated in the Contract. The Owner will suffer financial loss if the project is not substantially complete in the

time set forth in the Contract Documents. The Contractor and the Contractor's Surety shall be liable for and shall pay to the Owner the sum stated in the Contract Documents as fixed, agreed and liquidated damages for each consecutive calendar day (Saturdays, Sundays, and holidays included) of delay until the work is substantially complete. The owner shall be entitled to the sum stated in the Contract Documents. Such Liquidated Damages shall be withheld by the owner from the amounts due the Contractor for progress payments."

Delete Subparagraph 8.2.2.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 in the first sentence after the words "owner pending' delete the words "mediation and arbitration" and add the word "litigation" and delete the last word "determine" and add the following:

"recommend, subject to Owner's approval of Change Order. If the claim is not made within the limits of paragraph 4.3, all right for future claims for that month are waived."

ARTICLE 9

PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Delete Subparagraph 9.2.1 and substitute the following:

9.2.1 At the Pre-Construction Conference, the Contractor shall submit to the Owner and the Architect a Schedule of Values prepared as follows:

9.2.1.1 The attached Schedule of Values Format shall be used. If applicable, the cost of work for each Section listed under each Division shall be given. The cost for each Section shall include labor, materials, overhead, and profit.

9.2.1.2 The Total of all items shall equal the Total Contract Sum. This schedule, when approved by the Architect, shall be used only as a basis for the Contractor's Applications for Payment."

9.3 APPLICATIONS FOR PAYMENT

Delete Subparagraph 9.3.1 and clause 9.3.1.1 and 9.3.1.2 and substitute the following:

9.3.1 "Monthly, the Contractor shall submit to the Architect an Application & Certificate for Payment on the AIA Document G702-1992, accompanied by AIA Document G703-1992, and supported by any additional data substantiating the Contractor's right to payment as the Owner or the Architect may require. Application for Payment shall be submitted on or about the first of each month for the value of labor and materials incorporated into the work and of materials, suitably stored, at the site as of the twenty-fifth day of the preceding month, less normal retainage as follows, per R.S.38:2248:

9.3.1.1 Projects with Contract price up to $500,000.00 - 10 percent of the Contract price.
9.3.1.2 Projects with Contract price of $500,000.00, or more - 5 percent of the Contract price.

The normal retainage shall not be due the Contractor until after substantial completion and expiration of the forty-five day lien period and submission to the Architect of a clear lien certificate and invoice for retainage."

Delete Subparagraph 9.3.2 and substitute the following:

9.3.2 "Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. Payments for materials or equipment stored on the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, including applicable insurance."

9.6 PROGRESS PAYMENTS

Delete Subparagraph 9.6.1 and substitute the following:

9.6.1 "After the Architect has issued a Certificate for Payment, the Owner shall make payment within twenty days."

9.6.2 After the end of the second sentence, add the following:

"R.S. 9:2784 (A) and (C) require a Contractor or Subcontractor to make payment due to each Subcontractor and supplier within fourteen (14) consecutive days of the receipt of payment from the Owner. If not paid, a penalty in the amount of 1/2 of 1 percent per day is due, up to a maximum of 15 percent, from the expiration date until paid. The Contractor or subcontractor, whichever is applicable, is solely responsible for payment of a penalty."

9.6.4 Add the following:

Pursuant to La. R.S. 38:2242, when the Owner receives any claim of nonpayment arising out of the Contract, the owner shall deduct 125 percent of such claim from the Contract Sum. The Contractor, or any interested party, may deposit security, in accordance with La. R.S. 38:2242.2, guaranteeing payment of the claim with the recorder of mortgages of the parish where the Work has been done. When the Owner receives original proof of such guarantee from the recorder of mortgages, the claim deduction will be added back to the Contract Sum.

9.7 FAILURE OF PAYMENT

Delete Subparagraph 9.7.1.

9.8 SUBSTANTIAL COMPLETION

Delete this section and substitute the following:

9.8 SUBSTANTIAL COMPLETION

9.8.1 Substantial Completion is the stage in the progress of the work when the work is sufficiently complete in accordance with the Contract Documents so that the Owner can

occupy or utilize the work for its intended use. The Architect shall determine if the project is substantially complete in accordance with this Subparagraph.

9.8.2 When the Contractor considers that the work is Substantially Complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents.

9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the work is substantially complete. A prerequisite to the work being accepted as substantially complete is the Owner's receipt of the executed Roofing Contractor's and Roofing Manufacturer's guarantees, where roofing work is part of the Contract. Prior to inspection by the Architect, the Contractor shall notify the Architect that the project is ready for inspection by the State Fire Marshal's office. 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 for its intended use, the Contractor shall, before acceptance of the work as Substantially Complete, 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.

9.8.4 When the Architect determines that the project is Substantially Complete, he shall prepare a "punch list" of exceptions and the dollar value related thereto. The monetary value assigned to this list will be the sum of the cost estimate for each particular item of work the Architect develops based on the mobilization, labor, material and equipment costs of correcting the item and shall be retained from the monies owed the contractor, above and beyond the standard lien retainage. The cost of these items shall be prepared in the same format as the schedule of values. At the end of the 45 day lien period payment shall be approved for all punch list items completed up to that time. After that payment, none of the remaining funds shall be due the contractor until all punch list items are completed and are accepted by the Architect. If the dollar value of the punch list exceeds the amount of funds, less the retainage amount, in the remaining balance of the Contract, then the Project shall not be accepted as substantially complete. If funds remaining are less that that required to complete the work, the Contractor shall pay the difference.

9.8.5 When the "punch list" is complete the Architect shall prepare a Recommendation of Acceptance" incorporating the punch list and submit it to the Owner. Upon approval of the Recommendation of Acceptance, the Owner may issue a Notice of Acceptance of Building Contract which shall establish the Date of Substantial Completion. The Contractor will record the Notice of Acceptance with the Clerk of Court in the Parish in which the work has been performed. If the Notice of Acceptance has not been recorded seven (7) days after issuance, the owner may record the acceptance at the Contractor's expense.

9.8.6 Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the work unless otherwise agreed to in writing by the Owner and Contractor. Unless otherwise agreed to in writing by the Owner and Contractor, security, maintenance, heat, utilities, damage to the Work not covered by the

punch list and insurance shall become the Owner's responsibility on the Date of Substantial Completion.

9.8.7 If all punch list items have not been completed by the end of the forty-five (45) day lien period, through no fault of the Architect or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within forty-five (45) days after notification, the Surety has not completed the punch list, through no fault of the Architect or Owner, the Owner may, at his option, contract to have the balance of the work completed and pay for such work with the unpaid funds remaining in the Contract sum. Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future state contracts. If the surety fails to complete the punch list within the stipulated time period, the Owner may not accept bonds submitted, in the future, by the surety.

9.9 Partial Occupancy or Use

9.9.1 Delete paragraph and substitute the following:

"Partial Occupancy is that stage in the progress of the Work when a designated portion of the Work is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the designated portion of the Work for its intended use. The Owner may occupy or use any substantially completed portion of the work so designated by separate agreement with the Contractor and authorized by public authorities having jurisdiction over the Work. Such occupancy or use may commence provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers the designated portion substantially complete the Contractor shall prepare and submit a list to the Architect as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonable withheld."

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.1 After the first sentence, add the following:

If the Architect does not find the work acceptable under the Contract Documents, the Architect shall make one additional inspection; if the work is still not acceptable, the Architect, and each of the Architect's principal consultants, shall be paid $100.00/hour for their time at the project site, for each additional inspection, to be withheld from the unpaid funds remaining in the Contract sum. The payment shall be made by the owner and deducted from the construction contract funds.

Add the following clause 9.10.6:

9.10.6 In response to Federal Arbitrage regulations: If such compliance has not been effected within 90 days of the date of acceptance, the contract shall be terminated and no further opportunity will be granted the Contractor and no further payments will be made on this Contract.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.2 In the first sentence, between the words "bearing on" and "safety," add the words "the health and",

10.3.1 In the first sentence after "(PCB)" add "or lead"

10.3.2 After the first sentence, delete all after "Unless."
Add at the end "The Contract time shall be extended appropriately."

Delete Subparagraph 10.3.3

Delete Subparagraph 10.6.1 and substitute the following:

10.6.1 "In an emergency affecting the safety of persons or property, the Contractor shall notify the Owner and Architect immediately of the emergency, simultaneously acting at his discretion to prevent damage, injury, or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 4.3 and Article 7."

ARTICLE 11

INSURANCE REQUIREMENT FOR NEW CONSTRUCTION AND RENOVATIONS

Delete all of Paragraphs 11.1 and 11.2 and substitute the following:

11.1 STANDARDIZED INSURANCE REQUIREMENTS FOR ALL STATE CONTRACTS

11.1.1 This paragraph not used.

11.1.2 All policies and certificates of insurance of the Contractor/Subcontractor shall contain the following clauses:

11.1.2.1 The Contractor/Subcontractor's insurer will have no right of recovery or subrogation against the Owner, it being the intention of the parties that the insurance policies so affected shall protect both parties and the primary coverage for any and all losses covered by the below described insurance.

11.1.2.2 The Owner shall be named as an additional insured as regards negligence by the Contractor (ISO Forms CG 20 10, Current form approved for use in Louisiana).

11.1.2.3 The insurance companies issuing the policy or policies shall have no recourse against the Owner for payment of any premiums or for assessments under any form of policy.

11.1.2.4 Any and all deductibles in the below described insurance policies shall be assumed by and be at the sole risk of the Contractor or Subcontractor.

11.1.3 INSURANCE:

The Contractor/Subcontractor, prior to commencing work, shall provide at his own expense, proof of the following insurance coverages required by the contract to the Owner in insurance companies authorized in the State of Louisiana. Insurance is to be placed with insurers with an A. M. Best's rating of no less than A-:VI. This rating requirement will be waived for the workers' compensation coverage and policies written through Lloyds of London or Institute of London Underwriter (ILU) companies.

Thirty days prior notice of cancellation shall be given to the Owner by registered mail, return receipt requested, on all of the required coverage provided to the Owner. All notices will name the Contractor/ Subcontractor and identify the contract number.

Insurance coverage specified in the AIA Document A201-2007 General Conditions of the Contract for Construction to be provided by the Contractor, and any other insurance described below shall be furnished with the following minimum limits:

11.1.3.1 Workers' Compensation - Statutory - in compliance with the Compensation Law of the State. Exception: Employers liability to be $1,000,000 when work is to be over water and involves maritime exposures.

11.1.3.2 Commercial General Liability Insurance with a combined single limit per occurrence for bodily injury and property damage. This insurance shall include coverage for bodily injury and property damage, and indicate on the Certificate of Insurance which of the seven (7) coverages required below are not included in the policy, if any:

1 Premises – Operations;
2 Broad Form Contractual Liability;
3 Products and Completed Operations;
4 Use of Contractors and Subcontractors;
5 Personal Injury;
6 Broad Form Property Damage;
7 Explosion, Collapse and Underground (XCU) Coverage.

NOTE: On the certification of insurance, under the description of operations, the following wording is required: THE AGGREGATE LOSS LIMIT APPLIES TO EACH PROJECT, or a copy of ISO form CG2503 (Current form approved for use in Louisiana) shall be submitted.

COMBINED SINGLE LIMIT (CSL) - AMOUNT OF INSURANCE REQUIRED

Type of Construction	Projects Under $100,000	Projects $100,001 - $1,000,000	Projects Over $1,000,000
New Buildings:			
-Each Occurrence/ Minimum Limit	$500,000	$1,000,000	$3,000,000
-Aggregate (Applicable to this Contract ONLY)	$500,000	$1,000,000	$3,000,000
Renovations:	*The building(s) value for this Project is: $7,880,185.00.*		
-Each Occurrence/ Minimum Limit	$500,000*** (Depends On Building Value)	$1,000,000*** (Depends On Building Value)	$3,000,000*** (Depends On Building Value)
-Aggregate (Applicable to this Contract ONLY)	$500,000*** (Depends On Building Value)	$1,000,000*** (Depends On Building Value)	$3,000,000*** (Depends On Building Value)

****While the minimum combined single limit of $500,000 is required for all renovations, the value of a building shall be multiplied by 10 percent and insurance requirements will be increased at $1,000,000 intervals and rounded to the nearest $1,000,000. Example: Renovation on $33,000,000 building would require $3,000,000 minimum combined single limit of coverage. Maximum limit required is $5,000,000.00 regardless of building value.*

11.1.3.3 Business Automobile Liability Insurance with a combined single limit of $1,000,000 per occurrence for bodily injury and property damage, unless otherwise indicated. This insurance shall include for bodily injury and property damage the following coverages:

1 Owned automobiles;
2 Hired automobiles;
3 Non-owned automobiles.

11.1.3.4 An Umbrella Policy may be used to meet minimum requirements.

11.1.4 All property losses shall be made payable to and adjusted with the Owner.

11.1.5 All policies of insurance shall be approved by the contracting Owner prior to the inception of any work.

11.1.6 Other insurance required is as follows:

11.1.6.1 Owner's Protective Liability Insurance shall be furnished by the Contractor and naming the State of Louisiana as the Insured.

	Projects Under $100,000	Projects $100,001 - $1,000,000	Projects Over $1,000,000
CSL - Each Occurrence	$500,000	$1,000,000	$3,000,000

11.1.6.2 Asbestos Abatement Liability
(required when asbestos abatement is included in the work)

The contractor or subcontractor who will be doing the asbestos abatement as outlined in this contract shall obtain and maintain such liability coverage for the asbestos abatement hazard and exposure with minimum limits of $1,000,000 per occurrence for the duration of the project. The policy shall name the State of Louisiana, all State departments, agencies, boards and commissions as an additional insured for the project. The policy shall be written on an "occurrence" form without a sunset clause. Claims-made coverage is unacceptable. The insurance company shall have an A.M. Best rating of at least A-:VI or better or written through Lloyds of London or Institute of London Underwriter (ILU) companies.

11.1.7 If, at any time, any of the said policies shall be or become unsatisfactory to the Owner, as to form or substance, or if a company issuing any such policy shall be or become unsatisfactory to the Owner, the Contractor/Subcontractor shall promptly obtain a new policy, submit the same to the Owner for approval and submit a certificate thereof as hereinabove provided.
Upon failure of the Contractor/Subcontractor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of the Owner, may be forthwith

declared suspended, discontinued or terminated. Failure of the Contractor/Subcontractor to take out and/or to maintain or the taking out and/or maintenance of any required insurance, shall not relieve the Contractor/Subcontractor from any liability under the contract, nor shall the insurance requirements be construed to conflict with the obligations of the Contractor/Subcontractor concerning indemnification. The Owner reserves the right to require complete, certified copies of all required insurance policies, at any time.

11.1.8 RISKS AND INDEMNIFICATIONS ASSUMED BY THE CONTRACTOR
Neither the acceptance of the completed work nor payment therefor shall release the Contractor/Subcontractor from his obligations from the insurance requirements or indemnification agreement.

11.1.8.1 Additional insurance may be required on an individual basis for extra hazardous contracts and specific service agreements.

If such additional insurance is required for a specific contract, that requirement will be described in the "Special Conditions" of the contract specifications.

11.1.8.2 If any of the Property and Casualty insurance requirements are not complied with at their renewal dates, payments to the Contractor/Subcontractor will be withheld until those requirements have been met, or at the option of the Owner, the Owner may pay the Renewal Premium and withhold such payments from any monies due the Contractor/Subcontractor.

11.1.8.3 All property losses shall be made payable to and adjusted with the Owner.

11.1.8.4 All policies and certificates of insurance shall be approved by the contracting agency prior to the inception of any work.

11.1.8.5 If at any time any of the foregoing policies shall be or become unsatisfactory to the Owner, as to form or substance, or if a company issuing any such policy shall be or become unsatisfactory to the Owner, the Contractor/Subcontractor shall, upon notice to that effect from the Owner, promptly obtain a new policy, submit the same to the Owner for approval and submit a certificate thereof as hereinabove provided. Upon failure of the Contractor/Subcontractor to furnish, deliver and maintain such insurance as above provided, this Contract, at the election of the Owner, may be forthwith declared suspended, discontinued or terminated. Failure of the Contractor/Subcontractor to take out and/or maintain or the taking out and/or maintenance of any required insurance, shall not relieve the Contractor/Subcontractor from any liability under the Contract, nor shall the insurance requirements be construed to conflict with or otherwise limit the obligations of the Contractor/Subcontractor concerning indemnification. The Owner reserves the right to require complete, certified copies of all required insurance policies, at any time.

11.1.9 SUBCONTRACTORS

Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates from each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

11.1.10 CERTIFICATE OF INSURANCE

Contractor shall furnish the Owner with certificates of insurance affecting coverage required by this clause. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates of insurance must also contain the following in the "Description of Operations" section:

If the contractor is a General Contractor, then so state.

If the contractor is a specialty contractor, then so state and provide the list of specialties for which the contractor is insured.

The certificates are to be received and approved by the Owner before work commences. The Owner reserves the right to require complete, certified copies of all required insurance policies, at any time.

11.2 INSURANCE REQUIREMENTS FOR CONTRACTORS

Contractor shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the Contractor's bid.

11.2.1 MINIMUM SCOPE OF INSURANCE

Coverage shall be at least as broad as:

11.2.1.1 Insurance Services Office Commercial General Liability coverage ("occurrence") form CG 0001. (Current form approved for use in Louisiana.) "Claims Made" form is unacceptable. The "occurrence form" shall not have a "sunset clause".

11.2.1.2 Insurance Services Office form number CA 0001 (Current form approved for use in Louisiana.) covering Automobile Liability. The policy shall provide coverage for owned, hired, and non-owned coverage. If an automobile is to be utilized in the execution of this contract, and the vendor/contractor does not own a vehicle, then proof of hired and non-owned coverage is sufficient.

11.2.1.3 Workers' Compensation insurance as required by the Labor Code of the State of Louisiana, including Employers Liability insurance.

11.2.2 MINIMUM LIMITS OF INSURANCE

Contractor shall maintain limits no less than:

11.2.2.1 Commercial General Liability: $500,000 combined single limit per occurrence for bodily injury, personal injury and property damage (or higher limits depending on size of contract.)

11.2.2.2 Automobile Liability: $500,000 combined single limit per accident, for bodily injury and property damage (or higher limits depending on size of contract).

11.2.2.3 Workers Compensation and Employers Liability: Workers' Compensation limits as required by the Labor Code of the State of Louisiana and Employers Liability coverage. Exception: Employers liability limit is to be $1,000,000 when work is to be over water and involves maritime exposure.

11.2.3 DEDUCTIBLES AND SELF-INSURED RETENTIONS

Any deductibles or self-insured retentions must be declared to and approved by the Owner. At the option of the Owner, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its officers, officials, employees, and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

11.2.4 OTHER INSURANCE PROVISIONS

The policies are to contain, or be endorsed to contain, the following provisions:

11.2.4.1 General Liability and Automobile Liability Coverages

11.2.4.1.1 The Owner, its officers, officials, employees, Boards and Commissions and volunteers are to be added as "additional insureds" as respects liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Owner, its officers, officials, employees or volunteers.

It is understood that the business auto policy under "Who is an Insured" automatically provides liability coverage in favor of the State of Louisiana.

11.2.4.1.2 Any failure to comply with reporting provisions of the policy shall not affect coverage provided to the Owner, its officers, officials, employees, Boards and Commissions, or volunteers.

11.2.4.1.3 The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

11.2.4.2 Workers' Compensation and Employers' Liability Coverage

The insurer shall agree to waive all rights of subrogation against the Owner, its officers, officials, employees, and volunteers for losses arising from work performed by the Contractor for the Owner.

11.2.4.3 All Coverages

Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the Owner.

11.2.5 ACCEPTABILITY OF INSURERS

Insurance is to be placed with insurers with an A.M. Best's rating of no less than A-:VI. This rating requirement will be waived for the workers' compensation coverage.

11.2.6 VERIFICATION OF COVERAGE

Contractor shall furnish the Owner with certificates of insurance effecting coverage required. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates of insurance must also contain the following in the "Description of Operations" section:

If the contractor is a General Contractor, then so state.

If the contractor is a specialty contractor, then so state and provide the list of specialties for which the contractor is insured.

The certificates are to be received and approved by the Owner before work commences. The Owner reserves the right to require complete, certified copies of all required insurance policies, at any time.

11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

Delete Subparagraphs 11.3.1, 11.3.2, & 11.3.3

11.4 PROPERTY INSURANCE

Delete all Subparagraphs 11.4.1 through 11.4.10 and substitute the following:

11.4.1 The General Contractor shall purchase and maintain property insurance upon the entire work included in the contract for an amount equal to the greater of the full-completed value or the amount of the construction contract including any amendments thereto (with the exception of the following sub-limit for flood.) The general contractor's policy shall provide "ALL RISK" Builder's Risk insurance (extended to include the perils of flood, collapse, vandalism/malicious mischief, and theft, including theft of materials whether or not attached to any structure.) Flood sub-limit shall equal an amount no lower than ten percent (10 percent) of the total contract cost per occurrence. The "All Risk" Builder's Risk Insurance must also cover architects' and engineers' fees that may be necessary to provide plans and specifications and supervision of work for the repair and/or replacement of property damage caused by a covered peril not to exceed 10 percent of the cost of those repair and/or replacements.

Flood coverage shall be provided by the Contractor on the first floor and below for projects North of the Interstate Corridor beginning at the Texas - Louisiana border at Interstate 10 East to the Baton Rouge junction of Interstate 12, East to Slidell junction with Interstate 10 to the Louisiana - Mississippi border. On projects South of this corridor, flood coverage shall be required on the first and second floors and below. Coverage for roofing projects shall **not** require flood coverage. The contractor has the right to purchase coverage or self-insure any exposures not required by the bid specifications, but shall be held liable for all losses, deductibles, self-insurance for coverages not required.

A specialty contractor shall purchase and maintain property insurance upon the system to be installed for an amount equal to the greater of the full-completed value or the amount of the

contract including any amendments thereto. The specialty contractor may provide an installation floater with the same coverage as the "ALL RISK" Builder's Risk insurance policy.

The policy must include the interest of the Owner, Contractor and Subcontractors as their interest may appear.

Policies insuring projects involving additions, alterations or repairs to existing buildings or structures must include an endorsement providing the following:

> In the event of a disagreement regarding a loss covered by this policy which may also be covered by the State of Louisiana policy of self-insurance or any commercial property insurance policy purchased by the State of Louisiana, Office of Risk Management (ORM) covering in excess of the State of Louisiana, policy of self-insurance, this company agrees to follow the following procedure to establish coverage and/or the amount of loss:
>
> Any party to a loss may make written demand for an appraisal of the matter in disagreement. Within 20 days of receipt of written demand, this company and either ORM or its commercial insurance company shall each select a competent and impartial appraiser and notify the other of the appraiser selected. The two appraisers will select a competent and impartial umpire. The appraisers will then identify the policy or policies under which the loss is insured and, if necessary, state separately the value of the property and the amount of the loss that must be borne by each policy. If the two appraisers fail to agree, they shall submit their differences to the umpire. A written decision by any two shall determine the policy or policies and the amount of the loss. Each insurance company (or ORM) agree that the decision of the appraisers, and the umpire if involved, will be binding and final and that neither party will resort to litigation. Each of the two parties shall pay its chosen appraiser and bear the cost of the umpire equally.

ARTICLE 12

UNCOVERING AND CORRECTION OF WORK

12.2.2.1 At the end of the paragraph add the following sentences: "If the Contractor fails to correct Work identified as defective and covered by warranties, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future state contracts.

ARTICLE 13

MISCELLANEOUS PROVISIONS

13.2.1 In the second sentence, Delete "Except as.....13.2.2"

Delete paragraph 13.2.2

Add the following clause 13.4.3.

13.4.3 The Nineteenth Judicial Court in and for the Parish of East Baton Rouge, State of Louisiana shall have sole jurisdiction and venue in any action brought under this contract.

13.5 TESTS AND INSPECTIONS

In Subparagraph 13.5.1 delete the second sentence and substitute the following:

"The Contractor shall make arrangements for such tests, inspections and approvals with the Testing Laboratory provided by the Owner, and the Owner shall bear all related costs of tests, inspections and approvals."

Delete the last sentence of Subparagraph 13.5.1.

13.6 INTEREST

Delete Paragraph 13.6.

13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

Delete paragraph 13.7. (R.S.38:2189)

ARTICLE 14

TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

Delete clause 14.1.1.4.

14.2 TERMINATION BY THE OWNER FOR CAUSE

Add the following clause:

14.2.1.5"Failure to complete the punch list within the lien period as provided in 9.8.2.3."

14.2.3 Add the following sentence:

"Termination by the Owner shall not suspend assessment of liquidated damages against the surety."

14.2.5 Add the following Subparagraph:
"If an agreed sum of liquidated damages has been established, termination by the Owner under this Article will not relieve the Contractor and/or surety of his obligations under the liquidated damages provisions and the Contractor and/or surety shall be liable to the Owner for per diem liquidated damages."

Add the following as Article 15:

ARTICLE 15

EQUAL OPPORTUNITY

15.1 The Contractor and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during

employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of nondiscrimination.

15.2 The Contractor and all Subcontractors shall, in all solicitations or advertisement for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

SECTION 01010 - SUMMARY OF THE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 PROJECT/WORK IDENTIFICATION

A. General: Project name is **"Replace Temperature Controls in Library, Southern University, Shreveport, Louisiana"** as shown on Contract Documents prepared by John J. Guth Associates, Inc. Drawings and Specifications are dated March 31, 2010.

B. Summary by References: Work of the contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions, Specification Sections, Drawings, Addenda, and modifications to the Contract Documents issued as part of Addenda subsequent to the initial printing of this project manual and including, but not necessarily limited to, printed material referenced by any of these. It is recognized that work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon, including weather conditions, and other forces outside the Contract Documents.

C. Abbreviated Written Summary: Briefly and without force and effect upon the Contract Documents, the work of the Contract can be summarized as follows:

1. The work includes removal and replacement of existing temperature controls air handling unit and double duct terminal units and associated piping, ductwork, controls, and electrical work.

D. Sequence of Work: Sequence work for minimum interruption of campus operations.

E. Utility Interruptions: Utility interruptions shall be held to a minimum and will be permitted only at times approved by the User Agency. The User Agency may require that any outages be during nights, weekends, holidays, quarter breaks, etc. Provide any required overtime work at no additional cost to the Owner.

F. Completion Date: As required by Instructions to Bidders, the Contractor is required to fully complete construction of project within specified number of days. Contractor shall furnish sufficient forces, construction plant and equipment, and work such hours, including weekend and night shifts as may be necessary to insure prosecution of work in accordance with schedule to the contracted completion date. If, in the opinion of the Engineer and Owner, Contractor falls behind progress schedule, Contractor shall take steps as may be necessary to improve his progress by such means as increasing number of men, number of shifts, days of work, and/or amount of construction plant, all without additional cost to Owner. If access to building is required at other than normal building hours, Contractor shall make arrangements with User Agency.

1.3 CONTRACTOR USE OF PREMISES

A. General: The Contractor shall limit his use of the premises to the work indicated, so as to allow for Owner occupancy with minimum interruptions.

B. Use of the Site: Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction.

C. Keep existing driveways and entrances serving the premises clear and available to the Owner and his employees at all times. Do not use these areas for parking or storage of materials.

D. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas approved by User Agency. If additional storage is necessary, obtain and pay for such storage off-site. The Owner will not make payments for materials stored off-site.

E. Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place.

F. Use of existing toilets within the buildings by the Contractor and his personnel will not be permitted.

G. General Requirements: Observe no smoking rules. All personnel must wear shirts. No radios or similar items may be used.

H. Asbestos: No asbestos-containing materials have been identified on items that are indicated to be disturbed. If asbestos-containing materials are encountered, comply with the following:

1. Upon encountering any previously unidentified materials which he suspects may contain asbestos, the Contractor shall immediately cease all work in the immediate vicinity of the suspected materials and notify the Designer and the Owner. The Owner shall retain consultants to identify the suspected materials. Upon identification, the Owner reserves the right to contract separately for the removal, or require the Contractor to remove said materials in accordance with the following provision. In any case, the work shall be performed by a licensed and certified Abatement Contractor.
2. The Louisiana Department of Environmental Quality (D.E.Q.) has issued the Louisiana Emission Standards for Hazardous Air Pollutants. Where asbestos is encountered in a project, the Contractor shall comply with all laws and ordinances pertaining to asbestos handling and abatement, including the latest revision of LAC 33:111, Chapter 25, Subchapter F, Emission Standards for Hazardous Air Pollutants, LAC 33:111, Chapter 27, Asbestos Containing Materials in Schools and Public Buildings and LAC 33:111, Chapter 51, Subchapter M, Section 5151, Emission Standards for Asbestos.
3. Notification should be addressed to:

   Asbestos Coordinator
   Louisiana Department of Environmental Quality
   Air Quality Division
   Post Office Box 82135
   Baton Rouge, Louisiana 70884-2135

4. If the Owner chooses to remove any previously unidentified materials by utilizing different Contractors, the Contractor shall cooperate fully with the Owner's consultants and asbestos abatement Contractor permitting them full access to the project, and shall not resume work in the vicinity of the suspected materials until advised by the Designer and the Owner that it is safe to do so.
5. Refer to Article 7 of the Supplementary Conditions if the Contractor is required to do this work.

1.4 OWNER OCCUPANCY

A. Full Owner Occupancy: The Owner will occupy the site during the entire period of construction. Cooperate fully with the Owner and his representative during construction operations to minimize conflicts and to facilitate Owner usage. Perform the work so as not to interfere with the Owner's operations.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01010

SECTION 01045 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the work.

1. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 15 and Division 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 SUBMITTALS

A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:

1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
3. List products to be used and firms or entities that will perform Work.
4. Indicate dates when cutting and patching is to be performed.
5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.
7. Approval by the Engineer to proceed with cutting and patching does not waive the Engineer's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.4 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

1. Foundation construction.
2. Bearing and retaining wall.
3. Structural concrete.
4. Structural steel.
5. Lintels.
6. Timber and primary wood framing.
7. Structural decking.
8. Stair systems.
9. Miscellaneous structural metals.
10. Exterior curtain wall construction.
11. Equipment supports.
12. Piping, ductwork, vessels and equipment.

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:

a. Shoring, bracing, and sheeting.
b. Primary operational systems and equipment.
c. Air or smoke barriers.
d. Water, moisture, or vapor barriers.
e. Membranes and flashings.
f. Fire protection systems.
g. Noise and vibration control elements and systems.
h. Control systems.
i. Communication systems.
j. Conveying systems.
k. Electrical wiring systems.
l. Special construction specified by Division-13 Sections.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Engineer's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

1. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take all precautions necessary to avoid cutting existing pipe, conduit, or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.

4. Comply with requirements of applicable Specification Sections where cutting and patching requires excavating and backfilling.
5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.

   a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken containing the patch, after the patched area has received primer and second coat.

4. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.4 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

SECTION 01090 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION OF REQUIREMENTS

A. General: This Section specifies procedural and administrative requirements for compliance with governing regulations and codes and standards imposed upon the work. These requirements include obtaining permits, licenses, inspections, releases, and similar documentation, as well as payments, statements, and similar requirements associated with regulations, codes, and standards.

B. The term "Regulations" is defined to include laws, statutes, ordinances, and lawful orders issued by governing authorities, as well as those rules, conventions, and agreements within the construction industry which effectively control the performance of the work regardless of whether they are lawfully imposed by governing authority or not.

1.3 DEFINITIONS

A. General Explanation: Certain terms used in Contract Documents are defined in this Article. Definitions and explanations contained in this Section are not necessarily complete, but are general for the work to extent that they are not stated more explicitly in another element of the Contract Documents.

B. General Requirements: Provisions and requirements of other Division 1 Sections apply to the entire work of the Contract and, where so indicated, to other elements which are included in the project.

C. Indicated: The term "indicated" is a cross-reference to graphic representations, notes, or Schedules on the Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for the purpose of helping the reader locate the cross-reference, and no limitation of location is intended except as specifically noted.

D. Directed, Requested, Etc.: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by the Engineer," "requested by the Engineer," and similar phrases. However, no such implied meaning will be interpreted to extend the Engineer's responsibility into the Contractor's area of construction supervision.

E. Approve: Where used in conjunction with the Engineer's response to submittals, requests, applications, inquiries, reports, and claims by the Contractor, the term "approved" will be held

to limitations of the Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will the Engineer's approval be interpreted as a release of the Contractor from responsibilities to fulfill requirements of Contract Documents or acceptance of the work, unless otherwise provided by requirements of the Contract Documents.

F. Project Site: The term "project site" means the space available to the Contractor for performance of the work, either exclusively or in conjunction with others performing other construction as part of the project. The extent of the project site is shown on the Drawings, and may or may not be identical with the description of the land upon which the project is to be built.

G. Furnish: The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations."

H. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimensions, finishing, curing, protecting, cleaning, and similar operations."

I. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."

J. Installer: The "installer" is "the entity" (person or firm) engaged by the Contractor, its subcontractor, or sub-subcontractor for performance of a particular element of construction at the project site, including installation, erection, application, and similar required operations. It is a requirement that installers are experienced in the operations they are engaged to perform.

K. Testing Laboratory: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests of the work, either at the project site or elsewhere, and to report and (if required) interpret results of those inspections or tests.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Except where more explicit or stringent requirements are written into the Contract Documents, applicable construction standards have the same force and effect as if bound into or copied directly into the contract documents. Such industry standards are made a part of the Contract Documents by reference. Individual specification sections indicate which codes and standards the Contractor must keep available at the project site for reference.

B. Referenced standards (standards referenced directly in the contract documents) take precedence over standards that are not referenced but generally recognized in the industry for applicability to the work.

C. Unreferenced Standards: Except as otherwise limited by the Contract Documents, standards not referenced but recognized in the construction industry as having direct applicability will be enforced for performance of the work. The decision as to whether an industry code or standard is applicable, or as to which of several standards are applicable, is the sole responsibility of the Engineer.

D. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.

E. Conflicting Requirements: Where compliance with two or more standards is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the contract documents specifically indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Engineer for a decision before proceeding.

F. Minimum Quantities or Quality Levels: In every instance, the quantity or quality level shown or specified is intended to be the minimum to be provided or performed. Unless otherwise indicated, the actual work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits. In complying with these requirements, the indicated numeric values are minimum or maximum values, as noted, or as appropriate for the context of the requirements. Refer instances of uncertainty to the Engineer for decision before proceeding.

G. Copies of Standards: The contract documents require that each entity performing work be experienced in that part of the work being performed. Each entity is also required to be familiar with industry standards applicable to that part of the work. Copies of applicable standards are not bound with the contract documents.

H. Where copies of standards are needed for proper performance of the work, the Contractor is required to obtain such copies directly from the publication source.

I. Although copies of standards needed for enforcement of requirements may be required submittals, the Engineer reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.

J. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in Specifications or other Contract Documents they are defined to mean the recognized name of the trade association, standards generating organization, governing authority or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

1.5 SUBMITTALS

A. Permits, Licenses, and Certifications: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01090

SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 RELATED SECTIONS

A. Construction Schedule: Division 01 Section 01300, "Submittals."

1.3 PRE-CONSTRUCTION MEETING

A. After notification that the contract has been executed, the Engineer shall arrange with the Owner, User Agency, and Contractor, and conduct a pre-construction conference to be held at the project site. The Contractor shall be responsible to see that his subcontractors are in attendance, and shall furnish the following to the Engineer, Owner, and User Agency:

1. Schedule of values (Division 01 Section 01300, "Submittals").
2. List of Subcontractors and major material suppliers (Division 01 Section 01300, "Submittals").
3. Construction Schedule (Division 01 Section 01300, "Submittals").

B. The following shall serve as a minimum agenda:

1. Distribute and discuss the list of major subcontractors.
2. Tentative construction schedule.
3. Critical work sequencing.
4. Use of premises.
5. Relation and coordination of major subcontractors.
6. Designation of responsible personnel.
7. Processing of field decisions and change orders.
8. Submittal of shop drawings, project data, and samples.
9. Procedures for maintaining record documents.
10. Safety and first-aid procedures.

1.4 PROGRESS MEETINGS

A. Engineer shall schedule and administer monthly progress meetings during the construction period. Required attendance shall be:

1. Engineer and his professional consultants, as needed.
2. Contractor.

3. Subcontractors, as appropriate.
4. Suppliers, as appropriate.

B. The Owner shall be notified of such meetings and may be represented. It shall be the principal purpose of these meetings or conferences to effect coordination, cooperation, and assistance in every practical way to the end of maintaining progress of the project on schedule and completing the project within the contract time.

C. Suggested Agenda:

1. Review work progress since last meeting.
2. Note field observations, problems, and decisions.
3. Review off-site fabrication problems.
4. Revise construction schedule, as indicated.
5. Review submittal schedules, expedite as required to maintain schedule.
6. Review changes proposed by Owner for effect on construction schedule and effect on completion date.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01200

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Additional Submittal Requirements: Division 0 Section 00700, "AIA Document A201-2007 General Conditions of the Contract for Construction."

B. Closeout Submittals: Division 01 Section 01700, "Project Closeout."

1.3 CONSTRUCTION SCHEDULE

A. General: As required by Article 3.10 of the General Conditions, Contractor shall, within ten days after signing the Contract, prepare and submit to Engineer for information purposes, a practical schedule showing order in which Contractor proposes to carry on work, dates on which he will start salient features of work, and contemplated dates for completion. Schedule shall meet or better construction time included on Instructions to Bidders.

B. Form of Schedule: Provide in form of horizontal bar chart. Provide separate horizontal bar column for each trade or operation. Order shall be Table of Contents from Project Manual or the chronological order of beginning of each item of work. Submit three copies to Engineer.

C. Content of Schedule: Provide complete sequence of construction activity, dates for beginning, and completion of each element of construction. Identify work of separate phases or other logically grouped activities. Show projected percentage of completion for each item of work as of first day of each month.

1.4 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Shop Drawings:

1. Submit prints of original drawings prepared by Contractor, subcontractor, supplier, or distributor which illustrate same portion of work; showing fabrication, layout setting, or erection details.
2. Minor corrections needed on prints will be made by Engineer; for extensive modifications, prints may be returned to Contractor for correction. When reviewed, Engineer will retain two copies for record and return remaining copies to General Contractor for distribution. Reproducible copies of shop drawings will not be reviewed.

B. Product Data:

1. Manufacturer's Standard Drawings: Modify drawings to delete information which is not applicable to project. Supplement standard information to provide additional information applicable to project.

2. Manufacturer's Catalog Sheet, Brochures, Diagrams: Clearly mark each copy to identify pertinent materials, product, or models. Show dimensions and clearances required. Show performance characteristics and capacities.

C. Samples:

1. Physical examples to illustrate materials, equipment, or workmanship to establish standards by which completed work is judged.
2. Office samples shall be of sufficient size and quantity to clearly illustrate functional characteristics of product or material and full range of color and texture samples.

D. General Submission Requirements:

1. Quantities: Submit the number of copies of product data and shop drawings that the Contractor requires for distribution, plus two copies which will be retained by the Engineer. Quantity of samples required shall be as specified in Specification Section for respective product.

E. Submittals shall include:

1. Project title.
2. Names of Contractor, Subcontractor, Supplier, Manufacturer.
3. Identification of Product.
4. Relation to adjacent structure or materials.
5. Field dimensions.
6. Reference to Engineer's drawing numbers, specification section, room numbers, structural framing marks, and/or numbers.
7. Applicable standards: e.g., ASTM.
8. Blank space for Engineer's stamp.
9. Identification of deviations from Contract Documents.
10. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements, and compliance with Contract Documents.

F. These requirements are in addition to those in Article 3.12 of General Conditions.

1.5 SCHEDULE OF VALUES

A. General: As required by Article 9.2 of General Conditions, submit to Engineer a Schedule of Values at least ten days prior to submitting first Application for Payment. Upon request by Engineer, support values with data that will substantiate their correctness. Use Schedule of Values only as basis for Contractor's Application for Payment. Itemize separate line item cost for work required by each Section of this Specification.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01300

SECTION 01500 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to the work of this Section.

1.2 TEMPORARY UTILITIES

A. Temporary Services: Contractor shall arrange and pay for all hook-ups, meters for all temporary utility services for construction, and, as necessary, for the proper and expeditious prosecution of the work. The Contractor shall provide piping, conduit, etc., and make all connections to existing services and sources of supply, and pay all charges for same. The Contractor shall pay for all utilities usage during the time of construction directly to the utility company. Contractor shall provide all labor, materials, equipment and appliances necessary for the complete installation, operation, and maintenance of all temporary service systems and facilities. Contractor shall remove all such temporary installations and connections when no longer required, or when directed.

B. Electric power used in existing buildings for operating tools and testing of equipment will be furnished by the User Agency at no charge, but the Contractor shall provide any required temporary facilities and remove same when no longer required.

1.3 BARRICADES, LIGHTS, AND WATCHMEN

A. Where the work is constructed in or adjacent to any road, parking area, or public place, the Contractor shall, at his own cost and expense, furnish and erect such barricades, lights, and danger signals, shall provide such watchmen, and take such other precautionary measures for the protection of persons and property and of the work, as are necessary. At the completion of construction, all barricades and all traces thereof, shall be removed, holes filled, paving repaired, etc.

1.4 TEMPORARY LADDERS, SCAFFOLDS, HOISTS, ETC.

A. Contractor shall provide and maintain all equipment such as temporary ladders, ramps, scaffolds, hoists, runways, derricks, chutes, etc., as required for the proper execution of the work.

B. All such apparatus, equipment, and construction shall meet all requirements of the Labor Law and other Federal and State Laws applicable thereto.

C. Contractor shall provide, maintain, and remove at completion of work all scaffolding required for the execution of the work. Erect scaffolding on the side of the wall on which work occurs. No scaffolding shall be built into any work.

D. Scaffolding for all other work shall be provided, installed, maintained, and removed at completion of work by the trade requiring such scaffolding.

1.5 STORAGE OF MATERIALS

A. Contractor shall provide, on the premises where directed, suitable storage sheds (substantial and watertight) in which he shall store all materials subject to damage by weather. All storage sheds shall be of sufficient size to hold all materials required on the site at one time, and shall have floors raised at least 6 inches above the ground on heavy joists or sleepers. Storage sheds shall have neat appearance.

B. Major subcontractors shall provide such temporary buildings as, in the opinion of the Engineer, may be necessary to fully protect their materials, equipment, apparatus, etc., during the progress of the work. Such buildings shall have neat appearance.

C. Building materials, Contractor's equipment, etc., shall be stored on the premises in a manner so that it may be observed at any time by the Engineer.

D. All materials affected by the weather shall be covered and protected and kept free from damage while being transported to the site.

E. Subcontractors desiring to store materials scheduled for immediate use in the building may do so only in locations as directed by the General Contractor and approved by the Engineer.

1.6 CONTRACTORS FIELD OFFICE

A. Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes.

B. The office shall be located convenient to the work. It shall be adequately heated, ventilated, electrically lighted, and provided with telephone service, all at the expense of the Contractor.

1.7 SANITARY FACILITIES

A. Provide single-occupant, self-contained toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar non-absorbent material. Contractor shall keep such place in sanitary condition and remove at completion of contract. Facility fixtures shall not be used by workmen. Comply with all applicable codes, utility, and safety regulations.

1.8 LAYING-OUT OF WORK

A. Contractor shall compare all drawings and verify all dimensions, and shall take any and all measurements necessary to verify the drawing dimensions in relation to conditions already established at the job site before laying out the work. Contractor will be held responsible for subsequent errors which could have been avoided by such checking.

B. Any discrepancy which will affect the proper layout of the work shall be immediately called to the attention of the Engineer by the Contractor. No work shall proceed until such discrepancy has been rectified as directed by the Engineer.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01500

SECTION 01600 - MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Supplementary Conditions, apply to the work specified in this Section. Refer to other Division 1 Sections for additional requirements which may affect the work of this Section.

1.2 RELATED REQUIREMENTS

A. Warranty: Division 00 Section 00700, "AIA Document A201-2007: General Conditions of the Contract for Construction," Para.3.5.

B. Substitutions: Division 0 Document 00100, "Instructions to Bidders."

1.3 GENERAL PRODUCT REQUIREMENTS

A. Provide products, materials, and equipment which comply with the requirements and which are undamaged and unused at the time of installation, and which are complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and for the intended use and effect. Do not use material or equipment for any purpose other than that for which it is designed or specified.

1.4 MANUFACTURER'S INSTRUCTIONS

A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to Engineer. Maintain one set of complete instructions at the job site during installation and until completion.

B. Handle, install, connect, clean, condition, and adjust product in strict accord with such instructions and in conformity with specified requirements. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions. Do not proceed with work without clear instructions.

C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.5 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by method to prevent soiling or damage to products or packaging.

1.6 STORAGE AND PROTECTION

A. Store products in accord with manufacturer's instructions, with seals and labels intact and legible. Store products subject to damage by the elements in weathertight enclosures. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

B. Exterior Storage: Store fabricated products above the ground, on blocking, or skids to prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.

D. Protection After Installation: Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01600

SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION OF REQUIREMENTS

A. Definitions: Project closeout is the term used to describe certain collective project requirements, indicating completion of the work that is to be fulfilled near the end of the contract time in preparation for final acceptance and occupancy of the work by the Owner, as well as final payment to the Contractor and the normal termination of the Contract.

B. Specific requirements for individual units of work are included in the appropriate Sections in Division 15 and 16.

1.3 CLOSEOUT SUBMITTALS

A. Submit to Engineer for review, four copies each of the following items and other items as specified. Approved copies will be transmitted to Owner by Engineer.

B. Operation and Maintenance Data: Refer to Article titled "Operation and Maintenance Manuals" hereinafter this Section.

C. Record Drawings: Refer to "Record Drawings" article hereinafter this section (one copy required).

D. Release of Liens: AIA Form G706A, refer to Article 9.10 of the General Conditions.

E. Consent of Surety to Final Payment: AIA Form G707, refer to Article 9.10 of General Conditions.

1.4 OPERATION AND MAINTENANCE MANUALS

A. Purpose: Operation and maintenance manuals will be used for training of, and use by, the Owner and his employees in the operation and maintenance of the systems and related equipment as specified below. A separate manual or chapter shall be prepared for instructions of each class of equipment or system.

B. Contents: Manuals shall contain the following information on each item of equipment:

1. Routine maintenance operations.
2. Complete operating instructions.

3. Service instructions.
4. Complete control wiring.
5. Emergency procedure.
6. Equipment warranties or guarantees.

C. Preparation: The manuals shall be prepared to provide for the optimum operation and maintenance of the various systems outlined above and equipment forming a part of these systems. Manufacturer's literature and data shall be that of the actual equipment installed under contract for the particular facility. Each manual containing the systems noted shall be bound in one or more volumes as required for convenience in handling. In addition to "hard" (paper) copy manuals, provide "electronic files" on CD or DVD in Microsoft® Office or Adobe Acrobat.

1.5 INSTRUCTIONS

A. Instruct Owner's personnel in operation of all systems, mechanical, electrical, and other equipment in accordance with respective specification sections and manufacturer's instructions.

1.6 RECORD DRAWINGS

A. Mark-Up Procedure: During progress of work, maintain a white-print set of contract drawings and shop drawings, with mark-up of actual installations which vary substantially from the work as originally shown. Mark whatever drawing is most capable of showing actual physical condition, fully and accurately. Where shop drawings are marked up, cross-reference on contract drawings at corresponding location. Mark with erasable colored pencil, using separate colors where feasible to distinguish between changes for different categories of work at same general location. Mark-up important additional information which was either shown schematically or omitted from original drawings. Give particular attention to information on work concealed, which would be difficult to identify or measure and record at a later date. Note alternate numbers, change order numbers, and similar identification.

B. Submittal: At the conclusion of the Contract, the final set of record prints shall be prepared by the Engineer from information obtained from the Contractor.

1.7 CLEANING UP

A. No rubbish shall be allowed to accumulate or be allowed to remain on the premises or job site beyond a reasonable length of time. Trash shall be removed from within the building and from the site daily. Particular attention shall be given to these requirements.

B. All rubbish shall be removed by means of chutes, hoists, or receptacles. Under no circumstances shall any rubbish or waste be dropped or thrown from one level to another within or outside the buildings. Immediately after unpacking materials, all packing case lumber and other packing materials, excelsior, wrappings, and other like flammable wastes shall be collected and removed from the buildings and premises. Burning of trash on the site will not be permitted.

C. Care shall be taken by all workmen not to mark, soil, or otherwise deface any finishes. In the event that any finishes become defaced in any way by mechanics or workmen, the Contractor or any of his sub-contractors shall clean and restore such surfaces to their original condition.

D. Each subcontractor engaged upon the work shall bear his full responsibility for leaving all work in a clean and proper condition, satisfactory to the Owner and the Engineer.

E. Final Cleaning: Beside the general broom cleaning, the following cleaning shall be done just before final acceptance of the work:

1. Remove all labels not intended for permanent installation.
2. Remove all marks, stains, fingerprints, and other soil or dirt from all painted work, and clean as required to leave in first class condition.
3. Clean all equipment removing all stains, paint, dirt, and dust.

F. Upon completion of the work, the Contractor will be required to thoroughly clean the building site and surrounding ground, and all trash and rubbish left by him in the course of construction of the work shall be removed and disposed of off the site of work.

G. Contractor shall haul off all debris from the site to legal disposal areas and dispose of all debris and excess materials resulting from project work. No burning of material or debris shall be done at site. In hauling material from the site, it shall be the responsibility of the Contractor to prevent debris from dropping from vehicles and littering the site and any public thoroughfare.

1.8 SUBSTANTIAL COMPLETION

A. Inspection and other procedures for Contractor to follow to process Contract through Substantial Completion are specified in General and Supplementary Conditions, Articles 9.8 and 9.9.

1.9 FINAL INSPECTION

A. Contractor shall submit written certification that:

1. Contract Documents have been reviewed.
2. Project has been inspected for compliance with Contract Documents.
3. Work has been completed in accordance with Contract Documents.
4. Equipment and systems have been tested in presence of Owner's Representative and are operational.
5. Project is completed, and ready for final inspection.

B. Engineer will make final inspection after receipt of certification.

C. Should Engineer consider that work is not finally complete, he will notify Contractor, in writing, stating reasons. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete. Engineer will reinspect work.

1.10 FINAL PAYMENT

A. Application for final payment shall be submitted together with documents specified in General and Supplementary Conditions, Article 9.10 "Final Completion and Final Payment."

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01700

SECTION 01732 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of a building or structure.
2. Repair procedures for selective demolition operations.

B. Related Sections include the following:

1. Division 1 Section 01010, "Summary of Work," for use of the premises and phasing requirements.
2. Division 1 Section 01500, "Temporary Facilities," for temporary construction and environmental-protection measures for selective demolition operations.
3. Division 1 Section 01045, "Cutting and Patching," for cutting and patching procedures for selective demolition operations.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.5 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Pre-Demolition Conference: Conduct conference at Project site to review methods and procedures related to selective demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.6 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

C. Owner assumes no responsibility for condition of areas to be selectively demolished.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site will not be permitted.

F. Utility Service: Maintain existing utilities on roof in service unless indicated to be removed and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

G. Notify Engineer of discrepancies between existing conditions and drawings before proceeding with selective demolition.

1.7 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equals or surpasses that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of any items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

E. Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.

B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.

1. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.

C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.

1. Where required, Owner will arrange to shut off indicated utilities when requested by Contractor.
2. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

D. Utility Requirements: Refer to Division 15 and 16 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
3. Protect existing site improvements, appurtenances, and landscaping to remain.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.

C. Temporary Shoring: Provide and maintain interior bracing or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports during progress of selective demolition and before new rooftop air conditioning units are placed on roof.

3.4 POLLUTION CONTROLS

A. Dust Control: Use temporary enclosures and other suitable methods to limit spread of dust and dirt.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions.
2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.5 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.
10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

B. Existing Facilities: Comply with building manager's requirements for using and protecting building facilities during selective demolition operations.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable,

protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

D. Roofing: Remove no more existing roofing than can be covered in one day by new roofing. Refer to applicable Division 7 Section for new roofing requirements.

E. Air Conditioning Equipment: Remove equipment without releasing refrigerants.

3.6 PATCHING AND REPAIRS

A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

B. Patching: Comply with Division 1 Section 01045, "Cutting and Patching."

C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.

D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

E. Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 01732

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Transition fittings.
3. Dielectric fittings.
4. Mechanical sleeve seals.
5. Sleeves.
6. Escutcheons.
7. Grout.
8. Mechanical demolition.
9. Equipment installation requirements common to equipment sections.
10. Painting and finishing.
11. Supports and anchorages.
12. Access panels.
13. Motor starters.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Dielectric fittings.
2. Mechanical sleeve seals.
3. Escutcheons.

B. Shop Drawings: Detail fabrication and installation for metal supports and anchorage for mechanical materials and equipment.

C. Coordination Drawings: Submit, as soon as feasible after award of contract, equipment room and exterior equipment layouts at a scale not less than 1/4"=1' showing the layout of the actual equipment to be used. Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Indicate if sequence and coordination of installations are important to efficient flow of the Work. Include the following:

1. Planned piping layout, including valve and specialty locations and valve-stem movement.
2. Clearances for installing and maintaining insulation.
3. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
4. Equipment and accessory service connections and support details.
5. Exterior wall.
6. Sizes and location of required concrete pads and bases.
7. Floor plans and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

1.5 QUALITY ASSURANCE

A. Equipment Selection: Equipment of higher electrical characteristics, physical dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. Costs for these increases will be the responsibility of the contractor. No additional costs will be approved for these increases. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.

B. Drawings: The Mechanical Drawings show the general arrangement of all piping, equipment, and appurtenances, and shall be followed as closely as actual building construction and the work of other trades will permit. The mechanical work shall conform to the requirements shown on all the Drawings. Because of the small scale of the Mechanical Drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. The Contractor shall investigate the structural and finish conditions and other building components affecting the

work and shall arrange his work accordingly, providing such offsets, fittings, and accessories as may be required to meet such conditions. No extras will be approved for required additional offsets and fittings. Any offsets or additional fittings required to coordinate mechanical systems with existing conditions and other trades, or that are necessary for the complete installation of the system, including modifications to shop or off-site fabricated piping and/or ductwork, all shall be provided by the Contractor at no additional cost to the Owner.

C. Comply with International Building Code.

D. Comply with International Mechanical Code.

E. Comply with Louisiana State Plumbing Code, 2000 Edition.

F. Comply with Louisiana State Energy Code.

G. Comply with all applicable NFPA Codes, particularly the following: NFPA 90A, 90B, and 101.

H. Comply with all applicable local codes.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate mechanical equipment installation with other building components and existing conditions.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

D. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces.

E. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and other concealment.

1.8 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. No additional costs will be approved for these modifications. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.10 COORDINATION

A. Coordinate installation of required supporting devices.

B. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by firms regularly engaged in the manufacture of products required, whose products have been in satisfactory use in similar service.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 15 piping Sections and "Pipe and Fitting Material Schedule" on the Drawings for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 15 piping sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8 inch (3.2 mm) maximum thickness unless thickness or specific material is indicated.

   a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
   b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Brazing Filler Metals: AWS A5.8, BAg1, silver alloy.

F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, flanged, solder-joint, plain, or weld-neck end connections that match piping system materials and isolate joined dissimilar metals to prevent galvanic action and stop corrosion.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300 psig (2070 kPa) minimum working pressure at 225 degrees F (107 degrees C).

2.5 SLEEVES

A. Galvanized-Steel Sheet: 0.0239 inch (0.6 mm) minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

2.6 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.

C. Split-Plate, Stamped-Steel Type: With concealed or exposed-rivet hinge, set screw, and chrome-plated finish.

D. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.7 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000 psi (34.5 MPa), 28 day compressive strength.
3. Packaging: Premixed and factory packaged.

2.8 ACCESS PANELS

A. Access Panels: Flush metal hinged access panel and frame (type as required for surface encountered), prime coat finish, and key actuated cylinder lock.

B. Access Panels: Minimum size 12 inches x 12 inches. Locate over device to be serviced.

2.9 MOTOR STARTERS

A. Square D 8536, General Electric CR206, Cutler-Hammer Freedom Series, or approved equivalent (except where reduced voltage type are specified) with overload protection in each phase (with correctly sized heaters) in NEMA Type I enclosure unless noted otherwise, reset button in cover, and all of the same manufacturer. Provide auxiliary contacts for interlocking where required. Coordinate auxiliary contact needs with Division 15 Section 15971, "Building Management and Control Systems." Include HOA switch and pilot light in cover. Provide control power step-down transformer with sufficient additional capacity to handle essential control requirements (coordinate with Division 15 Section 15971, "Building Management and Control Systems").

2.10 IDENTIFYING DEVICES AND LABELS

A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 15 Sections. If more than one type is specified for application, selection is Installer's option, but provide one selection for each product category.

B. Equipment Nameplates: Metal nameplate with operational data engraved or stamped; permanently fastened to equipment.

1. Data: Manufacturer, product name, model number, serial number, and similar essential data.
2. Location: Accessible and visible location.

C. Stencils: Standard stencils, prepared for required applications with letter sizes complying with recommendations of ASME A13.1 for piping and similar applications, but not less than 1-1/4 inch (30 mm) high letters for ductwork and not less than 3/4 inch (19 mm) high letters for access door signs and similar operational instructions.

1. Material: Fiberboard.
2. Stencil Paint: Standard exterior-type stenciling enamel; black, unless otherwise indicated; either brushing grade or pressurized spray-can form and grade.
3. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise indicated for piping systems, comply with ASME A13.1 for colors.

D. Snap-on Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid, snap on, color-coded, complying with ASME A13.1.

E. Pressure-Sensitive Pipe Markers: Manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl, complying with ASME A13.1.

F. Plastic Duct Markers: Manufacturer's standard color-coded, laminated plastic.

1. Nomenclature: Include the following:

a. Direction of airflow.
b. Duct service (SA, RA, OA, EXH).

G. Engraved Plastic-Laminate Equipment Markers: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated.

1. Fabricate in sizes required for message.
2. Engraved with engraver's standard letter style, of sizes and with wording to match equipment identification.
3. Punch for mechanical fastening.
4. Thickness: 1/16 inch (1.6 mm), unless otherwise indicated.
5. Fasteners: Self-tapping stainless-steel screws or contact-type permanent adhesive.
6. Nomenclature: Include the following, matching terminology on schedules as closely as possible:

a. Name and plan number.
b. Equipment service.

7. Size: Approximate 4-1/2 by 6 inches (115 by 150 mm).

H. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification, with corresponding designations indicated. Use numbers, lettering, and wording indicated for proper identification and operation/maintenance of mechanical systems and equipment.

1. Multiple Systems: If multiple systems of same generic name are indicated, provide identification that indicates individual system number and service such as "AIR HANDLING UNIT NO. 1."

PART 3 - EXECUTION

3.1 MECHANICAL DEMOLITION

A. Refer to Division 1 Section 01045, "Cutting and Patching," for general demolition requirements and procedures.

B. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
5. Equipment to Be Removed: Disconnect and cap services and remove equipment.
6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 15 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Extruded-tee connections are not acceptable.

K. Weld-o-let taps are not acceptable as substitutes for tee fittings.

L. Install piping to allow application of insulation.

M. Select system components with pressure rating equal to or greater than system operating pressure.

N. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New and Existing Piping:

   a. Bare or Insulated Piping at Ceiling or Wall Penetrations in Finished Spaces: Split-casting, cast-brass type with polished chrome-plated finish.
   b. Bare Piping in Unfinished Service Spaces: Split-plate, stamped-steel type with concealed or exposed-rivet hinge and set screw clips.
   c. Bare Piping in Equipment Rooms: Split-plate, stamped-steel type with set screw clips.
   d. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.

O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

   a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.

2. Install sleeves that are large enough to provide 1/4 inch (6.4 mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

   a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
   b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating gypsum-board partitions.

P. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1 inch (25 mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches (150 mm) in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches (150 mm) and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

Q. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.

R. Verify final equipment locations for roughing-in.

S. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements, Division 15 Sections, and Schedules on the Drawings, specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

E. Electrical Work: Wherever equipment requiring electrical connection is specified, all wiring shall be furnished and installed under Division 16 of the specifications. Motor starters, starting switches, protective devices, and other means for the operation and control of equipment shall be furnished under the various mechanical sections, and installed and electrically connected complete under Division 16 unless otherwise specifically noted, except that control devices that are installed in or on ducts, piping, or mechanical equipment shall be mounted under Division 15. If equipment is furnished requiring power wiring different from that indicated on the electrical drawings, the Contractor furnishing the equipment shall be responsible for any required revisions and pay any additional costs connected therewith. Wiring revisions shall be submitted to the Engineer for approval prior to installation.

1. Motor starters shall be provided for each poly phase motor and for single phase motors requiring automatic control. See motor control center schedule on electrical drawings for starters that will be provided under Division 16. Additional disconnects required by the National Electrical Code shall be furnished, installed, and connected under Division 16 of the Specifications.
2. Contractors furnishing items to be wired shall provide adequate wiring diagrams.
3. Temperature control wiring is included in Division 15.

3.6 PAINTING

A. Damage and Touch-Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1.

3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.9 GROUTING

A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

3.10 MISCELLANEOUS

A. Services: Services as indicated.

B. The Contractor shall, before submitting a proposal, verify the location, depth, size, and pressure or grade of existing lines to which he is to make connections and shall include in his bid the cost of any required revisions. If for any reason conditions appear that will adversely affect the proper installation and operation of the systems, such conditions shall be reported to the Engineer in writing for his decision ten days prior to bid date. All cutting and patching of paving, etc. required for connection to existing piping lines shall be paid for or provided by the Contractor. Locations of plumbing lines are shown in accordance with data provided by the Owner. The points of connection to the existing piping are approximate only and shall be verified by each bidder. Each bidder shall include adequate funds in his bid price to cover all cost of connections to existing piping regardless of exact location, and shall hold the Owner harmless as to additional costs or extras regarding those connections.

C. Access Panels: Provide access panels as indicated. In addition, provide access panels for each concealed item requiring service or adjustment that would otherwise be inaccessible. Access panel locations shown on Drawings are approximate. Exact location shall be verified with the Engineer prior to installation.

END OF SECTION 15050

SECTION 15055 - MOTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes basic requirements for factory and field-installed motors.

1.3 DEFINITIONS

A. Factory-Installed Motor: A motor installed by motorized-equipment manufacturer as a component of equipment.

B. Field-Installed Motor: A motor installed at Project site and not factory installed as an integral component of motorized equipment.

1.4 SUBMITTALS

A. Product Data for Field-Installed Motors: For each type and size of motor, provide nameplate data and ratings, enclosure type and mounting arrangements.

B. Operation and Maintenance Data: For field-installed motors to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices and features that comply with the following:

1. Compatible with the following:

a. Magnetic controllers.
b. Reduced-voltage controllers, where applicable.
c. Variable frequency drive.

2. Designed and labeled for use with variable frequency controllers and suitable for use throughout speed range without overheating.
3. Matched to torque and horsepower requirements of the load.
4. Matched to ratings and characteristics of supply circuit and required control sequence.

B. Coordinate motor support with requirements for driven load; access for maintenance and motor replacement; installation of accessories, belts, belt guards; and adjustment of sliding rails for belt tensioning.

PART 2 - PRODUCTS

2.1 MOTOR REQUIREMENTS

A. Motor requirements apply to factory- and field-installed motors except motorized-equipment manufacturer requires ratings, performance, or characteristics, other than those specified in this Section, to meet performance specified.

2.2 MOTOR CHARACTERISTICS

A. Motors 3/4 HP and Larger: Three phase.

B. Motors Smaller Than 3/4 HP: Single phase.

C. Frequency Rating: 60 Hz.

D. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.

E. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.

F. Duty: Continuous duty at ambient temperature of 105 degrees F (40 degrees C) and at altitude of 3300 feet (1005 meters) above sea level.

G. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

H. Enclosure: Open dripproof.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Premium, E-Plus 3, as defined in NEMA MG 1.

C. Stator: Copper windings, unless otherwise indicated.

D. Rotor: Squirrel cage, unless otherwise indicated.

E. Bearings: Double-shielded, prelubricated ball bearings suitable for radial and thrust loading.

F. Temperature Rise: Match insulation rating, unless otherwise indicated.

G. Insulation: Class F, unless otherwise indicated.

H. Code Letter Designation:

1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
2. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.

I. Enclosure: Cast iron for motors 7.5 hp and larger; rolled steel for motors smaller than 7.5 hp.

1. Finish: Gray enamel.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Designed with critical vibration frequencies outside operating range of controller output.
2. Temperature Rise: Matched to rating for Class B insulation.
3. Insulation: Class H.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

B. Rugged-Duty Motors: Totally enclosed, with 1.25 minimum service factor, greased bearings, integral condensate drains, and capped relief vents. Windings insulated with non-hygroscopic material.

1. Finish: Chemical-resistant paint over corrosion-resistant primer.

C. Source Quality Control for Field-Installed Motors: Perform the following tests on each motor according to NEMA MG 1:

1. Measure winding resistance.
2. Read no-load current and speed at rated voltage and frequency.
3. Measure locked rotor current at rated frequency.
4. Perform high-potential test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for conduit systems to verify actual locations of conduit connections before motor installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

END OF SECTION 15055

SECTION 15060 - HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes hangers and supports for mechanical system piping and equipment.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry.

B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 SUBMITTALS

A. Product Data: For each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that are regularly engaged in the manufacture of hangers and supports, of types and sizes required, and whose products have been in satisfactory use in similar service.

2.2 MANUFACTURED UNITS

A. Pipe Hangers, Supports, and Components: MSS SP-58, factory-fabricated components. Refer to "Hanger and Support Applications" Article in Part 3 for where to use specific hanger and support types.

1. Galvanized, Metallic Coatings: For piping and equipment that will not have field-applied finish.
2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

B. Channel Support Systems: MFMA-2, factory-fabricated components for field assembly.

1. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

C. Thermal-Hanger Shield Inserts: 100 psi (690 kPa) minimum compressive-strength insulation, encased in sheet metal shield.

1. Material for Cold Piping: ASTM C 552, Type I cellular glass with vapor barrier.
2. Material for Hot Piping: ASTM C 552, Type I cellular glass.
3. For Trapeze or Clamped System: Insert and shield cover entire circumference of pipe.
4. For Clevis or Band Hanger: Insert and shield cover lower 180 degrees of pipe.
5. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.3 MISCELLANEOUS MATERIALS

A. Powder-Actuated Drive-Pin Fasteners (for concrete slabs 4 inches thick and greater): Powder-actuated-type, drive-pin attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Anchor Fasteners (for concrete slabs 4 inches thick and greater): Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

C. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger requirements are specified in Sections specifying equipment and systems.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system specification sections.

C. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 30 (DN15 to DN750).
2. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36 (DN100 to DN900), with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
3. Adjustable Roller Hangers (MSS Type 43): For suspension of insulated pipes, NPS 2-1/2 to NPS 20 (DN65 to DN500), from single rod.

D. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 degrees F (49 to 232 degrees C) piping installations.

E. Building Attachments: Except as otherwise indicated, provide factory-fabricated building attachments complying with ANSI/MSS SP-58, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods.

F. Building Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
2. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
3. C-Clamps (MSS Type 23): For structural shapes.
4. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
5. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

   a. Light (MSS Type 31): 750 lb (340 kg).

G. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.
2. Thermal-Hanger Shield Inserts: For supporting insulated pipe, 360-degree insert of high-density, 100 psi (690 kPa) minimum compressive-strength, water-repellent-treated cellular-glass pipe insulation, same thickness as adjoining insulation with vapor barrier and encased in 360 degree sheet metal shield.

3.2 HANGER AND SUPPORT INSTALLATION

A. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Install building attachments within concrete slabs or attach to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

C. Install powder-actuated drive-pin fasteners in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.

D. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

F. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," is not exceeded.

H. Insulated Piping: Comply with the following:

1. Attach clamps and spacers to piping.

   a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
   b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
   c. Do not exceed pipe stress limits according to ASME B31.9.

2. Install MSS SP-58, Type 40 protective shields on all piping. Shields shall span arc of 180 degrees except shall be 360° where "L1" bolts are used to secure piping to hanger.

   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN100) and larger if pipe is installed on rollers.

3. Shield Dimensions for Pipe: Not less than the following:

   a. NPS 1/4 to NPS 3-1/2 (DN8 to DN90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
   b. NPS 4 (DN100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
   c. NPS 5 and NPS 6 (DN125 and DN150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.

4. Pipes NPS 8 (DN200) and Larger: Include wood inserts.
5. Insert Material: Length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

C. Provide factory fabricated curbs for roof mounted equipment. Refer to other Division 15 Sections for curbs provided with equipment.

3.4 ADJUSTING

A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.5 PAINTING

A. Touching Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 15060

SECTION 15081 - DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes semi-rigid and flexible duct and plenum insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.

B. Related Sections include Division 15 Section 15083, "Pipe Insulation," for insulation for piping systems.

1.3 SUBMITTALS

A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any) for each type of product indicated.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to Authorities Having Jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread rating of 25 or less and smoke-developed rating of 50 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate clearance requirements with duct Installer for insulation application.

1.7 SCHEDULING

A. Schedule insulation application after testing duct systems. Insulation application may begin on segments of ducts that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: firms regularly engaged in the manufacture of piping insulation products, of types and sizes required, whose products have been in satisfactory use in similar service.

2.2 INSULATION MATERIALS

A. Mineral-Fiber Board Thermal Insulation: Glass fibers bonded with a thermosetting resin, rigid type, minimum 6 pound density, 0.23 maximum k factor at 75 degrees F mean temperature, and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film. Increase density at supports as required to limit deformation to 10 percent.

B. Mineral-Fiber Blanket Thermal Insulation: Glass fibers bonded with a thermosetting resin, 3/4 pound density, 0.3 maximum k factor at 75 degrees F mean temperature, and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.

2.3 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8-oz./sq. yd. (270 g/sq. meters).

1. Tape Width: 4 inches (100 mm).

B. Adhesive-Attached Anchor Pins and Speed Washers: Galvanized steel plate, pin, and washer manufactured for attachment to duct and plenum with adhesive. Pin length sufficient for insulation thickness indicated.

1. Adhesive: Recommended by the anchor pin manufacturer as appropriate for surface temperatures of ducts, plenums, and breechings; and to achieve a holding capacity of 100 lb (45 kg) for direct pull perpendicular to the adhered surface.

C. Self-Adhesive Anchor Pins and Speed Washers: Galvanized steel plate, pin, and washer manufactured for attachment to duct and plenum with adhesive. Pin length sufficient for insulation thickness indicated.

2.4 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.

B. Refer to Schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each duct system.

C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Apply multiple layers of insulation with longitudinal and end seams staggered.

E. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

F. Keep insulation materials dry during application and finishing.

G. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

H. Apply insulation with the least number of joints practical.

I. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.

J. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments. Trapeze hangers shall be external of insulation.

K. Insulation Terminations: For insulation application where vapor retarders are indicated, seal ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

L. Apply insulation with integral jackets as follows:

1. Pull jacket tight and smooth.
2. Joints and Seams: Cover with tape and vapor retarder as recommended by insulation material manufacturer to maintain vapor seal.
3. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to duct flanges and fittings.

M. Cut insulation according to manufacturer's written instructions to prevent compressing insulation to less than 75 percent of its nominal thickness.

N. Install vapor-retarder mastic on ducts and plenums scheduled to receive vapor retarders.

1. Ducts with Vapor Retarders: Overlap insulation facing at seams and seal with vapor-retarder mastic and pressure-sensitive tape having same facing as insulation. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-retarder seal.
2. Ducts without Vapor Retarders: Overlap insulation facing at seams and secure with outward clinching staples and pressure-sensitive tape having same facing as insulation.

O. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.

P. Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire/smoke damper sleeves for fire-rated wall and partition penetrations.

Q. Floor Penetrations: Terminate insulation at underside of floor assembly and at floor support at top of floor.

1. For insulation indicated to have vapor retarders, taper termination and seal insulation ends with vapor-retarder mastic.

3.4 MINERAL-FIBER INSULATION APPLICATION

A. Blanket Applications for Ducts and Plenums: Secure blanket insulation with adhesive and anchor pins and speed washers.

1. Apply adhesives according to manufacturer's recommended coverage rates per square foot.
2. Install anchor pins and speed washers on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

   a. On duct sides with dimensions larger than 24 inches (450 mm). Space 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Apply additional pins and clips to hold insulation tightly against surface at cross bracing.
   b. Anchor pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
   c. Do not overcompress insulation during installation.

3. Impale insulation over anchors and attach speed washers.
4. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
5. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2 inch (13 mm) staples, 1 inch (25 mm) o.c., and cover with pressure-sensitive tape having same facing as insulation.

6. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. Secure with steel band at end joints and spaced a maximum of 18 inches (450 mm) o.c.
7. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Apply insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
8. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6 inch (150 mm) wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches (150 mm) o.c.
9. Provide a 6 inch wide continuous strip of rigid insulation (density as required to limit deformation to 10 percent) at trapeze hangers. Locate between duct and blanket insulation.
10. Apply vapor-retarder mastic to open joints, breaks, and punctures for insulation indicated to receive vapor retarder.

B. Board Applications for Ducts and Plenums: Secure board insulation with adhesive and anchor pins and speed washers.

1. Apply adhesives according to manufacturer's recommended coverage rates per square foot.
2. Space anchor pins as follows:

   a. On duct sides with dimensions larger than 24 inches (450 mm). Space 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Apply additional pins and clips to hold insulation tightly against surface at cross bracing.
   b. Do not overcompress insulation during installation.

3. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2 inch (13 mm) staples, 1 inch (25 mm) o.c., and cover with pressure-sensitive tape having same facing as insulation.
5. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Apply insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6 inch (150 mm) wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches (150 mm) o.c.
7. Apply vapor-retarder mastic to open joints, breaks, and punctures for insulation indicated to receive vapor retarder.

3.5 DUCT SYSTEM APPLICATIONS

A. Insulation materials and thicknesses are specified in schedules at the end of this Section.

B. Materials and thicknesses for systems listed below are specified in schedules at the end of this Section.

C. Insulate the following plenums and duct systems:

1. Indoor concealed supply-, outside-, and return-air ductwork.
2. Indoor exposed supply-, outside-, and return-air ductwork.

D. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:

1. Metal ducts with duct liner.
2. Flexible connectors.
3. Nameplates and data plates.
4. Access panels and doors in air-distribution systems.

E. Internal duct insulation is disallowed.

3.6 INDOOR DUCT AND PLENUM APPLICATION SCHEDULE

A. Service: Supply-air, outside-air, and return-air ducts, concealed.

1. Material: Mineral-fiber blanket.
2. Thickness: 2 inches (50 mm).
3. Number of Layers: One.
4. Vapor Retarder Required: Yes.

B. Service: Supply-air, outside-air, and return-air ducts, exposed.

1. Material: Mineral-fiber board.
2. Thickness: 1 inch.
3. Number of Layers: One.
4. Field-Applied Jacket: None.
5. Vapor Retarder Required: Yes.

END OF SECTION 15081

SECTION 15083 - PIPE INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes preformed, rigid and flexible pipe insulation; insulating cements; field applied jackets; accessories and attachments; and sealing compounds.

B. Related Sections include the following:

1. Division 15 Section 15081, "Duct Insulation," for insulation for ducts and plenums.
2. Division 15 Section 15060, "Hangers and Supports," for pipe insulation shields and protection saddles.

1.3 SUBMITTALS

A. Product Data: Identify thermal conductivity, thickness, and jackets, for each type of product indicated.

B. Installer Certificates: Signed by the Contractor certifying that installers comply with requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the U.S. Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 15 Section 15060, "Hangers and Supports."

B. Coordinate clearance requirements with piping Installer for insulation application.

C. Coordinate installation and testing of steam or electric heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after testing piping systems and, where required, after installing and testing heat-trace tape. Insulation application may begin on segments of piping that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, manufacturers regularly engaged in the manufacture of piping insulation products of the types and sizes required, whose products have been in satisfactory use in similar service.

2.2 INSULATION MATERIALS

A. Mineral-Fiber Insulation: Glass fibers bonded with a thermosetting resin complying with the following:

1. Preformed Pipe Insulation: Comply with ASTM C 547, Type 1, with factory-applied, all-purpose, vapor-retarder jacket.
2. Blanket Insulation: Comply with ASTM C 553, Type II, without facing.
3. Fire-Resistant Adhesive: Comply with MIL-A-3316C in the following classes and grades:

    a. Class 1, Grade A for bonding glass cloth and tape to unfaced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to unfaced glass-fiber insulation.
    b. Class 2, Grade A for bonding glass-fiber insulation to metal surfaces.

4. Vapor-Retarder Mastics: Fire- and water-resistant, vapor-retarder mastic for indoor applications. Comply with MIL-C-19565C, Type II.
5. Mineral-Fiber Insulating Cements: Comply with ASTM C 195.
6. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.

B. Cellular-Glass Insulation: Inorganic, foamed or cellulated glass, annealed, rigid, hermetically sealed cells, incombustible.

1. Preformed Pipe Insulation, with Jacket: Comply with ASTM C 552, Type II, Class 2.

C. Flexible Elastomeric Thermal Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

1. Adhesive: As recommended by insulation material manufacturer.
2. Ultraviolet-Protective Coating: As recommended by insulation manufacturer.

2.3 FIELD-APPLIED JACKETS

A. PVC Jacket: High-impact, ultraviolet-resistant PVC; 20 mils (0.5 mm) thick; pre-curled ready for shop or field cutting and installing.

1. Adhesive: As recommended by insulation material manufacturer.
2. PVC Jacket Color: White or gray.

B. Standard PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20 mil (0.5 mm) thick, high-impact, ultraviolet-resistant PVC.

1. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories for the disabled.
2. Adhesive: As recommended by insulation material manufacturer.

C. Aluminum Jacket: Factory cut and rolled to indicated sizes. Comply with ASTM B 209 (ASTM B 209M), 3003 alloy, H-14 temper.

1. Finish and Thickness: Smooth finish, 0.010 inch (0.25 mm) thick.
2. Elbows: Preformed, 45- and 90-degree, short- and long-radius elbows; same material, finish, and thickness as jacket.

2.4 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz./sq. yards (270 g/sq. meters).

1. Tape Width: 4 inches (100 mm).

B. Bands: 3/4 inch (19 mm) wide, in one of the following materials compatible with jacket:

1. Stainless Steel: ASTM A 666, Type 304; 0.020 inch (0.5 mm) thick.

C. Wire: 0.080 inch (2.0 mm), nickel-copper alloy; 0.062 inch (1.6 mm), soft-annealed, stainless steel; or 0.062 inch (1.6 mm), soft-annealed, galvanized steel.

2.5 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

B. Refer to the Schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.

C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.

E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

F. Seal joints and seams with vapor-retarder mastic.

G. Keep insulation materials dry during application and finishing.

H. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

I. Apply insulation with the least number of joints practical.

J. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.

K. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.

1. Apply insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor retarders are indicated, extend insulation on anchor legs at least 12 inches (300 mm) from point of attachment to pipe and taper

insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

3. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.

L. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

M. Apply adhesives and mastics at the manufacturer's recommended coverage rate.

N. Apply insulation with integral jackets as follows:

1. Pull jacket tight and smooth.
2. Circumferential Joints: Cover with 3 inch (75 mm) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches (100 mm) o.c.
3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches (40 mm). Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.

   a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.

4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.

O. Wall Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.

1. Take necessary precautions not to disturb existing wall penetration when connecting to existing piping on the road.
2. Seal penetrations with flashing sealant.
3. Apply insulation for exterior applications tightly joined to existing jacket and seal.
4. Extend metal jacket of exterior insulation outside roof flashing at least 2 inches (50 mm) over existing insulated jacket and seal.
5. Seal metal jacket to existing with flashing sealant.

P. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.

Q. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions.

3.4 MINERAL-FIBER INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Secure each layer of preformed pipe insulation to pipe with wire, tape, or bands without deforming insulation materials.
2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet (4.5 to 6 meters) to form a vapor retarder between pipe insulation segments.
3. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.

B. Apply insulation to flanges as follows:

1. Apply preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

C. Apply insulation to fittings and elbows as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
3. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

D. Apply insulation to valves and specialties as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation sections are not available, apply glass-fiber blanket insulation to valve body to thickness equal to adjoining pipe insulation. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to stainer basket without disturbing insulation.
3. Apply insulation to flanges as specified for flange insulation application.
4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

3.5 CELLULAR-GLASS INSULATION APPLICATION

A. Apply at hangers and supports for piping insulated with mineral fiber insulation as follows:

1. Secure each layer of insulation to pipe with bands without deforming insulation materials.

2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic.
3. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.

3.6 FLEXIBLE ELASTOMERIC THERMAL INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Follow manufacturer's written instructions for applying insulation.
2. Seal longitudinal seams and end joints with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

B. Apply insulation to fittings and elbows as follows:

1. Apply mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

3.7 FIELD-APPLIED JACKET APPLICATION

A. Apply PVC jacket over all piping, fittings, valves, flanges, etc. located in equipment rooms and mechanical rooms, up to an elevation of 6 feet – 0 inches above the finished floor of the space. Apply with 1 inch (25 mm) overlap at longitudinal seams and end joints. Seal with manufacturers' recommended adhesive.

B. Apply metal jacket over all piping, fittings, valves, flanges, etc. on the building exterior. Apply with 2 inch (50 mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

3.8 PIPING SYSTEM APPLICATIONS

A. Insulation materials and thicknesses are specified in schedules at the end of this Section.

B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:

1. Flexible connectors.
2. Vibration-control devices.

3.9 FIELD QUALITY CONTROL

A. Insulation applications will be considered defective if sample inspection reveals noncompliance with requirements. Remove defective work and replace with new materials according to these Specifications.

B. Reinstall insulation and covers on fittings and valves if required to be uncovered for inspection according to these Specifications.

3.10 INSULATION APPLICATION SCHEDULE, GENERAL

A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.

B. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements.

3.11 INTERIOR INSULATION APPLICATION SCHEDULE

A. This application schedule is for interior insulation inside both the main building and the equipment building on the roof.

B. Service: Condensate drain piping.

1. Operating Temperature: 35 to 75 degrees F (2 to 24 degrees C).
2. Insulation Material: Flexible elastomeric.
3. Insulation Thickness: 3/4 inch.
4. Field-Applied Jacket: None.
5. Vapor Retarder Required: Yes.
6. Finish: None.

C. Service: Chilled-water supply and return.

1. Operating Temperature: 35 to 75 degrees F (2 to 24 degrees C).
2. Insulation Material: Mineral fiber.
3. Insulation Thickness: Apply the following insulation thicknesses:

    a. Steel Pipe, 3 Inches and Smaller: 1 inch.
    b. Steel Pipe, 4 Inches and Larger: 1-1/2 inches.

4. Field-Applied Jacket: PVC for exposed piping as specified.
5. Vapor Retarder Required: Yes.
6. Finish: None.

D. Service: Heating hot-water supply and return.

1. Operating Temperature: 100 to 200 degrees F (38 to 93 degrees C).
2. Insulation Material: Mineral fiber.
3. Insulation Thickness: Apply the following insulation thicknesses:

    a. Steel Pipe, 1/2 Inch: 1 inch.
    b. Steel Pipe, 3/4 Inch and Larger: 1-1/2 inches.

4. Field-Applied Jacket: PVC for exposed piping as specified.
5. Vapor Retarder Required: Yes.
6. Finish: None.

END OF SECTION 15083

SECTION 15110 - VALVES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following general-duty valves:

1. Bronze gate valves.
2. Cast-iron gate valves.
3. Bronze globe valves.

B. Related Sections include the following:

1. Division 15 Section 15971, "Building Management and Control System," for control valves and actuators.
2. Division 15 Piping Sections for specialty valves applicable to those Sections only.

1.3 DEFINITIONS

A. The following are standard abbreviations for valves:

1. CWP: Cold working pressure.
2. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.5 QUALITY ASSURANCE

A. ASME Compliance: ASME B31.9 for building services piping valves.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set angle, gate, and globe valves closed to prevent rattling.
4. Set plug valves open to minimize exposure of functional surfaces.
5. Set butterfly valves closed or slightly open.
6. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 Articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified or approved equivalent.

2.2 VALVES, GENERAL

A. Refer to Part 3 "Valve Applications" Article for applications of valves.

B. Bronze Valves: NPS 2 (DN 50) and smaller with threaded ends, unless otherwise indicated.

C. Ferrous Valves: NPS 2-1/2 (DN 65) and larger with flanged ends, unless otherwise indicated.

D. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

E. Valve Sizes: Same as upstream pipe, unless otherwise indicated.

F. Valve Actuators:

1. Handwheel: For valves other than quarter-turn types.
2. Lever Handle: For quarter-turn valves NPS 6 (DN 150) and smaller, except plug valves.

G. Extended Valve Stems: On insulated valves.

H. Valve Flanges: ASME B16.1 for cast-iron valves.

I. Solder Joint: With sockets according to ASME B16.18.

1. Caution: Use solder with melting point below 840 degrees F (454 degrees C) for angle, check, gate, and globe valves; below 421 degrees F (216 degrees C) for ball valves.

J. Threaded: With threads according to ASME B1.20.1.

K. Valve Stem Type: Use rising-stem type; except in cramped spaces where there is not space to fully open valve or where the extended valve handle restricts access, use non-rising stem type. Catalog numbers listed are for rising-stem type. Where required, use nonrising-stem by same manufacturer and comparable to the valve listed.

2.3 BRONZE GATE VALVES

A. Manufacturers:

1. Type 2, Bronze, Rising-Stem, Solid-Wedge Gate Valves:

a. Crane Co.; Crane Valve Group; Crane Valves, 431UB and 1334
b. Hammond Valve, IB629 and IB648
c. NIBCO INC., T/S 134
d. Walworth, W11

B. Bronze Gate Valves, General: MSS SP-80, with ferrous-alloy handwheel.

C. Type 2, Class 150, Bronze Gate Valves: Bronze body with rising stem and bronze solid wedge and union-ring bonnet.

2.4 CAST-IRON GATE VALVES

A. Manufacturers:

1. Type I, Cast-Iron, Rising-Stem Gate Valves:

a. Crane Co.; Crane Valve Group; Crane Valves, 465 1/2
b. Hammond Valve, IB-1140
c. NIBCO INC., F617-0
d. Walworth, W726F

B. Cast-Iron Gate Valves, General: MSS SP-70, Type I.

C. Class 125, OS&Y, Bronze-Mounted, Cast-Iron Gate Valves: Cast-iron body with bronze trim, rising stem, and solid-wedge disc.

2.5 BRONZE GLOBE VALVES

A. Manufacturers:

1. Type 2, Bronze Globe Valves with Nonmetallic Disc:

a. Crane Co.; Crane Valve Group; Crane Valves, 7-TF

b. Hammond Valve, 1B-413-T, 1B-413
c. NIBCO INC., T/S235Y
d. Walworth, W95

B. Bronze Globe Valves, General: MSS SP-80, with ferrous-alloy handwheel.

C. Type 2, Class 150, Bronze Globe Valves: Bronze body with nonmetallic PTFE or TFE disc and screwed bonnet.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

D. Examine threads on valve and mating pipe for form and cleanliness.

E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

F. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

A. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.

B. Chilled-Water Piping: Use the following types of valves:

1. Gate Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 150, bronze.

2. Gate Valves, NPS 2-1/2 (DN 65) and Larger: Type I, Class 125, OS&Y, bronze-mounted cast iron.
3. Globe Valves, NPS 2 (DN 50) and Smaller: Type 2, Class 150, bronze.
4. Plug Valves, NPS 2 (DN 50) and Larger: Class 125 or 150, lubricated-type, cast iron.

C. Heating Water Piping: Use the types of valves specified for chilled water piping.

3.3 VALVE INSTALLATION

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

C. Locate valves for easy access and provide separate support where necessary.

D. Install valves in horizontal piping with stem at or above center of pipe.

E. Install valves in position to allow full stem movement.

3.4 JOINT CONSTRUCTION

A. Refer to Division 15 Section 15050, "Basic Mechanical Materials and Methods," for basic piping joint construction.

3.5 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION 15110

SECTION 15181 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes piping and hydronic specialties for hot-water heating and chilled-water cooling; makeup water for these systems; and blowdown drain lines; and condensate drain piping.

B. Related Sections include the following:

1. Division 15 Section 15050, "Basic Mechanical Materials and Methods," for general piping materials and installation requirements.
2. Division 15 Section 15060, "Hangers and Supports," for pipe supports, product descriptions, and installation requirements.
3. Division 15 Section 15110, "Valves," for general-duty gate, globe, ball, butterfly, and check valves.
4. Division 15 Section 15971, "Building Management and Control System," for temperature-control valves and sensors.

1.3 SUBMITTALS

A. Product Data: For each type of hydronic specialty.

B. Welding Certificates: Copies of certificates for welding procedures and personnel.

C. Field Test Reports: Written reports of tests specified in Part 3 of this Section. Include the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Failed test results and corrective action taken to achieve requirements.

D. Maintenance Data: For hydronic specialties and valves to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

A. Welding: Qualify processes and operators according to the ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.

1.5 COORDINATION

A. Coordinate layout and installation of hydronic piping and suspension system components with HVAC equipment and existing construction.

B. Coordinate pipe fitting pressure classes with products specified in related Sections.

C. Coordinate size and location of any required concrete bases. Cast anchor-bolt inserts into base.

D. Coordinate installation of pipe sleeves for penetrations through floor assemblies. Coordinate with requirements for firestopping specified for fire and smoke wall and floor assemblies.

PART 2 - PRODUCTS

2.1 BASIC IDENTIFICATION

A. General: Provide identification in accordance with the following listing:

1. Piping: Plastic pipe markers.
2. Valves: Valve tags.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equivalent:

1. Calibrated Balancing Valves:

a. Armstrong Pumps, Inc., CBV Series
b. Flow Design, Inc., Model AS
c. ITT Bell & Gossett; ITT Fluid Technology Corp., CB Series
d. Taco, Inc., CS Series
e. Wheatley, BV Series

2.3 PIPING MATERIALS

A. General: Comply with the piping material schedule on the drawings for product requirements of piping materials. For each system, provide the piping materials indicated including pipe, tube, fittings, hangers, supports, anchors, valves, and accessories. Where more than one type is indicated, selection is Installer's option. Provide materials and equipment indicated and as

required for complete and functioning systems. Where type is not indicated, provide materials and equipment to comply with function and operation requirements.

2.4 VALVES

A. Gate, globe, and check valves are specified in Division 15 Section 15110, "Valves."

B. Refer to Part 3 "Valve Applications" Article for applications of each valve.

C. Calibrated Balancing Valves, NPS 2 (DN 50) and Smaller: Bronze body, ball type, 125 psig (860 kPa) working pressure, 250 degrees F (121 degrees C) maximum operating temperature, and having threaded ends. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.

D. Calibrated Balancing Valves, NPS 2-1/2 (DN 65) and Larger: Cast-iron or steel body, ball type, 125 psig (860 kPa) working pressure, 250 degrees F (121 degrees C) maximum operating temperature, and having flanged or grooved connections. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.

2.5 HYDRONIC SPECIALTIES

A. Manual Air Vent: Bronze body and nonferrous internal parts; 150 psig (1035 kPa) working pressure; 225 degrees F (107 degrees C) operating temperature; manually operated with screwdriver or thumbscrew; with NPS 1/8 (DN 6) discharge connection and NPS 1/2 (DN 15) inlet connection.

B. Automatic Air Vent: Designed to vent automatically with float principle; bronze body and nonferrous internal parts; 150 psig (1035 kPa) working pressure; 240 degrees F (116 degrees C) operating temperature; with NPS 1/4 (DN 8) discharge connection and NPS 1/2 (DN 15) inlet connection.

C. Y-Pattern Strainers: 125 psig (860 kPa) working pressure; cast-iron body, flanged ends for NPS 2-1/2 (DN 65) and larger, threaded connections for NPS 2 (DN 50) and smaller, bolted cover, perforated stainless-steel basket, and bottom drain connection.

D. Spherical, Rubber, Flexible Connectors: Fiber-reinforced rubber body with steel flanges drilled to align with Classes 150 and 300 steel flanges; operating temperatures up to 250 degrees F (121 degrees C) and pressures up to 150 psig (1035 kPa).

PART 3 - EXECUTION

3.1 VALVE APPLICATIONS

A. General-Duty Valve Applications: Unless otherwise indicated, use the following valve types:

1. Shutoff Duty: Gate valves.
2. Throttling Duty: Globe valves.

B. Install shutoff duty valves at each branch connection to supply mains, at supply connection to each piece of equipment, unless only one piece of equipment is connected in the branch line. Install throttling duty valves at each branch connection to return mains, at return connections to each piece of equipment, and elsewhere as indicated.

C. Install calibrated balancing valves in the return water line of each heating or cooling element and elsewhere as required to facilitate system balancing.

D. Install safety valves where indicated and elsewhere as required by the ASME Boiler and Pressure Vessel Code. Install safety-valve discharge piping, without valves, to floor. Comply with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, for installation requirements.

E. Install pressure-reducing valves where indicated and elsewhere as required to regulate system pressure.

3.2 PIPING INSTALLATIONS

A. Refer to Division 15 Section 15050, "Basic Mechanical Materials and Methods," for basic piping installation requirements.

B. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

C. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

D. Install piping at a uniform grade of 0.2 percent upward in direction of flow.

E. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

F. Unless otherwise indicated, install branch connections to mains using tee fittings in main pipe, with the takeoff coming out the bottom of the main pipe. For up-feed risers, install the takeoff coming out the top of the main pipe.

G. Install strainers on supply side of each control valve, pressure-reducing valve, solenoid valve, pump, and elsewhere as indicated. Install NPS 3/4 (DN 20) nipple and ball valve in blowdown connection of strainers NPS 2 (DN 50) and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2 (DN 50).

3.3 HANGERS AND SUPPORTS

A. Hanger, support, and anchor devices are specified in Division 15 Section 15060, "Hangers and Supports." Comply with requirements below for maximum spacing of supports.

B. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 3/4 (DN 20): Maximum span, 7 feet (2.1 meters); minimum rod size, 1/4 inch (6.4 mm).

2. NPS 1 (DN 25): Maximum span, 7 feet (2.1 meters); minimum rod size, 1/4 inch (6.4 mm).
3. NPS 1-1/2 (DN 40): Maximum span, 9 feet (2.7 meters); minimum rod size, 3/8 inch (10 mm).
4. NPS 2 (DN 50): Maximum span, 10 feet (3 meters); minimum rod size, 3/8 inch (10 mm).
5. NPS 2-1/2 (DN 65): Maximum span, 11 feet (3.4 meters); minimum rod size, 3/8 inch (10 mm).
6. NPS 3 (DN 80): Maximum span, 12 feet (3.7 meters); minimum rod size, 3/8 inch (10 mm).
7. NPS 4 (DN 100): Maximum span, 14 feet (4.3 meters); minimum rod size, 1/2 inch (13 mm).

C. Support vertical runs at roof and at each floor as applicable.

3.4 PIPE JOINT CONSTRUCTION

A. Refer to Division 15 Section 15050, "Basic Mechanical Materials and Methods," for joint construction requirements for threaded, welded, and flanged joints in steel piping.

3.5 HYDRONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

B. Install automatic air vents in mechanical equipment rooms only at high points of system piping, at heat-transfer coils, and elsewhere as required for system air venting.

3.6 TERMINAL EQUIPMENT CONNECTIONS

A. Size for supply and return piping connections shall be same as for equipment connections.

B. Install control valves in accessible locations close to connected equipment.

C. Install bypass piping with globe valve around control valve. If multiple, parallel control valves are installed, only one bypass is required.

D. Install ports for pressure and temperature gages at coil inlet connections.

3.7 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush system with clean water. Clean strainers.

4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.

B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
2. While filling system, use vents installed at high points of system to release trapped air. Use drains installed at low points for complete draining of liquid.
3. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the design pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed either 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A of ASME B31.9, "Building Services Piping."
4. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
5. Prepare written report of testing.

3.8 ADJUSTING

A. Mark calibrated nameplates of pump discharge valves after hydronic system balancing has been completed, to permanently indicate final balanced position.

B. Perform these adjustments before operating the system:

1. Open valves to fully open position. Close coil bypass valves.
2. Check air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
3. Set temperature controls so all coils are calling for full flow.
4. Lubricate motors and bearings.

3.9 CLEANING

A. Flush hydronic piping systems with clean water. Remove and clean or replace strainer screens. After cleaning and flushing hydronic piping systems, but before balancing, remove disposable fine-mesh strainers in pump suction diffusers.

END OF SECTION 15181

SECTION 15725 – MODULAR INDOOR AIR-HANDLING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes central-station air-handling units with coils for indoor installations.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each central-station air-handling unit specified, including the following:

1. Certified fan-performance curves with system operating conditions indicated.
2. Certified fan-sound power ratings.
3. Certified coil-performance ratings with system operating conditions indicated.
4. Motor ratings and electrical characteristics plus motor and fan accessories.
5. Material gages and finishes.
6. Dampers, including housings.

C. Shop drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.

D. Field test reports indicating and interpreting test results relative to compliance with specified requirements.

E. Maintenance data for central-station air-handling units to include in the operation and maintenance manual specified in Division 1 Sections.

1.4 QUALITY ASSURANCE

A. NFPA Compliance: Central-station air-handling units and components shall be designed, fabricated, and installed in compliance with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."

B. ARI Certification: Central-station air-handling units and their components shall be factory tested according to the applicable portions of ARI 430, "Central-Station Air-Handling Units," and shall be listed and bear the label of the Air-Conditioning and Refrigeration Institute (ARI).

C. UL and NEMA Compliance: Provide motors required as part of air-handling units that are listed and labeled by UL and comply with applicable NEMA standards.

D. Comply with NFPA 70 for components and installation.

E. Listing and Labeling: Provide electrically operated components specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

F. Coordination: Coordinate layout and installation of central-station air-handling units with piping and ductwork and with other installations.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver air-handling unit as a factory-assembled module with protective crating and covering.

B. Lift and support units with manufacturer's designated lifting or supporting points.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate size and location of concrete housekeeping bases. Cast anchor-bolt inserts into base.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

B. Fan Belts: Furnish 1 set for each central-station air-handling unit fan.

C. Gaskets: Furnish 1 for each sectional joint of each central-station air-handling unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equivalent.

1. McQuay "Vision".
2. Trane Company; Commercial Systems Group, "Modular Climate Changer."
3. York International Corporation, "Solutions".

2.2 MANUFACTURED UNITS

A. General Description: Factory assembled, draw through, consisting of fans, motor and drive assembly, coils, damper, plenums, filter sections, drip pans, and mixing dampers. Provide double wall construction throughout.

B. Motor and Electrical Components: Refer to Division 15 Section 15050, "Basic Mechanical Materials and Methods," for requirements. Motor shall be specifically recommended by the motor manufacturer for use with variable frequency drives.

2.3 CABINET

A. Materials: Formed and reinforced galvanized steel panels, double wall construction, fabricated to allow removal for access to internal parts and components, with joints between sections sealed.

1. Outside Casing: Galvanized steel, 0.0516 inch (1.3 mm).
2. Inside Casing: Galvanized steel, 0.0396 inch (1.0 mm).
3. Mounting Rail: Galvanized steel, minimum 10 gauge.

B. Cabinet Insulation: Coated, glass-fiber insulation, complying with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," for insulation.

1. Thickness: 1 inch (25 mm) minimum but as recommended by manufacturer to prevent condensation from forming on unit casing.
2. Location and Application: Factory applied between double walls with adhesive and mechanical fasteners to the internal surface of section panels downstream from and including the cooling coil section.

C. Access Panels and Doors: Same materials and finishes as cabinet and complete with hinges, latches, handles, and gaskets. Doors shall be full height and removable.

D. Fan section shall have inspection and access panels and doors sized and located to allow periodic maintenance and inspections.

E. Drain Pans: Formed sections of 304 stainless steel sheet. Fabricate pans in sizes and shapes to collect condensate from cooling coils (including coil piping connections and return bends) when units are operating at maximum catalogued face velocity across cooling coil.

1. Double-Wall Construction: Fill space between walls with foam insulation and seal moisture tight.
2. Drain Connections: Both ends of pan.
3. Units with stacked coils shall have an intermediate drain pan or drain trough to collect condensate from top coil.
4. Construct pans with slope and drain location such that water introduced into a pan will drain within 3 minutes to leave puddles no more than 2 inches (50 mm) in diameter and no more than 1/8 inch (3 mm) deep.

2.4 FAN SECTION

A. Fan-Section Construction: Belt-driven centrifugal fans, consisting of housing, wheel, fan shaft, bearings, motor, drive assembly, and support structure, equipped with formed-steel channel base

for integral mounting of fan, motor, and casing panels. Mount fan scroll, wheel, shaft, bearings, and motor on structural-steel frame, with frame mounted on base with vibration isolation.

B. Housings: Fabricate from formed- and reinforced-steel panels to form curved scroll housings with shaped cutoff, spun-metal inlet bell, and access doors or panels to allow entry to internal parts and components.

C. Fan Assemblies: Statically and dynamically balanced and designed for continuous operation over the range from 25 percent to 100 percent of design RPM. Allow isolators to free float when performing fan balance. Measure vibration at each shaft bearing in horizontal, vertical, and axial directions. Fan wheel shall be double-width, double-inlet type with forward-curved blades or backward-curved airfoil blades as indicated.

D. Backward Inclined Fan Wheels: Steel or aluminum construction with curved inlet flange, back plate, backward-curved blades, and cast-iron or cast-steel hub.

E. Forward Curved Fan Wheels: Black steel with enamel or galvanized finish, and having an inlet flange, back plate, shallow blades with inlet and tip curved forward in direction of airflow, and steel hub.

F. Airfoil Wheel Fan Wheels: Steel; with smooth, curved inlet flange; back plate; die-formed, hollow, airfoil blades; and cast-iron or cast-steel hub.

G. Shafts: Hot-rolled steel; turned, ground, and polished, and having keyway to secure to fan wheel hub.

H. Shaft Bearings: Prelubricated and sealed, self-aligning, pillow-block-type ball or roller bearings with the following:

1. Rated Bearing Life: ABMA 9 or ABMA 11, L-50 of 200,000 hours.
2. Rated Bearing Life: ABMA 9 or ABMA 11, L-50 of 400,000 hours.

I. Belt Drives: Factory mounted, minimum of 2 belts, with final alignment and belt adjustment made after installation.

1. Service Factor Based on Fan Motor: 1.5.

J. Pulleys: Cast iron or steel with split, tapered bushing, dynamically balanced at factory.

K. Motor Pulleys: Adjustable pitch, selected so pitch adjustment is at middle of adjustment range at fan design conditions.

L. Belts: Oil resistant, non-sparking, and non-static; matched for multiple belt drives.

M. Belt Guards: Fabricate to OSHA/SMACNA requirements, 0.1046 inch (2.7 mm) thick, 3/4 inch (20 mm) diamond-mesh wire screen welded to steel angle frame or equivalent, prime coated.

N. Provide belt guards for motors mounted on outside of cabinet.

O. Motor Mount: Adjustable slide base for belt tensioning.

P. Vibration Control: Install fans and drives on open-spring vibration isolators, minimum 2 inch (50 mm) static deflection, with side snubbers.

Q. Fan-Section Source Quality Control: The following factory tests are required.

R. Sound Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Fans shall bear AMCA-certified sound ratings seal.

S. Factory test fan performance for flow rate, pressure, power, air density, rotation speed, and efficiency. Establish ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

2.5 MOTORS

A. General: Refer to Division 15 Section 15050, "Basic Mechanical Materials and Methods," for general requirements.

B. Torque Characteristics: Sufficient to accelerate driven loads satisfactorily.

C. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range.

D. Temperature Rating: 50 degrees C maximum temperature rise at 40 degrees C ambient for continuous duty at full load (Class A Insulation).

E. Service Factor: 1.15 for polyphase motors and 1.35 for single-phase motors.

F. Motor Construction: NEMA MG1-31, general purpose, continuous duty, Design B, and compliant with W/EPACT specifically recommended by manufacturer for use with variable frequency drives.

1. Bases: Adjustable.

G. Bearings: The following features are required:

1. Ball or roller bearings with inner and outer shaft seals.
2. Grease lubricated.
3. Designed to resist thrust loading where belt drives or other drives produce lateral or axial thrust in motor.

H. Enclosure Type: The following features are required:

1. Open dripproof motors where satisfactorily housed or remotely located during operation.
2. Guarded dripproof motors where exposed to contact by employees or building occupants.

I. Overload Protection: Built-in, automatic reset, thermal overload protection.

J. Noise Rating: Quiet.

K. Nameplate: Indicate full identification of manufacturer, ratings, characteristics, construction, and special features.

2.6 COILS

A. Coil Sections: Common or individual, insulated, galvanized steel casings for heating and cooling coils. Design and construct to facilitate removal and replacement of coil for maintenance and to assure full airflow through coils. If 2 or more coils are stacked in unit, then install intermediate drain channels between coils to drain condensate to main pans without flooding lower coils or passing condensate through the airstream.

B. Coil Construction: Rigidly supported across full face, pitched to allow drainage.

1. Fins: Aluminum, mechanically bonded to tubes (no spine fins). Fin spacing shall be 10 fins per inch or less, max. 0.5 inch air side pressure drop.
2. Tubes: Seamless copper.
3. Coil Casing: Galvanized steel.
4. Headers for Water Coils: Steel, cast iron, or copper with connections for drain valve and air vent, and threaded piping connections.

C. Water Coils: Drainable with threaded plugs, serpentine with return bends in smaller sizes and with return headers in larger sizes.

D. Coil-Performance Tests: Factory-test cooling and heating coils, except sprayed surface coils for rating according to ARI 410, "Forced-Circulation Air-Cooling and Air-Heating Coils."

2.7 DAMPERS

A. General: Leakage rate, according to AMCA 500, "Test Methods for Louvers, Dampers and Shutters," shall not exceed 2 percent of air quantity at 2000 fpm (10 m/s) face velocity through damper and 4 inch wg (1000 Pa) pressure differential.

1. Damper operators are specified in Division 15 Section 15971, "Building Management and Control Systems."

B. Combination Filter/Mixing Box: Opposed-blade galvanized steel damper blades mechanically fastened to steel operating rod in reinforced, galvanized steel cabinet. Connect operating rods with common linkage and interconnect linkages so dampers operate simultaneously. Cabinet support members shall hold 2 inch (50 mm) thick, pleated, angle throwaway filters. Provide hinged access panels or doors to allow removal of filters from both sides of unit.

2.8 FILTERS

A. Filter Sections: Provide filter media holding frames arranged as indicated, with access doors on both sides of unit. Provide sections for pre-filters, intermediate filters, and final filters. See Division 15 Section 15861, "Air Filters," for filter requirements. All permanent filters to be in place before any testing or operation of air units or return fans.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions to receive equipment, for compliance with installation tolerances and other conditions affecting performance of central-station air-handling units.

B. Examine roughing-in of hydronic, condensate drainage piping, and electrical to verify actual locations of connections before installation.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install central-station air-handling units level and plumb, according to manufacturer's written instructions.

B. Floor-Mounted Units: Support on 4 inches high reinforced concrete housekeeping bases using neoprene pads. Secure units to anchor bolts installed in concrete housekeeping base.

C. Arrange installation of units to provide access space around air-handling units for service and maintenance.

D. All air handlers shall have safety drip pans complete with condensate piping to drains. Internal pans shall be stainless steel, double sloped to drains to assure no standing water. External secondary pans may be 18-gauge galvanized. Drain pan to be elevated a minimum of 4 inches above finished floor elevation to provide sufficient drain slope. Each secondary unit drain shall be piped separate from its internal drip pan drain.

E. Install P-traps at air unit condensate drains and overflow drains with depth at least 4 inches greater than the highest static pressure attainable by the unit. Air handlers shall be fitted with drain clean-outs. Condensate drains shall drain open sight to floor drains and not be connected directly to sewer system.

3.3 HOUSEKEEPING BASES

A. Coordinate size of housekeeping bases with actual unit sizes provided. Construct base 4 inches (100 mm) larger in both directions than overall dimensions of supported unit.

B. Form concrete bases with framing lumber with form-release compounds. Chamfer top edge and corners of base.

C. Install reinforcing bars, tied to frame, and place anchor bolts and sleeves to facilitate securing units.

D. Place concrete and allow to cure before installing units. Use portland cement conforming to ASTM C 150, 3000 psig (27.6 MPa) compressive strength, and normal-weight aggregate.

3.4 CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. The Drawings indicate the general arrangement of piping, fittings, and specialties. The following are specific connection requirements:

1. Install piping adjacent to machine to allow service and maintenance.
2. Connect piping to air-handling units with flexible connectors.

3. Connect condensate drain pans. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.
4. Hot- and Chilled-Water Piping: Conform to applicable requirements of Division 15 Section 15181, "Hydronic Piping." Connect to supply and return coil tappings with shutoff or balancing valve and union or flange at each connection.

B. Duct installation and connection requirements are specified in other Division 15 Sections. The Drawings indicate the general arrangement of ducts and duct accessories. Make final duct connections with flexible connections.

3.5 ADJUSTING

A. Adjust damper linkage for proper damper operation.

3.6 CLEANING

A. After completing installation, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes including chips, scratches, and abrasions.

B. Clean fan interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheels, cabinets, and coils entering air face.

3.7 COMMISSIONING

A. Manufacturer's Field Inspection: Engage factory-authorized service representatives to perform the following:

1. Inspect field assembly of components and installation of central-station air-handling units including piping, ductwork, electrical connections, and variable frequency drives.
2. Prepare a written report on findings and recommended corrective actions.

B. Final Checks before Startup: Perform the following before startup:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections for piping, ductwork, and electrical are complete. Verify that proper thermal overload protection is installed in motors, starters, and disconnects.
3. Perform cleaning and adjusting specified in this Section.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify free fan wheel rotation and smooth bearings operations. Reconnect fan drive system, align belts, and install belt guards.
5. Lubricate bearings, pulleys, belts, and other moving parts with factory-recommended lubricants.
6. Set outside-air and return-air mixing dampers to minimum outside-air setting.
7. Comb coil fins for parallel orientation.
8. Install clean filters.
9. Verify that manual and automatic volume control, and fire and smoke dampers in connected ductwork systems are in fully open position.

C. Starting procedures for central-station air-handling units include the following:

1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated rpm.

   a. Replace fan and motor pulleys as required to achieve design conditions.

2. Measure and record motor electrical values for voltage and amperage.

D. Do not allow air unit operation during or after construction without a complete set of permanent air filters including any required spacers. Units found violating this instruction shall immediately be locked off and cleaned with proper chemicals and pressure washers.

E. Refer to Division 15 Section 15950, "Testing, Adjusting, and Balancing," for air-handling system testing, adjusting, and balancing.

3.8 DEMONSTRATION

A. Engage the services of factory-authorized service representatives to train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance of all equipment in this section.

1. Review data in the operation and maintenance manuals. Refer to Division 1 Section 01700, "Project Closeout."
2. In addition, provide a minimum of 8 hours training on VFD's.
3. Schedule training with Owner, through Architect, with at least 7 days' advance notice.

END OF SECTION 15725

SECTION 15815 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes metal ducts for supply, return, outside, and exhaust air-distribution systems in pressure classes from minus 2 to plus 10 inch wg (minus 500 to plus 2500 Pa). Metal ducts include rectangular ducts and fittings.

B. Related Sections include Division 15 Section 15820, "Ductwork Accessories," for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 SYSTEM DESCRIPTION

A. Duct system design, as indicated, has been used to select size and type of air-moving and distribution equipment and other air system components. Changes to layout or configuration of duct system must be specifically approved in writing by Engineer. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," for hangers and supports and AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Codes and Standards:

1. SMACNA Standards: "HVAC Duct Construction Standards, Metal and Flexible".
2. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
3. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
4. NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations," Ch. 3, "Duct System," for range hood ducts, unless otherwise indicated.
5. Southern Standard Mechanical Code: 1997 Edition.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G60 (Z180) coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, matte finish for exposed ducts.

D. Stainless Steel: ASTM A 480/A 480M, Type 304, and having a No. 2D finish for concealed ducts and No. 4 finish for exposed ducts.

E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.

F. Tie Rods: Galvanized steel, 1/4 inch (6 mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8 inch (10 mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.2 SEALANT MATERIALS

A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.

B. Joint and Seam Tape: 2 inches (50 mm) wide; glass-fiber-reinforced fabric.

C. Flanged Joint Mastic: One-part, acid-curing, silicone, elastomeric joint sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.

D. Flange Gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

2.3 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.

B. Hanger Materials: Galvanized sheet steel or threaded steel rod.

1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.
3. Galvanized-steel straps attached to aluminum ducts shall have contact surfaces painted with zinc-chromate primer.

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel support materials.

2.4 RECTANGULAR DUCT FABRICATION

A. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.

1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, and joint reinforcement.

C. Formed-On Flanges: Construct according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.

1. Duct Size: Maximum 30 inches (750 mm) wide and up to 2 inch wg (500 Pa) pressure class.
2. Longitudinal Seams: Pittsburgh lock sealed with non-curing polymer sealant.

D. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches (480 mm) and larger and 0.0359 inch (0.9 mm) thick or less, with more than 10 sq. feet (0.93 sq. meter) of non-braced panel area unless ducts are lined.

PART 3 - EXECUTION

3.1 DUCT APPLICATIONS

A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:

1. Supply Ducts: Low pressure 2 inch wg (1250 Pa).
2. Return Ducts (Negative Pressure): 2 inch wg (500 Pa).

3.2 DUCT INSTALLATION

A. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.

B. Install round and flat-oval ducts in lengths not less than 12 feet (3.7 meters) unless interrupted by fittings.

C. Install ducts with fewest possible joints.

D. Install fabricated fittings for changes in directions, size, and shape and for connections.

E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches (300 mm), with a minimum of 3 screws in each coupling.

F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.

I. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.

J. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.

K. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.

L. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.

M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches (38 mm).

N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 15 Section 15820, "Ductwork Accessories."

O. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."

P. Remove all manufacturer's labels and stickers from inside ducts.

3.3 SEAM AND JOINT SEALING

A. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated.

   1. For pressure classes lower than 2 inch wg (500 Pa), seal transverse joints.

B. Seal and test ducts before external insulation is applied.

C. Test ducts in accordance with SMACNA. Make necessary repairs to sustain test pressure with not more than 5 percent leakage.

3.4 HANGING AND SUPPORTING

A. Support horizontal ducts within 24 inches (600 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.

B. Support vertical ducts at maximum intervals of 16 feet (5 meters) and at each floor.

C. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors according to Division 15 Section 15820, "Ductwork Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

END OF SECTION 15815

SECTION 15820 - DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

A. Extent of ductwork accessories work is indicated on Drawings and in Schedules and by requirements of this Section.

B. Types of ductwork accessories required for project include the following:

1. Low pressure manual dampers.
2. Fire dampers.
3. Turning vanes.
4. Duct hardware.
5. Duct access doors.
6. Flexible connections.
7. Flexible ducts.

C. Refer to other Division 15 Sections for testing, adjusting, and balancing of ductwork accessories; not work of this Section.

1.3 QUALITY ASSURANCE

A. Codes and Standards:

1. SMACNA Compliance: Comply with applicable portions of SMACNA "HVAC Duct Construction Standards, Metal, and Flexible."
2. UL Compliance: Construct, test, and label fire dampers in accordance with UL Standard 555 "Fire Dampers and Ceiling Dampers."
3. NFPA Compliance: Comply with applicable provisions of NFPA 90A "Air Conditioning and Ventilating Systems" pertaining to installation of ductwork accessories.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data for each type of ductwork accessory, including dimensions, capacities, and materials of construction and installation instructions.

B. Maintenance Data: Submit manufacturer's maintenance data including parts lists for each type of duct accessory. Include this data and product data in maintenance manual; in accordance with requirements of Division 1 Sections and Division 15 Section 15050, "Basic Materials and Methods."

PART 2 - PRODUCTS

2.1 DAMPERS

A. Low Pressure Manual Dampers: Provide manual volume dampers constructed of galvanized steel.

1. Square and Rectangular Dampers: Dampers shall have minimum 20 gauge frames and minimum 20 gauge roll formed blades. Multi-blade dampers shall have interlocking corrugated edges. Damper linkage shall be concealed in the damper frame. Dampers for ducts smaller than 36 inches by 12 inches may be single blade dampers, all other dampers shall have multiple blades. Provide opposed blade type unless indicated otherwise.
2. Round Dampers: Dampers shall be minimum 20 gauge frame and 20 gauge blade. Blade shall be secured to 3/8 inch square or 1/2 inch diameter galvanized or plated axle/shaft that extends beyond frame through bearings and locking hand quadrant.
3. Dampers shall include permanently lubricated oilite bronze bearings pressed securely into damper frame.
4. Dampers shall include factory furnished locking quadrants with 2 inch elevated dial and "OPEN" and "CLOSED" indicators.

B. Manufacturer: Subject to compliance with requirements, provide balancing dampers of one of the following or approved equivalent:

		Single Blade	Opposed Blade	Parallel Blade	Round Blade
1.	Ruskin	MD35	MD35	MD35	MDRS25
2.	Greenheck	MBD-15	MBD-15	MBD-15	
3.	Pottoroff	CD10	MD42	MD41	CD10R

2.2 DYNAMIC CLOSURE FIRE DAMPERS

A. Dynamic Fire Dampers: Provide fire dampers of the dynamic closure type where indicated. Construct casings of minimum 18-gauge galvanized steel with mil finish. Provide fusible link rated at 160 to 165 degrees F (71 to 74 degrees C) unless otherwise indicated. Dampers in high velocity ducts shall be designed for high velocity duct installation. Provide damper with positive lock in closed position, and with the following additional features:

1. Provide a factory installed galvanized steel sleeve for each fire damper as required by the UL listing of the damper. The minimum sleeve thickness and length shall be determined in accordance with the UL listing for the damper size, duct connection type, and wall thickness.
2. UL Listing: Fire dampers shall be UL listed and labeled.
3. Damper Blade Assembly: Curtain type, clear of air stream.
4. Blade Material: Steel, match casing.
5. Provide a hinged access panel for each fire damper. Access panel size shall be 18 inches x 20 inches for ducts 22 inches wide and larger. For duct width less than 22 inches, panel size shall be 18 inches x (duct width minus 2 inches). Locate access panels where

door can be fully opened to access and service fire damper. Provide one access panel for each 36 inches of damper width. Provide label for each access panel entitled "FIRE DAMPER" in 1 inch high red letters located on face of door.

6. Manufacturer: Subject to compliance with requirements, provide fire dampers of one of the following or approved equivalent:

   a. Ruskin, Model DIBD2.
   b. Greenheck, Model DFD.
   c. Pottoroff, VFD-10D.

2.3 TURNING VANES

A. Fabricated Turning Vanes: Provide fabricated turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards."

2.4 DUCT HARDWARE

A. General: Provide duct hardware, manufactured by one manufacturer for all items on project, for the following:

1. Test Holes: Provide in ductwork at fan inlet and outlet and elsewhere as indicated, duct test holes, consisting of slot and cover, for instrument tests.
2. Quadrant Locks: Provide quadrant lock device on one end of shaft and end bearing plate on other end for damper lengths over 12 inches. Provide 2 inch extended quadrant locks and 2 inch end extended bearing plates for externally insulated ductwork.

   a. Duro-dyne, Model 8021.
   b. Young, Model 443B/404B.

3. Concealed dampers that are not accessible shall be controlled by a concealed regulator, type as indicated. Where type is not indicated, provide type as recommended by manufacturer for application. Include flush chrome plated access panel for each.

   a. Duro-dyne, Model 8009.
   b. Young, Model 301/315.

4. Spin-In Fittings:

   a. Flexmaster U.S.A., Inc., Model CB.
   b. Sheet Metal Connectors, Inc., Model G.
   c. Dace, Model CONSP-P.

5. High Efficiency Takeoffs (Rectangular Tap with Transition to Round Branch):

   a. Sheet Metal Connectors, Inc., Model HET.

   b. Dace, Model STO.
   c. Field fabricated as detailed on the drawings.

2.5 DUCT ACCESS DOORS

A. General: Provide where indicated, duct access doors of size indicated.

B. Construction: Construct of same or greater gage as ductwork served; provide insulated doors for insulated ductwork with minimum 1 inch insulation (k-valve = 0.26 at 75 degrees F mean temperature sandwiched between sheetmetal panels. Provide flush frames for uninsulated ductwork; extended frames for externally insulated duct. Provide one side hinged, other side with one handle-type latch for doors 12 inches high and smaller, 2 handle-type latches for larger doors. Screwdriver operated latches are not acceptable.

2.6 FLEXIBLE CONNECTIONS

A. Provide flexible duct connections wherever ductwork connects to HVAC equipment, fans or other vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.

2.7 FLEXIBLE DUCTS

A. Manufacturers:

1. Flexmaster U.S.A., Inc.
2. Hart & Cooley, Inc.
3. Thermaflex.

B. Insulated-Duct Connectors: UL 181, Class 1, liner of multiple layers of aluminum laminate supported by helically wound, galvanized or coated spring-steel wire; fibrous-glass insulation; aluminized vapor barrier film.

1. Pressure Rating: 10 inch wg (2500 Pa) positive and 1.0 inch wg (250 Pa) negative.
2. Rated Air Velocity: 4000 fpm (20.3 m/s).
3. Temperature Range: Minus 20 to plus 210 degrees F (Minus 28 to plus 99 degrees C).
4. Flame Spread: Less than 25.
5. Smoke Developed: Less than 50.
6. Thermal Conductance: C Factor not more than 0.23.

C. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes to suit duct size.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF DUCTWORK ACCESSORIES

A. Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

B. Where ducts take off mains, and where ducts divide, install splitter dampers or volume dampers, each with adjustable locking quadrant control. Provide volume damper unless splitter damper is indicated. Provide adjustable pivoting splitter with locking quadrant control for all splitter dampers. Provide a volume damper after each splitter damper, located in the branch with the lowest resistance.

C. Concealed dampers that are not accessible shall be controlled by a concealed regulator, type as indicated. Where type is not indicated, provide type as recommended by manufacturer for application. Include flush chrome plated access panel for each.

D. Install turning vanes in all square or rectangular 90 degree elbows in supply, return, and exhaust air systems, and elsewhere as indicated.

E. Install access doors to open against system air pressure, with latches operable from either side, except outside only where duct is too small for person to enter.

F. Install flexible ducts only where indicated and only in extended straight lengths not to exceed 36 inches; bend, sags, or elbows will not be permitted.

G. Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.

3.3 FIELD QUALITY CONTROL

A. Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories, as required to obtain proper operation and leakproof performance.

3.4 ADJUSTING AND CLEANING

A. Adjusting: Adjust ductwork accessories for proper settings, install fusible links in fire dampers, and adjust for proper action.

B. Final positioning of manual dampers is specified in Division 15 Section 15950, "Testing, Adjusting, and Balancing."

C. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION 15820

SECTION 15840 - AIR TERMINALS

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

A. Extent of air terminals work required by this Section is indicated on Drawings and Schedules, and by requirements of this Section.

B. Types of air terminals specified in this Section include double duct, variable volume, pressure independent.

C. Refer to other Division 15 Sections for testing, adjusting and balancing of air terminals.

D. Refer to other Division 15 Sections for temperature controls which are to be installed as work of this Section.

E. Refer to Division 16 Sections for the following work; not work of this Section:

1. Power supply wiring from power source to power connection on air terminals.

1.3 QUALITY ASSURANCE

A. Codes and Standards:

1. ARI Compliance: Provide air terminals which have been tested and rated in accordance with ARI 880 "Industry Standard for Air Terminals" and bear ARI certification seal.
2. NFPA Compliance: Construct air terminals using acoustical and thermal insulations complying with NFPA 90A "Air Conditioning and Ventilating Systems."

1.4 SUBMITTALS

A. Product Data: Submit Manufacturer's technical product data, including performance data for each size and type of air terminal furnished; schedule showing drawing designation, room location, number furnished, model number, size, and accessories furnished; and installation and start-up instructions.

B. Shop Drawings: Submit Manufacturer's assembly-type Shop Drawings indicating dimensions, weight loadings, required clearances, and methods of assembly of components.

C. Wiring Diagrams: Submit ladder-type wiring diagrams for electric power and control components, clearly indicating required field electrical connections.

D. Maintenance Data: Submit maintenance data and parts list for each type of air terminals; including "trouble-shooting" maintenance guide. Include this data, product data, shop drawings, and maintenance manual; in accordance with requirements of Division 1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver air terminals wrapped in factory-fabricated fiberboard type containers. Identify on outside of container type of air terminal and location to be installed. Avoid crushing or bending and prevent dirt and debris from entering and settling in boxes.

B. Store air terminals in original cartons and protect from weather and construction work traffic. Where possible, store indoors; when necessary to store outdoors, store above grade and enclose with waterproofing wrapping.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide air terminals of one of the following or approved equivalent.

1. Titus, Model DMDV
2. Price Model DPQ
3. Trane (The) Co., VDDF Series
4. Metalaire, DD-500 Series
5. Johnson, DD Series

2.2 AIR TERMINALS

A. General: Provide factory-fabricated and tested air terminals as indicated, selected with performance characteristics which match or exceed those indicated on the Schedule.

B. Casings: Construct of die-cast aluminum or sheet metal of the following minimum thicknesses:

		Steel	Aluminum
1.	Upstream Pressure Side:	24 gage	0.032 inch
2.	Downstream Pressure Side:	26 gage	0.025 inch

3. Provide hanger brackets for attachment of supports.
4. Linings: Line inside surfaces of casings with lining material to provide acoustic performance, thermal insulation, and to prevent condensation on outside surfaces of casing. Provide minimum thickness of 1/2 inch. Secure lining to prevent delamination, sagging, or settling.
5. Access: Provide removable panels in casings to permit access to air dampers and other parts requiring service, adjustment, or maintenance.

6. Leakage: Construct casings such that when subjected to 3.0 inch wg pressure specified air flow capacity with outlets sealed and inlets wide open. Construct air dampers such that when subjected to 4.0 inch wg inlet pressure with damper closed, total leakage does not exceed 5 percent of specified air flow capacity.

C. Air Dampers: Construct of materials that cannot corrode, do not require lubrication, nor require periodic servicing. Provide maximum volume dampers, pressure independent, that are calibrated in cfm, factory-adjusted, and marked for specified air capacities. Provide damper actuator and linkages to vary air volume thru damper for minimum to maximum, in response to signal output from the DDC controller.

D. Controls: Air Terminal unit Manufacturer shall factory mount DDC controls, provide and mount 24vac control power transformer, relays, air flow rings, and enclosures, and connect as required. Adjust for air quantities indicated. DDC controls will be furnished by the BMCS Manufacturer.

E. Identification: Provide label on each unit indicating Plan Number, cfm range, cfm factory setting, and calibration curve (if required).

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which air terminals are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF AIR TERMINALS

A. General: Install air terminals as indicated, and in accordance with Manufacturer's installation instructions.

B. Location: Install each unit level and accurately in position indicated in relation to other work; and maintain sufficient clearance for normal service and maintenance, but in no case less that recommended by Manufacturer.

C. Duct Connections: Connect ductwork to air terminals in accordance with Division 15 Section 15815, "Metal Ducts."

D. Connect wiring according to Division 16.

E. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL486A and UL486B.

3.3 FIELD QUALITY CONTROL

A. Upon completion of installation and prior to initial operation, test and demonstrate that air terminals, and duct connections to air terminals, are leak-tight.

B. Repair or replace air terminals and duct connections as required to eliminate leaks, and retest to demonstrate compliance.

3.4 CLEANING

A. Clean exposed factory-finished surfaces. Repair any marred or scratched surfaces with Manufacturers touch-up paint.

END OF SECTION

SECTION 15861 - AIR FILTERS

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

A. Extent of air filter work is shown on Drawings and in Schedules, and by requirements of this Section, and is defined to include (but not necessary be limited to) media and media frames.

1.3 QUALITY ASSURANCE

A. NFPA Compliance: Comply with applicable portions of ANSI/NFPA 90A pertaining to installation of air filters.

B. UL Compliance: Comply with UL Standards pertaining to safety and performance of air filter units.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's air filter specifications and installation instructions including, but not limited to, dimensions, required clearances and access, flow capacity including initial and final pressure drop at rated air flow, efficiency and test method, and fire classification.

PART 2 - PRODUCTS

2.1 AIR FILTERS

A. Filter shall be two (2) inch thick Farr 30/30, Flanders FRP, or approved equivalent, medium efficiency, pleated, disposable type. The filter media shall have an average efficiency of 25-30 percent on ASHRAE Test Standard 52-76. They shall have an average arrestance of 90-92 percent in accordance with the same test standard. Each filter shall consist of a non-woven cotton fabric media, media support grid, and enclosing frame.

B. Each filter bank shall be provided with a Dwyer "Magnehelic," Airguard Industries, Inc. "Filter Gage," or approved equivalent, 4-1/2 inch diameter, with filter kit to measure the pressure drop across each filter bank. An air filter gauge shall be furnished and installed by the Contractor for each filter housing. The range of the air filter gauge shall be 0-2 inches W.G.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which air filters and supporting components will be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with installation requirements as specified elsewhere in these specifications pertaining to air filter housing/casings and associated supporting devices.

B. Install air filters and holding devices of types indicated, and where shown; in accordance with air filter manufacturer's written instructions and with recognized industry practices; to ensure that filters comply with requirements and serve intended purposes. Comply with applicable portions of ANSI/NFPA 90A pertaining to installation of air filters.

C. Locate each filter unit accurately in position indicated, in relation to other work. Position unit with sufficient clearance for normal service and maintenance. Anchor filter holding frames securely to substrate.

D. Coordinate with other work including ductwork and air handling unit work, as necessary to interface installation of filters properly with other work.

E. Install filters in proper position to prevent passage of unfiltered air. Install filters before operating fan (even for testing).

F. Install air filter gage pressure tips upstream and downstream of filters to indicate air pressure drop through air filter. Mount filter gages on outside of filter housing or filter plenum, in accessible position. Adjust and level inclined gages, if any, for proper readings.

3.3 FIELD QUALITY CONTROL

A. Operate installed air filters to demonstrate compliance with requirements. Test for air leakage of unfiltered air while system is operating. Correct malfunctioning units at site, then retest to demonstrate compliance; otherwise remove and replace with new units, and proceed with retesting.

3.4 EXTRA STOCK

A. Provide three complete sets of filters. Install one set prior to operating air handling equipment. Deliver two sets of filters to Owner and obtain receipt.

END OF SECTION 15861

SECTION 15950 – TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

A. The extent of test-adjust-balance (TAB) work is indicated by the requirements of this Section and also by Drawings and Schedules, and is defined to include, but is not necessarily limited to, air distribution systems and associated equipment and apparatus of HVAC work. The work consists of setting speed and volume (flow)-adjusting facilities provided for the systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to the work as required by the Contract Documents.

B. The component types of testing, adjusting, and balancing specified in this section includes the following as applied to HVAC equipment:

1. Air handling units (new and existing).
2. Ductwork systems.
3. Temperature controls.
4. Hydronic piping systems.

1.3 QUALITY ASSURANCE

A. Installer (Option): A TAB firm certified by the National Environmental Balancing Bureau (NEBB) in those testing and balancing disciplines similar to those required for this project, which is not Installer of system to be tested and is otherwise independent of the project.

B. Installer (Option): A TAB firm certified by the Associated Air Balance Council (AABC) in those testing and balancing disciplines similar to those required for this project, which is not Installer of system to be tested and is otherwise independent of the project.

C. NEBB Compliance (Option): Comply with NEBB's "Procedural Standards for Testing-Adjusting-Balancing of Environmental Systems" as applicable to HVAC air and hydronic distribution systems and associated equipment and apparatus.

D. AABC Compliance (Option): Comply with AABC's Pub. No. 12173, "National Standards for Field Measurements and Instrumentation, Total System Balanced," as applicable to HVAC air and hydronic distribution system and associated equipment and apparatus.

E. Industry Standards: Comply with ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.) recommendations pertaining to measurements, instruments, and testing, adjusting, and balancing, except as otherwise indicated.

F. The Owner reserves the right to hire a second TAB firm to review the TAB report of the first. The Owner also reserves the right to hire a second TAB firm to check the work of the first TAB firm.

1.4 SUBMITTALS

A. Submit certified test report signed by the Test and Balance Supervisor who performed the TAB work.

B. Include identification and types of instruments used and their most recent calibration date with submission of final test report.

1.5 JOB CONDITIONS

A. Do not proceed with testing, adjusting, and balancing work until the work to be TAB'ed has been completed and is operable. Ensure that there is no latent residual work still to be completed.

B. Do not proceed until the work scheduled for TAB'ing is clean and free from debris, dirt, and discarded building materials.

PART 2 - PRODUCTS

2.1 PATCHING MATERIALS

A. Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork, and housing which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.

B. At Tester's option, plastic plugs with retainers may be used to patch drilled holes in ductwork and housings.

2.2 TEST INSTRUMENTS

A. Utilize test instruments and equipment for the TAB work required, of the type, precision, and capacity as recommended in the following TAB standards:

1. NEBB's Procedural Standards for Testing-Adjusting-Balancing of Environmental Systems.
2. AABC's National Standards for Field Measurements and Instrumentation, Total Balance System.

PART 3 - EXECUTION

3.1 GENERAL

A. Tester must examine the installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned, and is operable. Notify the Contractor in

writing of conditions detrimental to the proper completion of the test-adjust-balance work. Shop Drawings must be provided to the TAB firm no later than 30 days after the final, approved Shop Drawings have been returned by the designer to the contractor.

B. Do not proceed with the TAB work until unsatisfactory conditions have been corrected in a manner acceptable to the Tester.

C. Test, adjust, and balance the environmental systems and components, as indicated, in accordance with the procedures outlined in applicable standards. In addition perform the following:

1. Test all safety devices for proper operation, including fire dampers and smoke dampers.
2. Calibrate temperature control systems and adjust heat anticipators per manufacturer's recommendations.

D. Prepare report of test results, including instrumentation calibration reports, in format recommended by the applicable standards. In addition, certify that safety devices have been checked and are operating properly, that gas inputs and gas burners have been adjusted in accord with manufacturer's recommendations, that temperature control systems have been calibrated and are operating properly, and that heat anticipators have been adjusted in accord with manufacturer's recommendations.

E. Patch holes in insulation, ductwork, and housings, which have been cut or drilled for test purposes, in a manner recommended by the original Installer.

F. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.

G. Retest, adjust, and balance system subsequent to significant system modifications or if report is unsatisfactory, and resubmit test results. Repeat until satisfactory results are obtained.

H. At the time of final inspection, the TAB agency may be required to recheck, in the presence of the Owner's Representative, specific and random selections of data, air quantities, and air motion recorded in the certified report. Points and areas for recheck shall be selected by the Owner's Representative or Engineer.

END OF SECTION 15950

SECTION 15971 - BUILDING MANAGEMENT AND CONTROL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this Section.

1.2 SUMMARY

A. This Section includes control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls.

1.3 SYSTEM COMPATIBILITY

A. Temperature control system shall be capable of interfacing with and shall be compatible with the existing campus BMCS. "Compatible" means:

1. It is expected that at the conclusion of this project, all DDC points specified in this document will be available for monitoring, control, scheduling, trending, and alarming on the existing Siemens Apogee network. This shall be accomplished by a web based interface.

1.4 QUALITY ASSURANCE

A. Codes and Approvals:

1. The complete BMCS installation shall be in strict accordance to the national and local electrical codes and the electrical Section of these specifications. All devices designed for or used in line voltage applications shall be UL listed. All microprocessor based remote and central devices connecting onto the primary bus (including link devices) shall be UL-Listed.
2. The system shall comply with NFPA 90A Air Conditioning and 90B Warm Air Heating, Air Conditioning.

B. Provide satisfactory operation without damage at 110 percent above and 85 percent below rated voltage and at 3 hertz variation in line frequency. Provide static, transient, and short circuit protection on all inputs and outputs. Communication lines shall be protected against incorrect wiring, static transients, and induced magnetic interference. All bus connected devices shall be a.c. coupled, or equivalent, so that any single device failure will not disrupt or halt bus communication.

C. Acceptance: The BMCS Contractor shall completely check out, calibrate, and test all connected hardware and software to insure that the system performs in accordance with the approved Specifications and sequences of operations approved.

1. Witnessed acceptance demonstration shall display and demonstrate each type of data entry to show site specific customizing capability; demonstrate parameter changes;

execute digital and analog commands; and demonstrate DDC loop stability via trend of inputs and outputs.

2. Operator's tool with preloaded software and necessary interface: The Control Contractor shall provide the balancing Contractor up to four hours training on the use of, and in order to, exercise actuators, and enter calibration and balancing parameters. Additional training or assistance required by the balancing Contractor shall be contracted directly with the Control Contractor by the balancing Contractor.

D. Manuals: The following manuals will be provided:

1. An Operators Manual shall be provided with graphic explanations of keyboard use for all operator functions specified under Operator Training.
2. Computerized printouts of all PCP data file including all point processing assignments, physical terminal relationships, scales and offsets, command and alarm limits, etc.
3. A manual shall be provided including revised as-built documents of all materials required under the paragraph "SUBMITTALS" on this specification.
4. Two Operators Manuals and two As-Built Manuals shall be provided to the Owner.
5. Five compact discs (CD's) of manuals, drawings, specifications, etc. in Microsoft Word, Excel, or PDF format as necessary.

E. Training: All training shall be by the BMCS Contractor and shall utilize Operator's Manuals and As-Built documentation.

1. Operator training shall include four eight-hour sessions encompassing modifying text and graphics, sequence of operation review, selection of all displays and reports, use of all specified OWS functions, use of Portable Operators Terminals, troubleshooting of sensors (determining bad sensors), and password assignment and modification

a. One training session shall be conducted at system completion. The remaining sessions shall be conducted within forty-five days after system completion.

F. Warranty: All components, system software, and parts supplied by the BMCS Contractor shall be guaranteed against defects in materials and workmanship for one year from acceptance date. Labor to repair, reprogram, or replace components shall be furnished by the BMCS Contractor at no charge during the warranty period. All corrective software modifications made during warranty periods shall be updated on all user documentation and on user and Manufacturer archived software disks.

1.5 ACCEPTABLE MANUFACTURERS

A. The only acceptable Manufacturer is Siemens Apogee.

PART 2 - PRODUCTS

2.1 BMCS CONTROLLER HARDWARE

A. Plant Control Processors shall contain a 16-bit microprocessor with an EPROM based operating system. DDC programs and data files shall be non-volatile EEPROM or flash memory to allow simple and reliable additions and changes. Each PCP shall have an on-board

30-day battery backed real-time clock. PCPs shall be provided where shown or specified with capacity to accommodate input/output (I/O) points required for the application plus spare points specified. Each panel shall be provided with a socket for a Portable Operators Terminal (POT), and a port for network communications at no less than 78,000 baud. PCP outputs shall be binary for On-Off control, and true variable voltage (0-10v) for driving analog or pneumatic transducer devices. Analog outputs shall have a minimum incremental resolution of one percent of the operating range of the controlled device. PCPs shall have LEDs for continuous indication of all bus communications, power, and operational status. All panel electronics and associated equipment shall be installed in suitable enclosures.

B. TECs shall be UL916 stand-alone EEPROM based configured to perform the sequences specified, and with I/O selected for the application. TEC enclosures shall be compact plastic conforming to UL94-5V or plated steel. Each TEC shall be provided with LED type annunciation to continually display its operational mode; power, normal, or in an alarm state. 9600 baud TEC networks shall be grouped with no more than 20 TECs per primary bus connected device, except for TEC networks operating over 50,000 baud, up to 100 TECs may be so grouped.

1. The Control Contractor shall furnish and ship damper actuators and terminal unit controllers to the Terminal Unit Manufacturer for factory installation. (Note: Terminal Unit Manufacturer furnishes transformers, relays, air flow rings, and enclosures). The Control Contractor shall provide the Terminal Unit Manufacturer with necessary wiring and mounting instructions.

2.2 OPERATOR INTERFACE SOFTWARE

A. New HVAC controls to connect to existing Siemens Apogee Insight software. All points, programming, and graphics to be available at the existing workstation via the Insight Apogee Software.

1. Basic Interface Description

a. Operator interface software shall minimize operator training through the use of user-friendly and interactive graphical applications, 30-character English language point identification, on-line help, and industry standard Windows application software. Interface software shall simultaneously communicate with and share data between Ethernet-connected building level networks.

b. Provide a graphical user interface that shall minimize the use of keyboard through the use of a mouse or similar pointing device, with a "point and click" approach to menu selection and a "drag and drop" approach to inter-application navigation.

c. The navigation shall be user friendly by utilizing "forward & back" capability between screens and embedded hyperlinks to open graphics, documents, drawings, etc.

d. Selection of applications within the operator interface software shall be via a graphical toolbar menu – the application toolbar menu shall have the option to be located in a docked position on any of the four sides of the visible desktop space on the workstation display monitor, and the option to automatically hide itself from the visible monitor workspace when not being actively manipulated by the user.

e. The software shall provide a multi-tasking type environment that allows the user to run several applications simultaneously. BMS software shall run on a Windows XP, 2000, or comparable 32 bit operating system. System database parameters shall be stored within an object-oriented database. Standard Windows applications shall run simultaneously with the BMS software. The mouse or Alt-Tab keys shall be used to quickly select and switch between multiple applications. The operator shall be able to work in Microsoft Word, Excel, and other Windows based software packages, while concurrently annunciating on-line BMS alarms and monitoring information

f. The software shall provide, as a minimum, the following functionality:

1) Real-time graphical viewing and control of the BMS environment
2) Reporting
3) Scheduling and override of building operations
4) Collection and analysis of historical data
5) Point database editing, storage and downloading of controller databases.
6) Utility for combining points into logical Point Groups. The Point Groups shall then be manipulated in Graphics, trend graphs and reports in order to streamline the navigation and usability of the system.
7) Alarm reporting, routing, messaging, and acknowledgment
8) "Collapsible tree," dynamic system architecture diagram application:

    a) Showing the real-time status and definition details of all workstations and devices on a management level network
    b) Showing the real-time status and definition details of all Building Controllers at the Primary Network.
    c) Showing the definition details of all application specific controllers

9) Definition and construction of dynamic color graphic displays.
10) Online, context-sensitive help, including an index, glossary of terms, and the capability to search help via keyword or phrase.
11) On-screen access to User Documentation, via online help or PDF-format electronic file.
12) Automatic database backup at the operator interface for database changes initiated at Building Controllers.
13) Display dynamic trend data graphical plot.

    a) Must be able to run multiple plots simultaneously
    b) Each plot must be capable of supporting 10 pts/plot minimum
    c) Must be able to command points directly off dynamic trend plot application.
    d) Must be able to plot both real-time and historical trend data

14) Program editing
15) Transfer trend data to 3rd party spreadsheet software

    a) Scheduling reports
    b) Operator Activity Log
    c) Open communications via OPC Server
    d) Open communications via BACnet Client & Server

g. Enhanced Functionality:

1) Provide functionality such that any of the following may be performed simultaneously on-line, and in any combination, via adjustable user-sized windows. Operator shall be able to drag and drop information between the following applications, reducing the number of steps to perform a desired function (e.g., Click on a point on the alarm screen and drag it to the dynamic trend graph application to initiate a dynamic trend on the desired point):

a) Dynamic color graphics application
b) Alarm management application
c) Scheduling application
d) Dynamic trend graph data plotter application
e) Dynamic system architecture diagram application
f) Control Program and Point database editing applications
g) Reporting applications

2) Report and alarm printing shall be accomplished via Windows Print Manager, allowing use of network printers.

h. Security: Operator-specific password access protection shall be provided to allow the administrator/manager to limit users' workstation control, display, and data base manipulation capabilities as deemed appropriate for each user, based upon an assigned password. Operator privileges shall "follow" the operator to any workstation logged onto (up to 999 user accounts shall be supported). The administrator or manager shall be able to grant discrete levels of access and privileges, per user, for each point, graphic, report, schedule, and BMS workstation application. And each BMS workstation user account shall use a Windows Operating System user account as a foundation.

i. The operator interface software shall also include an application to track the actions of each individual operator, such as alarm acknowledgement, point commanding, schedule overriding, database editing, and logon/logoff. The application shall list each of the actions in a tabular format, and shall have sorting capabilities based on parameters such as ascending or descending time of the action, or name of the object on which the action was performed. The application shall also allow querying based on object name, operator, action, or time range.

j. Dynamic Color Graphics application shall include the following:

1) Must include graphic editing and modifying capabilities
2) A library of standard control application graphics and symbols must be included
3) Must be able to command points directly off graphics application
4) Graphic display shall include the ability to depict real-time point values dynamically with animation, picture/frame control, symbol association, or dynamic informational text-blocks
5) Navigation through various graphic screens shall be optionally achieved through a hierarchical "tree" structure
6) Graphics viewing shall include zoom capabilities
7) Graphics shall be capable of displaying the status of points that have been overridden by a field HAND switch, for points that have been designed to provide a field HAND override capability.

8) Advanced linking within the Graphics application shall provide the ability to navigate to outside documents (e.g., .doc, .pdf, .xls, etc.), Internet web addresses, e-mail, external programs, and other workstation applications, directly from the Graphics application window with a mouse-click on a customizable link symbol.

k. Scheduling and override

1) Provide a calendar type format for simplification of time and date scheduling and overrides of building operations. Schedule definitions reside in the PC workstation and in the Building Controller to ensure time equipment scheduling when PC is off-line, PC is not required to execute time scheduling. Provide override access through menu selection, graphical mouse action or function key. Provide the following capabilities as a minimum:

a) Weekly schedules
b) Zone schedules
c) Event schedules – an event consists of logical combinations of equipment and/or zones
d) Report schedules
e) Ability to schedule for a minimum of up to ten (10) years in advance.

l. Dynamic Color Graphic Displays

1) Capability to create color graphic floor plan displays and system schematics for each piece of mechanical equipment, including, but not limited to, air handling units, chilled water systems, hot water boiler systems, and room level terminal units.
2) The operator interface shall allow users to access the various system schematics and floor plans via a graphical penetration scheme, menu selection, point alarm association, or text-based commands. Graphics software shall permit the importing of Autocad or scanned pictures for use in the system.
3) Dynamic temperature values, humidity values, flow values and status indication shall be shown in their actual respective locations within the system schematics or graphic floor plan displays, and shall automatically update to represent current conditions without operator intervention and without pre-defined screen refresh rates.

a) Provide the user the ability to display real-time point values by animated motion or custom picture control visual representation. Animation shall depict movement of mechanical equipment, or air or fluid flow. Picture Control shall depict various positions in relation to assigned point values or ranges. A library (set) of animation and picture control symbols shall be included within the operator interface software's graphics application. Animation shall reflect, ON or OFF conditions, and shall also be optionally configurable for up to five rates of animation speed.
b) Sizable analog bars shall be available for monitor and control of analog values; high and low alarm limit settings shall be displayed on

the analog scale. The user shall be able to "click and drag" the pointer to change the setpoint.

c) Provide the user the ability to display blocks of point data by defined point groups; alarm conditions shall be displayed by flashing point blocks.

d) Equipment state or values can be changed by clicking on the associated point block or graphic symbol and selecting the new state (on/off) or setpoint.

e) State text for digital points can be user-defined up to eight characters.

4) Colors shall be used to indicate status and change as the status of the equipment changes. The state colors shall be user definable.

5) Advanced linking within the Graphics application shall provide the ability to navigate to outside documents (e.g., .doc, .pdf, .xls, etc.), Internet web addresses, e-mail, external programs, and other workstation applications, directly from the Graphics application window with a mouse-click on a customizable link symbol.

6) The Windows environment of the PC operator workstation shall allow the user to simultaneously view several applications at a time to analyze total building operation or to allow the display of a graphic associated with an alarm to be viewed without interrupting work in progress.

7) Off the shelf graphic software shall be provided to allow the user to add, modify, or delete system graphic background displays.

2.3 TEC SOFTWARE

A. TEC Software shall be configured to meet the requirements of the "Sequence of Operation" specified and shall be field reconfigurable. TEC software shall support full PID control, and shall utilize separate PID gains for heating and cooling. Where TEC space sensors are provided with temperature setpoint knobs, TECs shall be provided with unique software setpoint limits. Each TEC shall have continuously running hardware diagnostics to detect malfunctions of the flow sensor, the temperature sensor, the remote setpoint sensor, and the A to D converter.

1. TECs shall have preconfigured airflow calibration software to assist the Test and Balance (T&B) Contractor in final calibrations. Using the TEC Contractor's calibration tool, the T&B Contractor shall be provided with a display allowing a simple command entry to place the TEC in zero, minimum, and maximum CFM control modes. At each mode, a display field shall be provided for the T&B Contractor to enter the actual measured value in CFM. Upon completion of entering the three values, the TEC shall automatically recalibrate based upon the actual values.

2.4 DATA COMMUNICATIONS

A. All PCPs and TEC network management devices shall be interconnected via a primary communications network. TECs shall also be connected together via secondary networks managed by PCPs or TEC network management devices to provide data concentration and parallel processing such that system expansion does not noticeably affect system response. All communications shall be via twisted pair wires, shielded where required.

DDC microprocessor failures shall not cause loss of communications of the remainder of any network. All networks shall support sensor sharing, global application programs, and bus-to-bus communications in a true peer-to-peer token passing manner.

B. TECs shall be peer bus connected such that where more than one TEC serves a single space sensor, one TEC shall slave the other TECs in unison independent of any TEC bus communications master.

C. For reliability, maintainability, and performance communication busses shall be extendible to 4000 feet without active links, hubs, or repeaters.

D. TECs shall be managed by PCPs or other TEC network management devices to provide alarm detection and reporting, data sharing, trending, and response to data requests and commands.

2.5 ELECTRIC AND MECHANICAL AND DEVICES

A. All electric switch devices shall be selected for the applied load and UL listed for the application. Miscellaneous electric, pneumatic, and mechanical devices shall include:

B. Any automatic control dampers not specified to be integral with other equipment. Frames shall not be less than 13 gage galvanized steel. Blades shall not be over 8 inches wide nor less than 16 gage galvanized steel roll formed. Bearings shall be oilite, ball-bearing, or nylon with steel shafts. Side seals shall be stainless steel of the tight-seal spring type. Dampers and seals shall be suitable for temperature ranges of -40 to 200 degrees F.

1. All proportional control dampers shall be opposed or parallel blade type as hereinafter specified and all two-position dampers shall be parallel blade types.
2. Dampers shall be sized to meet flow requirements of the application. The sheet metal Contractor shall furnish and install baffles to fit the damper to duct size. Baffles shall not exceed 6 inches.
3. Dampers shall be minimum leakage type to conserve energy and the temperature control Manufacturer shall submit leakage data for all control dampers with the temperature control submittal. Maximum leakage for dampers in excess of sixteen inches square shall be 30 CFM per square foot at static pressure of 1 inch of WC.
4. Where ultra-low leakage dampers are specified the blade edges shall be fitted with replaceable, snap-on, inflatable seals to limit damper leakage to 6 CFM per square foot for dampers in excess of sixteen inches square at 1 inch of WC.

C. Smoke dampers, where indicated on the plans, shall conform to UL 555S Leakage Class II or III and be provided and installed by the mechanical Contractor. Any control applicable to this Section shall be detailed in the sequence of operations.

D. Automatic Control Valves: 2 inches and smaller shall be screwed type, and valves 2 1/2 inches and larger shall be flanged. Valves shall be ANSI-rated to withstand the pressures and temperatures encountered. Valves shall have stainless-steel stems and spring-loaded Teflon packaging with replaceable discs.

1. All modulating straight-through water valves shall be provided with equal-percentage contoured throttling plugs. All three-way valves shall be provided with linear throttling plugs such that the total flow through the valve shall remain constant regardless of the

valve's position. Valves shall be sized for a pressure drop equal to the coil they serve but not to exceed 4 psi.

2. All modulating steam valves shall have a linear characteristic for 90 percent of the closing stroke and equal-percentage for the final 10 percent. Valves shall be sized for 10 psi entering steam and 50 percent psi pressure drop through valves.
3. Unitary valves shall be straight-through or three-way type as specified in the sequence of operation. Stems shall be polished stainless-steel and packing shall be ethylene-propylene suitable for both chilled water and 250 degree hot water service. Pressure ratings shall be as required for the intended service.

E. Actuators: All automatically controlled devices, unless specified otherwise elsewhere, shall be provided with actuators sized to operate their appropriate loads with sufficient reserve power to provide smooth modulating action or two-position action and tight close-off.

F. Safety high limit shall be 135 degrees manual reset type when provided in the exhaust or return air and 10 degrees above the anticipated high temperature when provided in the supply air.

G. Safety low limit shall be manual reset twenty foot limited fill type responsive to the coolest Section of its length.

H. Duct smoke detectors are included in Division 16.

2.6 DATA INPUTS AND OUTPUTS

A. Input/output sensors and devices shall be closely matched to the requirements of the remote panel for accurate, responsive, noise-free signal input/output. Control input response shall be high sensitivity and matched to the loop gain requirements for precise and responsive control. In no case shall computer inputs be derived from pneumatic sensors or.

B. Temperature sensors shall be Resistance Temperature Detector (RTD) type of 100, 1000, or 3,000 ohm platinum, 500 ohm Balco, or 20,000 ohm. Sensors shall have ±1.0 degrees F accuracy between 32 degrees and 212 degrees.

C. TEC space temperature sensors shall be provided with blank commercial type locking covers with the following features:

1. Space sensors plans shall be provided with plug-in port to respective TEC network for software maintenance and/or reconfiguration.
2. Plastic used on subbase or housing shall be UL94-5V rated.

D. Duct temperature sensors shall be rigid stem or averaging type as specified in the sequence of operation. Water sensors shall be provided with a separable copper, monel, or stainless-steel well.

E. Dewpoint sensors shall employ a non-reactive organic bobbin material to give precise dewpoint readings with error of no more than ±1.5 degrees. The dewpoint sensor shall incorporate an integral draft shield as part of the instrument for air velocities in excess of 50 feet per minute.

F. Water flow analog sensors shall be provided complete with flow element and shall be an all solid-state precision industrial type with stainless-steel meter body, maximum error of no more

than .5 percent of span and 4 to 20 mA output. Sensor shall be rated for 250 psi minimum and installed in strict accordance to the Manufacturer's instructions, complete with three-valve manifold for calibration and maintenance.

G. Analog output transducers shall be designed for precision closed loop control with pneumatic repeatability error no greater than 1 percent.

1. Unless specified otherwise elsewhere, relative humidity sensors shall be capacitance type with 10 percent to 90 percent range. Duct mounted humidity sensors shall be provided with a sampling chamber.

H. Outside air relative humidity sensor used for enthalpy economizer decision shall be duct mounted, 10 to 90 percent measurement range, replaceable sensor, ± 3 percent RH accuracy, thin film, capacitive type.

I. Current sensing relays used for proof-of-loading for fans and pumps shall be suitable for 2 to 200 amperes and shall have adjustable trip thresholds of plus or minus two percent of range. Each relay shall be provided with an LED to allow ready observation of the relay status.

J. Fan proof-of-flow switches shall be adjustable setpoint and differential pressure type. Switches shall be piped to fan discharge except where fans operate at less than one inch WC, they shall be piped across the fan. For fractional horsepower and non-ducted fans, relays, or auxiliary contacts may be used. Maximum pressure rating shall be at least 10 inches WC.

K. Pump proof-of-flow switches shall be adjustable differential pressure or flow type as specified in the sequence of operation or data point summary. Devices shall be 150 psi rated except chilled water flow switches shall be provided with totally sealed vapor tight switch enclosure on 300 psi body. Differential pressure switches shall have valved manifold for servicing.

PART 3 - EXECUTION

3.1 GENERAL

A. The BMCS shall be designed, installed, and commissioned in a turnkey operational manner; including all labor not noted in work by others paragraph of PART I of this Section of these Specifications, and not noted in other Sections of these Specifications.

3.2 DATA CONTROL (D/C) AND GRAPHICS SUMMARY

A. All hardware, custom software, application software, graphics, etc., necessary to accomplish the control sequences and display the graphics specified shall be provided as part of this contract. Provide all controllers, inputs, outputs, valves, dampers, actuators, and flow meters required to provide the control and graphic data described. Provide software setpoints required for display in logical groups and graphics.

B. Each digital output shall have a software-associated monitored input. Any time the monitored input does not track its associated command output within a programmable time interval, a "command failed" alarm shall be reported.

C. Where calculated points (such as CFM) are shown, they shall appear in their respective logical groups.

D. Unless otherwise specified or approved prior to bidding, the primary analog input and the analog output of each DDC loop shall be resident in a single remote panel containing the DDC algorithm and shall function independent of any primary or TEC communication links. Secondary (reset type) analog inputs may be received from the primary network, but approved default values and/or procedures shall be substituted in the DDC algorithm for this secondary input if network communications fail or if the secondary input becomes erroneous or invalid.

E. In addition to VAV box data points specified to be presented on colorgraphic displays, technical data for each VAV box shall be presented to operators on the OWS in full English menu text displays including the VAV box name; heating and cooling PID loop P, I and D gains; primary CFM airflow; damper position (percent open); reheat status/value; cooling setpoint; heating dead-band; minimum and maximum CFM setpoints; reheat CFM setpoint; unoccupied temperature setpoint; temperature sensor calibration offset; bypass push button time, in minutes; smoke purge mode damper position; smoke pressurization mode damper position; smoke depressurization mode damper position; and morning warm-up mode damper position. All such points shall be presented in complete and direct read-write (command) format, unless they are provided in commandable, colorgraphic displays.

3.3 SUBMITTALS

A. Provide 10 copies of submittal data within 60 days of contract award.

B. Submittal shall consist of:

1. System architecture showing all digital devices.
2. Equipment lists of all proposed devices and equipment, including data sheets of all products.
3. Valve, damper, and well and tap schedules showing size, configuration, capacity, and location of all equipment.
4. Wiring and piping interconnection diagrams, including panel, device power, and sources.

3.4 INSTALLATION

A. Provide all wiring required for BMCS, including power wiring not shown on Electrical Drawings, all in accordance with Division 16 and Manufacturer's recommendations. All wiring and tubing shall be properly supported and run in a neat and workmanlike manner. All wiring and tubing exposed and in equipment rooms shall run parallel to or at right angles to the building structure. All piping and wiring within enclosures shall be neatly bundled and anchored to prevent obstruction to devices and terminals. All wiring shall be in accordance with all local and national codes. All line voltage wiring, all wiring exposed, and all wiring in equipment rooms shall be installed in conduit in accordance to the Electrical Specifications. All electronic wiring shall be #18 AWG minimum THHN and shielded, if required, except standard network (Ethernet, Eschelon, etc.) cabling shall be as tested and recommended. All wiring in the central control room shall be concealed in an approved manner.

B. This Contractor shall provide all sensing, control, and interlock wiring for the following unless not applicable to this project or shown or specified elsewhere by others.

1. BMCS inputs and outputs
2. BMCS communications
3. BMCS system power
4. Chilled water and heating water system interlocks
5. Miscellaneous exhaust fan interlocks
6. VAV Air Handling Units
7. VAV Box Controls and Network

C. The BMCS Contractor shall enter all computer data into the related computers including all graphics, control programs, initial approved parameters and settings, and English descriptors. The BMCS Contractor shall maintain diskette copies of all data file and application software for reload use in the event of a system crash or memory failure. One copy shall be delivered to the Owner during training sessions and one copy shall be archived in the BMCS Contractor's local software vault.

D. Network Communications: The Contractor shall provide a complete and functioning Building Management and Control System at the end of the project. This includes all installed VAVs and AHUs reporting operational and alarm status to the central workstation location, specifically, Southern University Student Center Building.

E. This requirement may be met in one of the following manners: Web based interface with the existing Siemens Apogee network.

3.5 POINTS LIST

Each VAV Air Handling Unit

#	DESCRIPTION	LOCATION	FIELD DEVICE	I/O	OWS INDICATION
1	AHU Start/stop	AHU	Starter	BO	Start/stop
2	AHU Feedback	AHU	DP switch	BI	On/Off
3	SA Temperature	Duct	Sensor	AI	Degrees F
4	SA Setpoint	Controller	Software	---	Degrees F
5	Chilled water valve	AHU	Valve	AO	percent open
6	Heating water valve	AHU	Valve	AO	percent open
7	RPM setpoint	Controller	VFD output	---	
8	RPM	Controller	VFD output	AI	Pct
9	VFD Alarm	VFD	VFD output	BI	Normal/Alarm
10	Static setpoint	Controller	Software	---	Inches
11	Duct static	Duct	DP Transducer	AI	Inches
12	Damper Position	Controller	Software	AO	percent open
13	Low Limit Stats	Duct	Freezestat	BI	Normal/Alarm
14	Smoke Detector Status	Duct	Smoke Detector	BI	Normal/Alarm
15	Outside Air Temperature	Wall Mounted	Sensor	AI	Degrees F

Each Pump

#	DESCRIPTION	LOCATION	FIELD DEVICE	I/O	OWS INDICATION
1	Pump Start/Stop	Panel	Relay	BO	Start/Stop

Each Air Terminal

#	DESCRIPTION	LOCATION	FIELD DEVICE	I/O	OWS INDICATION
1	Occupied Status	Controller	Software	-	Occp/Vac
2	Standby Status	Controller	Software	-	Occp/Vac
3	Temporary occupied	Stat	Stat switch	BO	On/Off
4	Space temperature	Stat	Sensor	AI	Degrees F
5	SA Flow	Duct	Sensor	AI	CFM
6	SA commanded flow	Controller	Damper	AO	CFM
7	Heat valve command	Controller	Valve	AI	Pct. open command
8	Cooling setpoint	Controller	Software	AO	Degrees F
9	Heating setpoint	Controller	Software	AO	Degrees F
10	Unoccupied cooling setpoint	Controller	Software	-	Degrees F
11	Unoccupied heating setpoint	Controller	Software	-	Degrees F
12	Standby cooling setpoint	Controller	Software	-	Degrees F
13	Standby heating setpoint	Controller	Software	-	Degrees F
14	Stat reset	Stat	Slider	AI	Degrees F

Each Constant Volume Air Handling Unit

#	DESCRIPTION	LOCATION	FIELD DEVICE	I/O	OWS INDICATION
1	Occupied Status	Controller	Software	-	Occp/Vac
2	Standby Status	Controller	Software	-	Occp/Vac
3	Temporary occupied	Stat	Stat switch	BO	On/Off
4	Space temperature	Stat	Sensor	AI	Degrees F
5	Cool valve command	Controller	Valve	AI	Pct. open command
6	Heat valve command	Controller	Valve	AI	Pct. open command
7	Cooling setpoint	Controller	Software	AO	Degrees F
8	Heating setpoint	Controller	Software	AO	Degrees F
9	Unoccupied cooling setpoint	Controller	Software	-	Degrees F
10	Unoccupied heating setpoint	Controller	Software	-	Degrees F
11	Standby cooling setpoint	Controller	Software	-	Degrees F
12	Standby heating setpoint	Controller	Software	-	Degrees F
13	Stat reset	Stat	Slider	AI	Degrees F

Other Systems

#	NAME	DESCRIPTION	LOCATION	FIELD DEVICE	I/O	UNITS
1	AHU1 VFD	VFD data	Speed drive	BMCS direct		Varies
2	AHU2 VFD	VFD data	Speed drive	BMCS direct		Varies

END OF SECTION 15971

SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Codes and Standards: Where indicated, the referenced edition shall govern. Where not indicated, the latest edition shall govern.

1.2 SUMMARY

A. This Section includes the following:

1. Supporting devices for electrical components.
2. Electrical identification.
3. Control wiring.
4. Electrical demolition.
5. Cutting and patching for electrical construction.
6. Touchup painting.

1.3 SUBMITTALS

A. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.4 DEFINITIONS

A. General Explanation: A substantial amount of the Contract Document Specification language constitutes specific definitions for terms found in other Contract Documents, including the Drawings which must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated thereon. Certain terms used repetitiously in the Contract Documents are defined generally in this Article.

B. General Requirements: The provisions or requirements of the Division 1 Sections. The General Requirements apply to the entire work of the Contract, and where so indicated, to other elements of work which are included in the project.

C. Indicated: The term "Indicated" is a cross reference to details, notes or schedules on the Drawings, other paragraphs or schedules in the Specifications, and similar means of recording requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for the purpose of helping the reader locate the cross reference, and no limitation of location is intended except as specifically noted.

D. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by the Architect," "requested by the Architect," etc. However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

E. Refer: Used to indicate that the subject is defined or specified in further detail at another location in the Contract Documents, or elsewhere as indicated. Except as otherwise noted, "refer" does not imply that the Contractor must purchase or subcontract the subject work in any special manner.

F. Approve: Where used in conjunction with the Architect's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the meaning of the term "approved" will be held to the limitations of the Architect's responsibilities and duties as specified in the General and Supplementary Conditions. In no case will "approval" by the Architect be interpreted as a release of the Contractor from responsibilities to fulfill the requirements of the Contract Documents.

G. Project Site: The space available to the Contractor for the performance of the work, either exclusively or in conjunction with others performing other work as part of the project. The extent of the project site may or may not be identical with the description of the land upon which the project is to be built.

H. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

I. Install: Except as otherwise defined in greater detail, the term "install" is used to describe operations of the project site including unloading, unpacking, assembly, erection, placing, anchoring, connecting utilities, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

J. Provide: Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete and ready for the intended use, as applicable in each instance.

K. Installer: The entity (person or firm) engaged by the Contractor or its subcontractor or sub-subcontractor for the performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (Installers) be expert in the operations they are engaged to perform.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70 (2005).

1.6 HAZARDOUS MATERIALS

A. Asbestos: No asbestos-containing materials have been identified on items that are indicated to be disturbed. If asbestos-containing materials are encountered, comply with the following:

Upon encountering any previously unidentified materials which he suspects may contain asbestos, the Contractor shall immediately cease all work in the immediate vicinity of the suspected materials and notify the Designer and the Owner. The Owner shall retain consultants to identify the suspected materials. Upon identification, the Owner reserves the right to contract separately for the removal, or require the Contractor to remove said materials in accordance with the following provision. In any case, the work shall be performed by a licensed and certified Abatement Contractor.
The Louisiana Department of Environmental Quality (D.E.Q.) has issued the Louisiana Emission Standards for Hazardous Air Pollutants. Where asbestos is encountered in a project, the Contractor shall comply with all laws and ordinances pertaining to asbestos handling and abatement, including the latest revision of LAC 33:111, Chapter 25, Subchapter F, Emission Standards for Hazardous Air Pollutants, LAC 33:111, Chapter 27, Asbestos Containing Materials in Schools and Public Buildings and LAC 33:111, Chapter 51, Subchapter M, Section 5151, Emission Standards for Asbestos.

Notification should be addressed to:

Asbestos Coordinator
Louisiana Department of Environmental Quality
Air Quality Division
Post Office Box 82135
Baton Rouge, Louisiana 70884-2135

If the Owner chooses to remove any previously unidentified materials by utilizing different Contractors, the Contractor shall cooperate fully with the Owner's consultants and asbestos abatement Contractor permitting them full access to the project, and shall not resume work in the vicinity of the suspected materials until advised by the Designer and the Owner that it is safe to do so.

1.7 COORDINATION

A. The electrical Plans and Specifications are a portion of the entire project. Other portions of the project contain information and requirements that will affect the electrical work. It is the responsibility of the Electrical Contractor to review all of the Contract Documents and to include those requirements in the bid.

B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the work. Coordinate installing large equipment requiring positioning before closing in the building.

C. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.

B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16 inch (14 mm) diameter slotted holes at a maximum of 2 inches (50 mm) o.c., in webs.

D. Slotted-Steel Channel Supports:

1. Channel Thickness: Selected to suit structural loading.
2. Fittings and Accessories: Products of the same manufacturer as channel supports.

E. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

F. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

G. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.

H. Expansion Anchors: Carbon-steel wedge or sleeve type.

I. Toggle Bolts: All-steel springhead type.

J. Powder-Driven Threaded Studs: Heat-treated steel.

2.2 ELECTRICAL IDENTIFICATION

A. Identification Devices: A single type of identification product for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.

B. Cable Labels: Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each cable size.

1. Type: Preprinted, flexible, self-adhesive, vinyl. Legend is overlaminated with a clear, weather- and chemical-resistant coating.

C. Colored Adhesive Marking Tape for Wires, and Cables: Self-adhesive vinyl tape, not less than 3/4 inch wide by 3 mils thick (18 mm wide by 0.08 mm thick).

D. Tape Markers for Wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

E. Engraved-Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16 inch (1.6 mm) minimum thickness for signs up to 20 sq. inch (129 sq. cm) and 1/8 inch (3.2 mm) minimum thickness for larger sizes. Engraved legend in black letters on white background.

F. Interior Warning and Caution Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145. Preprinted, aluminum, baked-enamel-finish signs, punched or drilled for mechanical fasteners, with colors, legend, and size appropriate to the application.

G. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.3 TOUCHUP PAINT

A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.

B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom, but no less than that required by NEC.

B. Clearances: Coordinate with other trades and/or existing conditions to maintain code required clearances above, below and around electrical equipment.

C. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.

B. Dry Locations: Steel materials.

C. Selection of Supports: Comply with manufacturer's written instructions.

D. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200 lb (90 kg) design load.

3.3 SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.

D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.

E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps. Clamps less than 7 feet above the floor shall be one-piece without protruding edges or bolts.

F. Install 1/4 inch (6 mm) diameter or larger threaded steel hanger rods, unless otherwise indicated.

G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2 inch (38 mm) and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports. Support wires shall be dedicated to the support of electrical materials and equipment. Ceiling support equipment and wires are not to be used for the support of electrical equipment.

H. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches (610 mm) from the box.

I. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength. Field galvanize galvanized members that have been field cut.

J. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

K. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:

1. Wood: Fasten with wood screws or screw-type nails.
2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
3. New Concrete: Concrete inserts with machine screws and bolts.
4. Existing Concrete: Expansion bolts.

5. Instead of expansion bolts, threaded studs driven by a powder charge and provided with lock washers may be used in existing concrete.
6. Steel: Welded threaded studs or spring-tension clamps on steel.

    a. Field Welding: No field welding of supports to structural members will be allowed.

7. Light Steel: Sheet-metal screws. Do not penetrate outer skin of building from within.
8. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.4 IDENTIFICATION MATERIALS AND DEVICES

A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout project.

C. Self-Adhesive Identification Products: Clean surfaces before applying.

D. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.

E. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches (150 to 200 mm) below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm), overall, use a single line marker.

F. Color-code 208/120-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:

    1. Phase A: Black.
    2. Phase B: Red.
    3. Phase C: Blue.

G. Install warning, caution, and instruction signs where required to comply with 29 CFR, Chapter XVII, Part 1910.145, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

H. Install engraved-laminated signs with white letters on black background with minimum 3/8 inch (9 mm) high lettering for equipment designations for switchgear or description of load being fed or controlled in the case of disconnects or contactors.

3.5 FIRESTOPPING

A. Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly. Firestopping materials shall be fire resistant per ASTM E119 fire test conditions and shall be non-combustible when tested per ASTM E136. Melting point shall exceed 2000 degrees F per ASTM C24. Fireproofing installation for openings in rated floors or partitions shall provide an airtight seal.

3.6 EQUIPMENT AND CONTROL WIRING

A. Wire in and connect every motor and item of equipment furnished as a part of this contract, including those furnished under other Divisions. Provide all required disconnecting means, boxes, conduit, conductors, etc. Motors and equipment furnished under other Divisions will be installed under that Division.

B. Motor starters and variable speed drives will be furnished under the division that the motors being controlled are furnished, and will be installed under Division 16 by the Electrical Contractor unless controllers are integral to the equipment. Installation includes mounting, connection to power and grounding.

C. Control Wiring: All control wiring and interlock wiring is included in Division 15.

3.7 DEMOLITION

A. Protect existing electrical equipment and installations not indicated to be removed. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, appearance and functionality.

B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.

C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.

D. Existing Work to Remain: Maintain feed, or provide new feed to equipment and devices that are not being removed.

E. Remove demolished material from project site.

F. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.8 SEQUENCING AND SCHEDULING

A. Electrical power and system interruptions shall be held to a minimum and will be permitted only at times approved by the using agency. The using agency may require that any interruptions be during nights, weekends, holidays, etc. Provide any required overtime work at no additional cost to Owner.

B. Do not interrupt feed to any service, feeder or branch circuit feeding facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to make temporary provisions where required according to requirements indicated:

1. Notify Owner no fewer than seven (7) days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.
3. Provide all temporary facilities and services, including fire watch, required to maintain operation, security, and life safety.

3.9 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.10 FIELD QUALITY CONTROL

A. Inspect installed components for damage and faulty work, including the following:

1. Supporting devices for electrical components.
2. Electrical identification.
3. Electricity-metering components.
4. Concrete bases.
5. Electrical demolition.
6. Cutting and patching for electrical construction.
7. Touchup painting.

3.11 REFINISHING AND TOUCHUP PAINTING

A. Refinish and touch up paint:

1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.12 CLEANING AND PROTECTION

A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.

B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 16050

SECTION 16060 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 (2005), Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1. Comply with UL 467.

PART 2 - PRODUCTS

2.1 MAUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Grounding Conductors, Cables, Connections, and Rods:

a. Apache Grounding/Erico Inc.
b. Chance/Hubbell
c. Copperweld Corp.
d. Erico Inc.; Electrical Products Group
e. Ideal Industries, Inc.
f. ILSCO
g. Kearney/Cooper Power Systems
h. O-Z/Gedney Co.; a business of the EGS Electrical Group
i. Raco, Inc.; Division of Hubbell
j. Thomas and Betts, Electrical

2.2 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Division 16 Section 16120, "Conductors and Cables."

B. Material: Copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation.

D. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B 3.

2.3 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Twist-on Connectors: Plastic body with coiled copper alloy wire forming threads.

D. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

E. Underground Mechanical Connectors: Bolted-pressure type or compression type, listed for underground application.

PART 3 - EXECUTION

3.1 APPLICATION

A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections except these at test wells.

D. Equipment Grounding Conductor Terminations: Use bolted clamp type or compression connectors for conductors larger than 10 AWG. Use Plastic body twist-on connectors for 10AWG and smaller.

3.2 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install equipment grounding conductors in all feeders and circuits.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

3.4 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:

1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.

END OF SECTION 16060

SECTION 16120 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.3 SUBMITTALS

A. Field Quality-Control Test Reports: From Contractor.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70 (2005).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 CONDUCTORS AND CABLES

A. Manufacturers:

1. American Insulated Wire Corp.; a Leviton Company.
2. General Cable Corporation.
3. Senator Wire & Cable Company.
4. Southwire Company.

B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC 5 or 7; stranded or solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN, XHHW or USE complying with NEMA WC 5 or 7 as applicable.

2.3 CONNECTORS AND SPLICES

A. Manufacturers:

1. AFC Cable Systems, Inc.
2. AMP Incorporated/Tyco International.
3. Hubbell/Anderson.
4. O-Z/Gedney; EGS Electrical Group LLC.
5. 3M Company; Electrical Products Division.
6. Ideal

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated. Push in splice and insulation displacement type connectors shall not be used.

PART 3 - EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Service Entrance, Feeders, and Branch Circuits: Type THHN-THWN, XHHW, or USE single conductors in raceway. Minimum size #12 AWG or larger where required for voltage drop. Where branch circuits exceed 100 feet in length, use minimum #10 AWG.

B. Fire Alarm Circuits: Type THHN-THWN, in raceway or Power-limited, fire-protective, signaling circuit cable in raceways. Size as recommended by equipment manufacturer or as specified in fire alarm specifications.

C. Class 1 Control Circuits: Type THHN-THWN, in raceway. Minimum size #14 AWG.

D. Class 2 Control Circuits: Type THHN-THWN, in raceway or Power-limited cable in raceways. Size as recommended by equipment manufacturer.

3.2 INSTALLATION

A. Run all conductors in raceways unless specifically indicated otherwise.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Identify and color-code conductors and cables according to Division 16 Section 16050, "Basic Electrical Materials and Methods."

E. No more than three current carrying phase conductors (excluding switch legs and grounded conductors), and one grounding conductor, may be installed in any raceway.

3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

END OF SECTION 16120

SECTION 16130 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:

1. Division 16 Section 16050, "Basic Electrical Materials and Methods," for supports, anchors, and identification products.
2. Division 16 Section 16140, "Wiring Devices," for devices installed in boxes.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. FMC: Flexible metal conduit.

C. IMC: Intermediate metal conduit.

D. LFMC: Liquidtight flexible metal conduit.

E. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways, and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70 (2005).

1.6 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 Articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 METAL CONDUIT AND TUBING

A. Manufacturers:

1. Anamet Electrical, Inc.; Anaconda Metal Hose.
2. Electri-Flex Co.
3. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
4. LTV Steel Tubular Products Company.
5. Manhattan/CDT/Cole-Flex.
6. O-Z Gedney; Unit of General Signal.
7. Wheatland Tube Co.

B. Rigid Steel Conduit: ANSI C80.1. U. L. 6. Threaded with threaded fittings.

C. IMC: ANSI C80.6. U.L. 1242.

D. Plastic-Coated Steel Conduit and Fittings: NEMA RN 1.

E. Plastic-Coated IMC and Fittings: NEMA RN 1.

F. EMT and Fittings: ANSI C80.3.U.L.797.

1. Fittings, 2 Inch Diameter and Larger: Steel (not die cast) set-screw or compression type.
2. Fittings, Smaller than 2 Inches Diameter: Compression type.

G. LFMC: Flexible steel conduit with PVC jacket.

H. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

2.3 BOXES

A. Manufacturers:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. Emerson/General Signal; Appleton Electric Company.
3. Erickson Electrical Equipment Co.
4. Hoffman.
5. Hubbell, Inc.; Killark Electric Manufacturing Co.
6. O-Z/Gedney; Unit of General Signal.
7. RACO; Division of Hubbell, Inc.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet-PLM Division.
10. Spring City Electrical Manufacturing Co.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.

D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

E. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

2.4 FACTORY FINISHES

A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard paint applied to factory-assembled surface raceways, enclosures, and cabinets before shipping.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Use the following raceways for outdoor installations:

1. Exposed: IMC.
2. Concealed: IMC.
3. Underground, Single Run: RNC.
4. Underground, Grouped: RNC.
5. Connection to Vibrating Equipment: LFMC.
6. Boxes and Enclosures: NEMA 250; Type 3R or Type 4.

B. Use the following raceways for indoor installations:

1. Exposed in Unfinished Areas: EMT. Use IMC or Rigid Steel Conduit for locations subject to mechanical damage.
2. Exposed in finished areas: Surface metal raceway where concealment is impossible. Limit use to the least possible. The impossibility of concealment is in the opinion of the Architect.
3. Concealed: EMT.

4. Connection to Vibrating Equipment: LFMC.
5. Damp or Wet Locations: IMC.
6. Boxes and Enclosures: NEMA 250, Type 1, unless otherwise indicated.

C. Minimum Raceway Size: 1/2 inch trade size (DN 14) unless noted.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.

3.2 INSTALLATION

A. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

B. Do not support electrical equipment or raceways from ceiling grid or ceiling grid supports. Independently support all equipment and raceways directly from structural elements.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 16 Section 16050, "Basic Electrical Materials and Methods."

E. Install temporary closures to prevent foreign matter from entering raceways.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Conceal raceways within finished walls, ceilings, and floors unless concealment is impossible or where otherwise indicated.

1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

H. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.
2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

I. Join raceways with fittings designed and approved for that purpose and make joints tight.

1. Use insulating bushings to protect conductors.

J. Tighten set screws of threadless fittings with suitable tools.

K. Terminations:

1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts; one inside and one outside box.
2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200 lb (90 kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

M. Telephone and Signal System Raceways, 2-Inch Trade Size (DN 53) and Smaller: In addition to above requirements, install raceways in maximum lengths of 150 feet (45 meters) and with a maximum of two 90 degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

N. Flexible Connections: Use maximum of 60 inches (1725 mm) of flexible conduit for recessed and semirecessed lighting fixtures. Use maximum of 12 inches (35 mm) of liquid tight flexible conduit for equipment subject to vibration, noise transmission, or movement; and for all motors. Install separate ground conductor across flexible connections.

3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.4 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION 16130

SECTION 16140 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Duplex receptacles.
2. Ground-fault circuit interrupters.
3. Single- pole switches.

1.3 DEFINITIONS

A. GFCI: Ground-fault circuit interrupter.

B. TVSS: Transient voltage surge suppressor.

C. EMI: Electromagnetic interference.

D. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for premarking device plates.

C. Samples: One for each type of device and plate specified, in each color specified.

D. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70 (2005).

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide products of one of the following (for each type of wiring device):

1. Single Pole Toggle Switch, 120-277V, 20A:

   a. Hubbell #HBL1221.
   b. Leviton #1221-2.
   c. P & S #20-AC-1.

2. Duplex Receptacle, 125V-1ϕ-20A:

   a. Hubbell #HBL5362.
   b. Leviton #5362.
   c. P & S #5362A.

3. GFCI Receptacles, 125V-1ϕ-20A:

   a. Hubbell #HBL-GF-5362.
   b. Leviton #8899.
   c. P & S #2091-S.

4. Motor Rated Switches and Manual Motor Starters:

   a. General Electric CR101 Series.
   b. Square-D FG or KG Series.
   c. P & S 78XX Series.

2.2 DEVICE PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035 inch (1 mm) thick, satin-finished stainless steel. Material for Unfinished Spaces: Galvanized steel.
3. Material for Wet Locations: Thermoplastic, with spring-loaded lift cover, and listed and labeled for use in "wet locations." For receptacles, listing shall apply with plug cap inserted.

2.3 FINISHES

A. Color: Wiring Devices Connected to Normal Power System: Gray, unless otherwise indicated or required by NFPA 70.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies level, plumb, and square with building lines.

3.2 MOUNTING HEIGHTS

A. Mount toggle switches at 48 inches above finished floor to center of toggle handle.

B. Mount receptacles, telephone outlets and data outlets 18 inches above finished floor to center of receptacle unless specifically noted otherwise.

C. Mount devices above counters at 2 inches from bottom of device to top of counter, or counter backsplash.

3.3 CONNECTIONS

A. Ground equipment according to Division 16 Section 16060, "Grounding and Bonding."

B. Connect wiring according to Division 16 Section 16120, "Conductors and Cables."

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

D. Do not connect stranded wire to devices using back wired push-in feature.

E. When terminating stranded conductors on devices, ends of strands shall be contained by insulation so that all strands must be held by screw.

3.4 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
2. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.

B. Remove malfunctioning units, replace with new units, and retest as specified above.

END OF SECTION 16140