HSC Airborne Infection Isolation Room Modifications

Alamance Health Services Building

Alamance County Health Department
319 North Graham Hopedale Road
Burlington, NC 27217

Alamance County Quote Number: RFQ #18-Q010

Commission # 16-10  December 19, 2017
(Revised: April 17, 2018)

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REQUEST FOR WRITTEN QUOTES

Alamance County is soliciting written quotes for HSC Airborne Infection Isolation Room Modifications at the Alamance County Health Services Center located at 319 North Graham Hopedale Road, Burlington, NC 27217. Quotes will be received until 2:00 pm, May 3, 2018. Quotes shall be hand delivered to the Purchasing Department located at 124 W. Elm Street, Graham NC 27253, Attn: Randy Clark.

Quotes will be opened publically and read aloud. Quotes submitted late will not be accepted.

Quotes must be submitted in a sealed envelope and clearly marked:

Quote: HSC Airborne Infection Isolation Room Modifications
     Quote #18-Q010
     Attn: Randy Clark
     Contractor’s License Number

This project consists of providing all materials and labor for modifications to the mechanical system at the waiting area (Waiting 160), the exam room (Exam 161), as necessary to provide new finishes in the spaces, modify the ceilings, and install a new mechanical ventilation system at the Alamance County Health Services Building located at 319 North Graham Hopedale Road, Burlington, NC 27217. See the attached plans and specifications for a detailed Scope of Work and project requirements.

Quotes shall be submitted on the bid forms provided within the specification documents and the signature on the forms must be that of an authorized representative or officer of the company. Two signed copies shall be included in the envelope. Submission of quotes by email is not acceptable.

Bidders must be properly licensed as may be required for this type work in accordance with Section 87 of the North Carolina General Statutes.
Any permits that may be required for this type work are the responsibility of the contractor.

There is a pre-bid meeting scheduled at 10:00 AM, April 24, 2018 located on site at 319 North Graham Hopedale Road, Burlington, NC 27217. Meet at the front main entrance. Any questions thereafter must be submitted in writing and addressed to:

Mr. Ricky L. Loman, AIA Architect  
603 Summit Avenue, Suite 102  
Greensboro, NC 27405  
Phone/FAX (336) 273-7999  
email: riloman@bellsouth.net

Access to the facility during other times must be scheduled with Mr. Buddy Whitesell, Alamance County Facilities Director. Phone numbers are (336) 570-4198 and (336) 269-4554  
email: Buddy.Whitesell@alamance-nc.com

No quote may be withdrawn after the scheduled bid closing time for a period of 90 days.

Bidders must provide evidence of insurance in the minimum amount of $1 Million for General Liability (each occurrence), Commercial Auto Liability Coverage, Personal Liability Coverage ($2 Million) and Workers Compensation (min $500,000 per accident). Certificates of Insurance shall be provided prior to award of any contract. Additional information will be provided to the successful company.

Bid bond or Performance & Payment bonds will not be required for this project.

Minority businesses are encouraged to participate in this project.

Alamance County awards public contracts without regard to race, religion, color, creed, national origin, sex, age or handicapped condition as defined by North Carolina General Statutes, Section 168A-3.

Alamance County reserves the right to reject any or all bids presented and to waive any informalities and irregularities.
1. CONTRACTOR'S LICENSES. - All applicable state and local licenses will be required.

2. BUILDING PERMITS - Will be the responsibility of the successful contractor.

3. INSURANCE:
   a. Workers' Compensation Insurance
      The Contractor shall maintain during the life of his contract Workers' Compensation insurance for all of his employees employed at the site of the project, and, in case any work is sub-let, the contractor shall require the sub-contractor similarly to provide Workers' Compensation insurance for all the latter's employees employed at the site of the project, unless such employees are covered by the protection afforded by the contractor.
   
   b. Public Liability Insurance
      The Contractor shall maintain public liability insurance covering his liability for bodily injury and property damage which may arise from his operations, contractual obligations, products and completed operations, as well as operations performed by independent contractors, in not less than the following amounts:
      1. A combined single limit (CBL) of $1,000,000 each occurrence, or
      2. A $1,000,000 limit for Bodily Injury Liability, and $1,000,000 limit for Property Damage Liability.
      An occurrence form of policy will be required, and the certificate of insurance submitted by the Contractor must be personally signed by a resident licensed agent of each of the companies listed on that form.
   
   c. Certificate of Insurance
      Each contractor shall furnish the Owner a certificate of insurance showing that the required workers' compensation and public liability insurance are carried by the Contractor. The certificate of insurance should show that it is issued to or at the request of the Alamance County Purchasing Department, Graham, North Carolina. All insurance carriers shall be licensed to do business in North Carolina or approved to issue insurance coverage by the Commission of Insurance of North Carolina.
      
      The Certificate of insurance shall include substantially the following provision: The insurance policies to which this certificate refers shall not be altered or canceled until after ten (10) days written notice of such cancellation or alteration has been sent by certified mail to the Alamance County Purchasing Department, Graham, North Carolina.
   
   d. Alamance County reserves the right to reject any carrier of insurance shown in the certificate of insurance by the Contractor on the grounds of poor claim service or financial responsibility.

4. SAFETY - Contractor shall be familiar, and in complete compliance, with OSHA requirements and regulations.

5. EXAMINATION OF CONDITIONS:
   a. Before submitting a bid, each Bidder shall examine the site. He shall familiarize himself with the site conditions and with the specifications. He shall investigate such local conditions as rules and regulations, availability and cost of labor, etc. which may affect the performance of the contract. No allowances will be made for his failure to do so. No consideration will be given at a later time for alleged misunderstanding as to requirements of work, materials to be furnished, or conditions required by nature of the site.
   
   b. Items incorrect or obviously omitted from the specifications by oversight or error shall be called to the attention of the Owner's representative, who will send written instructions to all Bidders.

6. QUALIFICATIONS - Bidders must have a successful record of experience in the type of work specified.
7. **PAYMENT TO THE CONTRACTOR** - Payment will be made in one lump sum thirty (30) days after the work has been successfully completed and every provision of the specifications complied with to the Owner’s satisfaction unless prior approval is given for the submission of progress payments. Evidence that all accounts are paid in full and three copies of the warranties and guarantees will be required to be submitted to the Owner prior to approval of the final payment.

8. **FINAL CLEANING:**
   a. The contractor shall at all times keep the premises free from accumulation of waste materials.
   b. The Contractor shall be responsible for removing all the construction debris from the premises and disposing of the same at a dump location of his choice.
   c. Restore any grassy areas and replace any sidewalks or pavement damaged during construction.

9. **THE BIDDER** hereby declares that the only person or persons interested in the proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a Bid or Proposal; and that is in all respects fair and in good faith without collusion or fraud. The Bidder further declares that he has examined the site of the work and informed himself fully in regard to all conditions pertaining to the place where the work is to be done; that he has examined the specifications for the work and has satisfied himself relative to the work to be performed.

10. **ALAMANCE COUNTY** reserves the right to reject any or all bids and to waive any informalities or technicalities. All projects are awarded contingent on the availability of funds.

11. **TAXES** – Taxes, if required or included, should be reported separately.

12. **DEFAULT AND PERFORMANCE BOND** - In case of default by the contractor, Alamance County may procure the articles or services from other sources and hold the contractor responsible for any excess cost occasioned thereby. Alamance County reserves the right to require performance bond or other acceptable alternative guarantees from successful bidder without expense to the school system.

13. **SUBCONTRACTOR** - Subcontractors may not be used unless receiving prior written approval from The Alamance County Maintenance Department.

14. **DISPUTE RESOLUTION** - All Construction and Repair projects in the amount of $15,000 or more are subject to the requirements of NCGS 143-128(f1).

15. **SPECIAL REQUIREMENTS REGARDING CRIMINAL BACKGROUND:**
   a. Criminal Background Investigations of individuals working on county property (sites occupied with employees and sites not occupied with employees).
   b. At a minimum, the contractor shall obtain a complete North Carolina statewide criminal background investigation for all employees and subcontractors who will work on this project. In the event that the contractor or subcontractor is from out of state, the criminal background investigation shall be broadened to include their home state, as well as the state of North Carolina as outlined above. The company providing such information must be recognized by local law enforcement agency as qualified to do so. All costs associated with these criminal background checks is the responsibility of the contractor.

Each prime contractor will be responsible for all their employees and all of their subcontractors working under them.
On sites that are occupied, a daily sign-in sheet will be presented by each prime contractor to the building manager. This list will contain the name of each person on site and the company for which they work.

The “Addendum to Proposal/Agreement Between Alamance County and the Contractor” appended to this section referencing use of the E-Verify system or I-9 Documentation must be attached to the construction agreement along with the Iran Divestment Act Certification affidavit included in these specifications.

c. Any individual with the following criminal convictions or pending charges will **NOT** be permitted on any county project or property.

1. Child Molestation or Abuse or indecent liberties with a child;
2. Rape;
3. Any Sexually Oriented Crime;
4. Drugs: Felony use, possession or distribution;
5. Murder, manslaughter or other death related charge; or
6. Assault with a deadly weapon or assault with intent to kill.

d. Any individual with a prior conviction or pending charges contained in the aforementioned list, shall be banned (not allowed) from any county project or property.

Each person on site must wear a plastic laminated identification badge that identifies the name of the company and the person’s name. These badges are to be computer produced at a font large enough to be clearly visible. All costs associated with these criminal background checks is the responsibility of the contractor. The ID badge template will be made available to the successful prime contractors at the Pre-Construction Meeting.

Alamance County, may, at any time, request verification of criminal background investigation for any employee or subcontractor on school property.

16. REQUIRED WORK SCHEDULE:

Prior to beginning work, the contractor is to provide a schedule that defines the construction effort. Work is to be completed as per the approved project schedule, unless revised by the Alamance County Maintenance Department. Work may begin when a Notice to Proceed is given. The Notice To Proceed may be a phone call from a Alamance County Maintenance Department Representative, with a verbal PO number, followed by a written notice to proceed and/or actual PO.

17. PERMITS:

The Contractor is responsible for obtaining all required permits and for having and insuring all applicable certification requirements are met prior to the start of the work. The cost of any required permits is also the responsibility of the Contractor.
INSTRUCTIONS TO BIDDERS
(Informal Construction Projects)

18. **ASBESTOS:**

The Contractor is advised that no representation is made by the Owner that the work site is completely free of asbestos-containing materials. Reasonable steps have been taken by the Owner to identify any such asbestos-containing materials; however, the Contractor is hereby notified that if any suspect materials are encountered, the following steps are to be taken:

1. Stop work immediately.
2. Rope off the work site to prevent anyone from contacting suspect materials. Contact the Owner and describe what was found.

19. **SITE CONDITIONS, UNDERGROUND UTILITIES:**

It is the responsibility of the Contractor to become familiar with the specific conditions at the worksite. The Contractor is responsible for locating and marking all public and private underground utilities. Once marked, it is the Contractor's responsibility to maintain markings for reference. If the Contractor damages any underground utility, the Contractor must arrange for repair of the damage at their cost.

The Contractor must also isolate the work site as much as possible from students/public by means of ropes, fencing, barricades, etc.

**DIGGING -** All digging shall be done Monday-Friday from the hours of 7:00 am until 4:00 pm UNLESS other times are approved by project manager.

20. **SOIL DISRUPTION:**

1. The Contractor will ensure that all holes are refilled and compacted (minimum 95%) in 6” intervals and the area disrupted by his effort is leveled and re-seeded.
2. The Contractor shall avoid driving across sidewalks, grass or other non-vehicular areas. Where vehicular access cannot be avoided, the Contractor shall be responsible for repairing and reseeding these areas to the Owner's satisfaction. The Contractor shall notify the building manager or the maintenance department representative prior to crossing non-vehicular areas.

21. **TRASH:**

All trash, construction debris, etc, should be removed from the site daily or stored safely in a container belonging to the contractor.

22. **DAMAGES:**

The contractor is responsible for repairing all damages his organization causes to any Alamance County property during the performance of the work.

23. **CHANGE ORDERS:**

When unforeseen conditions require modifications to the Contract, the Contractor must propose changes by submitting a request for a change to the Owner. This request must include the following:
**Alamance County Maintenance Department**  
Alamance County, North Carolina  
**INSTRUCTIONS TO BIDDERS**  
(Informal Construction Projects)

1. A statement outlining the reasons for the change and the effect of the change on the contract total cost and time for completion. The request is to provide a detailed description of the proposed change.

2. A detailed list of required products, quantities needed, and unit cost, with the total amount of purchases to be made.

3. Applicable taxes, delivery charges, equipment rental, and amounts of trade discounts

The Alamance County Maintenance Department representative must accept the proposed changes and give a notice to proceed to the Contractor prior to any Change Order work being performed.

24. **PROJECT DELAYS:**

The Contractor will be responsible for contacting the county maintenance department project manager when a delay is anticipated. The PM will evaluate the cause and make a recommendation to his/her supervisor if the delay justifies an extension of time in completing the project. If the delay is deemed warranted and an extension is granted, the PM shall notify the Contractor in writing.

25. **PROJECT DEFAULT:**

If the Contractor defaults or neglects to carry out the work in accordance with the project specifications or fails to provide adequate manpower, material, or resources within 48 hours of written notice of default by Owner, the county may correct such deficiencies, or provide adequate manpower, material, and resources (including supplementing the Contractor's workforce). In such cases, an appropriate change order shall be issued deducting from current or future payments due the Contractor to include the actual cost of correcting such deficiencies, or providing adequate manpower, material, and resources including all other expenses the county incurs. Alamance County may withhold payments to the Contractor until the cost of correction is determined. If payments due to the Contractor are not sufficient to cover such amounts, the Contractor's surety shall pay the difference to the county.

26. **INSPECTIONS:**

The contractor is to notify the Alamance County project manager of all inspection dates and times involving the services of all certifying agencies.

The contractor shall determine, within the specified contract period, when work is completed and ready for owner's acceptance inspection. At the acceptance inspection, the school system representative will, if warranted, record a list of discrepancies that will be used to identify work that is incomplete or not in accordance with the specifications. This list of discrepancies is to be known as the punch list. At conclusion of the final inspection, the owner (Alamance County) shall make the following determination:

1. That the project is complete and accepted.

2. That the project is accepted subject to resolution of the punch list. Correction of work not in accordance with specifications or determined to be unacceptable shall begin within 48 hours after receipt of notice from the owner or inspector and shall be pursued to completion.

3. That the project is not accepted and another date for a final inspection will be identified.
27. **WORKSITE CONDUCT:**

The contractor shall at all times obey the rules and restrictions of the Alamance County Maintenance Department pertaining to conduct while on county property. NO TOBACCO PRODUCTS, ALCOHOLIC BEVERAGES OR WEAPONS ON COUNTY PROPERTY.

Due to the commitment to a drug and alcohol free workplace, it is also the policy of Alamance County that the work environment shall be free of the presence of alcoholic beverages or unlawful controlled substances and that contractor's employees shall perform their job assignment(s) safely, efficiently, and without the adverse influence of alcohol or controlled substances. Therefore, the county prohibits all employees from possessing, using, manufacturing, dispensing, selling, distributing, or being under the influence of illegal drugs and from the use, sale, distribution or possession of drug paraphernalia. All employees are prohibited from unlawfully possessing, using, manufacturing, dispensing, selling, distributing, or being under the influence of alcohol.

28. **SPECIAL REQUIREMENT:**

When on county property, the contractor and all persons performing work for him shall wear some form of identification showing the company name or logo, either by identification badge or by clothing (shirts, uniforms, hats) with the company name or logo.
Addendum to

Proposal/Agreement Number _____________

Between

Alamance County

and

________________________________________

The above referenced Proposal/Agreement is hereby amended by adding a new paragraph as follows:

E-Verify or I-9 Documentation.

The parties hereby stipulate that the contractor shall use the E-Verify system established and maintained by the United States Department of Homeland Security or produce I-9 documentation to ensure that all contractor and subcontractor employees meet the employment eligibility requirements as set forth in the federal laws, rules and regulations and further that the contractor and subcontractor shall maintain E-Verify or I-9 records and make them immediately available upon the written request of Alamance County.

Contractor

By:__________________________________

Alamance County

By:__________________________________
DIVISION 00. PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 002113 INSTRUCTIONS TO BIDDERS

1. **FINAL TIME FOR RECEIVING PROPOSALS:**
   2:00 P.M., local time, Thursday, May 03, 2018.

2. **PLACE FOR RECEIVING PROPOSALS:**
   Alamance Facilities Purchasing Department, 124 W. Elm Street, Graham, N.C. 27253.

3. **PLACE FOR OPENING PROPOSALS:**
   Alamance Facilities Purchasing Department, 124 W. Elm Street, Graham, N.C. 27253.

4. **PROPOSALS RECEIVED BEFORE TIME OF OPENING:**
   Will remain unopened until time for receiving bids.

5. **PROPOSALS RECEIVED AFTER TIME FOR OPENING:**
   Will not be accepted.

6. **OPENING OF PROPOSALS:**
   Publicly opened.
   Tabulations will be sent to all bidders.

7. **EXAMINATION OF DRAWINGS AND DOCUMENTS:**
   Should a bidder find discrepancies in, or omissions from, the drawings or documents, or should he be in doubt as to their meaning, he should at once notify the Architect, who will send written instructions to all bidders. Neither the Owner nor the Architect will be responsible for any oral instructions.

8. **EXAMINATION OF THE SITE:**
   Before submitting a proposal, each bidder should visit the site of the work, fully inform himself as to all existing conditions and limitations, and shall include in the proposal a sum to cover all items included in the contract.

9. **PREBID MEETING:**
   A prebid meeting will be held at the site of the work at 10:00 AM, local time on Tuesday, April 24, 2018.

10. **QUESTIONS AND CLARIFICATIONS:**
    Bidders will have until 12:00 P.M. local time, Friday, April 27, 2018 to submit questions to the architect for clarification and inclusion in a project addendum to be issued to all bidders.

11. **ADDENDA:**
    Any addenda issued and received during the time of bidding shall be included and acknowledged in the proposal and in closing a contract, they will become a part thereof.

12. **ACCEPTANCE OR REJECTION OF PROPOSALS:**
    A. The competency and responsibility of bidders and their proposed subcontractors will be considered in making the award. The Owner does not obligate himself to accept the lowest or any other bid.
    B. The Owner reserves the right to hold proposals for 90 days before award or rejection, and to reject any or all bids.

13. **PAYMENTS:**
    Refer to the Alamance County Instructions to Bidders (Informal Construction Projects) for payment terms.

14. **FIRE INSURANCE:**
    As a condition precedent to effectuation of the contract, furnish certificate of coverage of fire insurance for all the work performed by this contract.
**DIVISION 00. PROCUREMENT AND CONTRACTING REQUIREMENTS**

**SECTION 002113 INSTRUCTIONS TO BIDDERS (CONTINUED)**

15. **CONTRACTOR’S LICENSE:**
Contractor’s are hereby notified that they must have proper license under the State laws governing their respective trades and that North Carolina General Stature 87 will be observed in receiving and awarding contracts. General Contractors must have general license classification for at least LIMITED BUILDING.

16. **TIME FOR COMPLETION:**
A. The work included under this contract to be substantially complete no later than Sixty (60) days after issuance of the contract for construction.
B. If the Contractor is delayed at anytime in the progress of his work by changes ordered in the work; abnormal weather conditions; or any causes beyond the Contractor’s control or any other causes deemed justifiable by the Architect, then the contract time shall be reasonably extended in a written Change Order from the Architect.
C. The Contractor is to notify the Architect within one day of any delays caused by conditions beyond his control. A written report shall be submitted with the Contractor’s application for payment each month listing all requests for contract time extensions for that month. No extensions in time will be allowed if not handled in this manner.

17. **USE OF SITE:**
A. The Contractor will have access and control of the area of work for demolition and construction purposes during normal business hours Monday through Friday. Access is possible at other times but must be approved by the site administrator and the Alamance County Maintenance Department. Owner must have use of the facility throughout the construction period. Utilities will be provided by the Owner and must be kept in operation during business hours.
B. Daily work hours are normally limited to the hours between 7:00 AM and 6:00 PM, Monday through Friday, work hours other than these times should be cleared in advance with the Owner’s representative. Weekend work and extended work day hours may be permissible with written permission of the Owner. The use of generators, mechanical equipment, and other work items generating noise are to be limited to times outside normal business hours, unless approved by the Owner.

18. **PREPARATION OF PROPOSALS:**
To be entitled to consideration, proposals must be made in accordance with the following instructions:
A. Proposals shall be made upon the proposal form provided, and all blank spaces in the forms shall be filled; numbers shall be stated both in writing and in figures; the signature shall be long hand; and the completed forms shall be without interlineation, alteration, or erasure.
B. Proposals shall not contain any recapitulation of the work to be done. No oral, telegraphic, or telephonic proposals or modifications will be considered.
DIVISION 00. PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 002113 INSTRUCTIONS TO BIDDERS (CONTINUED)

19. **PROPOSALS:**
Proposals may be transmitted to the Owner as follows:

A. Hand Delivery:
   Address to Randy J. Clark, Alamance County Purchasing Manager and deliver enclosed in an opaque envelope marked as follows:

   "HSC Airborne Infection Isolation Room Modifications
   Quote #18-Q010
   Alamance County Office Building
   124 West Elm Street
   Graham, North Carolina 27253
   Attn: Randy Clark"

   Include North Carolina Contractor's license on envelope.

   End of Section
Form of Proposal
HSC Airborne Isolation Room Modifications

Alamance Health Services Building
Alamance County Health Department
319 North Graham Hopedale Road
Burlington, North Carolina 27217

Quote #18-Q010

Bidder: ________________________________________________

Date: _______________________________________________

The undersigned, as Bidder, hereby declares that the only person or persons interested in this proposal as
principal or principals is / or named herein and that no other person than herein mentioned has any
interest in this proposal or in the contract to be entered into; that this proposal is made without connection
with any other person, company, or parties making a bid or proposal; and that it is in all respects fair and
in good faith without collusion or fraud.

The Bidder further declares that he has examined the site of the work and the contract documents relative
there to, and has read all special provisions furnished prior to the opening of bids; that he has satisfied
himself relative to the work to be preformed.

The Bidder proposes and agrees if this proposal is accepted to contract with the Alamance County
Maintenance Department (Owner), in the form of contract specified, to furnish all necessary materials,
equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the
fabrication and delivery of the project “HSC Airborne Infection Isolation Room Modifications, Alamance
Health Services Building, 319 North Graham Hopedale Road, Burlington, North Carolina 27217” in full and
complete accordance with the plans, specifications and contract documents, to the full and entire
satisfaction of the Owner, with a definite understanding that no money will be allowed for extra work
except as set forth in the General Conditions and other contract documents, for the sum of:

Single-prime contract:

BASE BID:

$_____________________________________________________

Dollars $_____________________________________________

TIME FOR COMPLETION:
The bidder further proposes and agrees hereby to commence work under this contract upon receipt of a
purchase order and a written notice to proceed from the Owner, and shall substantially complete all work
Sixty (60) days after issuance of the contract for construction.
**ADDENDA:**
The following addenda were received and used in computing this bid:

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RESPECTIVELY SUBMITTED this ________ day of ________________________, 20 ___.

(Name of firm or corporation making bid)

By: _________________________________________

Title: ________________________________________

(Owner/Partner/President/Vice President)

WITNESS: (Proprietorship/Partnership) Address: ________________________________

By: ________________________________ License No. ________________________________

Federal ID No. ________________________________

ATTEST: (Corporation)

By: _________________________________________

Title: ________________________________________

(Corp. Secretary or Asst. Secretary Only) (CORPORATE SEAL)
DIVISION 00. PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 007200 GENERAL CONDITIONS

1. The "General Conditions of the Contract for Construction", AIA Document A201, 2007 Edition; Articles 1 thru 14 inclusive are hereby made a part of the contract documents to the same extent as if herein written out in full.

2. Copies of this document may be purchased from the American Institute of Architects, 1735 New York Avenue, N.W., Washington, D.C. 20066.

3. Copies of this document are available for inspection in the Architect's office and may be reviewed upon request.

4. Where any article is supplemented under Section 007300, the AIA provisions of such article shall remain in effect and the supplemental provisions shall be considered as added hereto.

5. Where any article is amended, voided, or superceded under Section 007300, the AIA provisions of such article not so specifically amended, voided, or superceded shall remain in effect.
STATE OF NORTH CAROLINA
HSC AIRBORNE ISOLATION ROOM MODIFICATIONS AGREEMENT
COUNTY OF ALAMANCE

This AGREEMENT, made this the _______ day of _________________ 2018, by and between
ALAMANCE COUNTY, a political subdivision of the State of North Carolina, 124 West Elm
Street, Graham, North Carolina, 27253 hereinafter called the Owner, and

______________________________________________ , ________________, North Carolina,
hereinafter called the Contractor:

W I T N E S S E T H:

WHEREAS, the Owner has need to modify the mechanical system for the HSC Airborne
Infection Isolation Room in the Alamance Health Services Building, 319 Graham Hopedale
Road, Burlington, NC 27217, hereinafter called the Project; and

WHEREAS, the Owner desires to employ the Contractor to complete the Project in accordance
with the requirements set forth in the attached Request for Written Quotes dated __________,
2018 a copy of which is attached to this Agreement as Exhibit A and incorporated herein as if set
forth; and

WHEREAS, the Contractor has set forth its proposal for the Project dated January 12, 2018, a
copy of which is attached to this Agreement as Exhibit B and incorporated herein as if set forth;
and

NOW, THEREFORE, in consideration of these premises and of the scope of work, terms and
conditions herein set forth in this Agreement, including Exhibits A & B, the parties agrees as
follows:

The Contractor agrees to furnish and perform for the Project as follows:

1. General. Contractor shall be properly licensed for the work in accordance with Section
87 of the North Carolina General Statutes. General Contractors shall have a general
license classification for at least LIMITED BUILDING in accordance with the Rules &
Regulations of the North Carolina Licensing Board for General Contractors.

2. Insurance Requirement. Contractor shall provide evidence of insurance in the minimum
amount of $1 Million for General Liability (each occurrence), Commercial Auto Liability
Coverage, Personal Liability Coverage ($2 Million) and Workers Compensation (min $500,000
per accident). Certificates of Insurance shall be provided prior to award of any contract.

3. Scope of Work. Contractor shall furnish all materials and labor for modifications to the
mechanical system in selected offices located in the Alamance County Office Building. The
building is located at 124 West Elm Street, Graham, North Carolina 27253.
A brief description of work in the Project follows:

1. Removal and replacement of ceiling tile and grid as necessary to install new mechanical ventilation equipment and ductwork, install new ceilings and ceiling grid, paint, and other items as shown on the drawings and described in the project specifications.

2. Project start date is ____________, 2018. Project duration should not exceed 60 days from date of award.

3. Contractor shall furnish all labor, supervision, materials and equipment necessary to perform the work for the Project as shown on the plans and described in the project specifications.

The Owner shall not during such site observations supervise, direct, or have control over the Contractor's work nor shall the Owner have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected by the Contractor, including safety measures.

4. **Post Construction Services.** Upon completion of the construction of the Project, Contractor will furnish Owner with "Record Drawings" that reflect any changes that were made during the Project; advise and jointly with the Owner administer the enforcement of all guarantees and warranties made by each supplier of sub-contractor under the terms of any such suppliers or sub-contractor's agreement.

5. **Compensation.** The Contractor shall be compensated for Project services provided herein, on a lump sum basis in the amount of $__________ upon completion and acceptance of the Project by the Owner.

6. **Termination of Contract.** In the event this contract is terminated by the Owner, the Contractor shall be compensated for the time spent on the project based on the attached hourly charge rate schedule of those performing said services on the contract.

7. **E-Verify.** The parties hereby stipulate that the Contractor shall use the E-Verify system established and maintained by the United States Department of Homeland Security to ensure that all Contractor and subcontractor employees meet the employment eligibility requirements as set forth in the federal laws, rules and regulations and further that the Contractor and subcontractor shall maintain E-Verify records and make them immediately available upon the written request of the Owner.
IN TESTIMONY WHEREOF, the County of Alamance and __________________, Inc. has caused this contract to be executed in its corporate name by the County Manager, attested by the Clerk, and its corporate seal to be hereunto affixed, and the said __________________, Inc. has caused this contract to be executed in its corporate name by its Senior Vice President, attested by its corporate Secretary, and its corporate seal to be hereunto affixed, the day and year first above written.

(SEAL)

COUNTY OF ALAMANCE

By: ____________________________
   Bryan Hagood, County Manager

ATTEST:

______________________________
Tory Frink, Clerk

(SEAL)

______________________________
, INC.

By: ____________________________
   President

ATTEST:

__________________________________
Date: ____________________________

______________________________
Secretary
DIVISION 00. PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 007300 SUPPLEMENTARY GENERAL CONDITIONS

ARTICLE 1:
The Supplementary General Conditions are to supplement, or amend the "General Conditions of the Contract" and intended to address job specific issues.

ARTICLE 2. CONTRACTORS LIABILITY INSURANCE:
Refer to the enclosed "ALAMANCE COUNTY MAINTENANCE DEPARTMENT INSTRUCTIONS TO BIDDERS" for necessary insurance requirements.

ARTICLE 3. PROPERTY INSURANCE 11.3:
Builders risk insurance shall be purchased by the Contractor.

ARTICLE 4. TIME FOR COMPLETION:
A. The Contractor shall commence all work to be performed under this contract upon receipt of a Purchase Order from the Alamance County Maintenance Department and shall fully complete all work hereunder in accord with the completion date noted in Section 002113 Instructions to Bidders.
B. If the Contractor is delayed at anytime in the progress of his work by changes ordered in the work; abnormal weather conditions; or any causes beyond the Contractor's control or any other causes deemed justifiable by the Architect, then the contract time shall be reasonably extended in a written Change Order from the Architect.
C. The Contractor is to notify the Architect and the Owner within one day of any delays caused by conditions beyond his control. A written report shall be submitted with the Contractor's application for payment each month listing all requests for contract time extensions for that month. No extensions in time will be allowed if not handled in this manner.

ARTICLE 5. SPECIFICATION EXPLANATION:
A. These specifications are of the abbreviated or "streamlined" type and include incomplete sentences. Omissions of works or phrases such as "the contractor shall", "in conformity therewith", "shall be", "as noted on the drawings", "according to the plans", "a", "the", and "all" are intentional. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" appears on the drawings.
B. All references to known standard specifications shall mean and intend the latest edition of such specifications.

End of Section
DIVISION 01 GENERAL REQUIREMENTS

SECTION 011100 SCOPE OF WORK

PART 1 - GENERAL

1.01 Work covered by the contract documents:

A. Work under this contract consists of furnishing labor, materials, and equipment necessary to perform the following work, which includes, but is not limited to:

B. Division 02 - Existing conditions:
   Demolition:
   1. Carefully remove and protect the existing lighting fixtures, and all ceiling mounted devices.
   2. Remove existing exhaust duct where shown on the drawings and the exhaust fan.
      Refer to the demolition specification for special handling of these materials.
   3. Remove the ceiling tile and grid in the areas of new work along with all mechanical items as shown on the mechanical drawings for removal.
   4. Protect and reinstall the existing lighting fixtures and devices once the new mechanical work is in place.

C. Division 07 - Moisture Protection:
   1. Caulking and sealants.
   2. Fire caulking at existing fire rated assemblies.

D. Division 09 - Finishes:
   1. Repair and seal any openings in the drywall above the ceilings in Waiting 160 and Exam 161.
   2. Install new ceiling tile, grid, in Waiting 160 and Exam 161.
   3. Paint the walls in Waiting 160 and Exam 161.

   1. New mechanical equipment.
   2. Ductwork, grilles, and registers.
   3. Controls and wiring.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

End of Section
DIVISION 01 GENERAL REQUIREMENTS

SECTION 013323 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 - GENERAL

1.01 Section Includes:
A. Requirements for information to be provided in submittals.
B. Submittal procedures for shop drawings, product data, manufacturer's installation data and samples.

1.02 Related Requirements in other Sections:
A. Product options and substitutions (Section 016000).
B. Definitions and additional responsibilities of parties (General Conditions).
C. Requirements of individual Sections of Specifications.

1.03 Shop Drawings:
A. Shop Drawings are drawings, sketches, diagrams, or other data prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work. The use of manufacturer's standard catalog details without modification is prohibited.
B. Present in a clear and thorough manner. Title each shop drawing with Project name and number, identify each element of drawings by reference to sheet number and detail.
C. Identify field dimensions; show relation to adjacent or critical features of work or products.
D. Details shall indicate materials to be used by product identification and their relation to as-built conditions. Show all fasteners including size, length, and spacing. Generic details of the membrane manufacturer may be submitted for information but will not be accepted as shop drawings.

1.04 Product Data:
A. Product Data are illustrations, standard schedules, performance capabilities and charts, instructions, brochures, diagrams and other information furnished to illustrate a material, product, or system for some portion of the Work.
B. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification section and Article number. Show reference standards, and performance characteristics; finishes; dimensions; and required clearances.
C. Modify manufacturer's standard drawings and information in order to provide information specifically applicable to the work of this Contract. Delete information not applicable.

1.05 Samples:
A. Label each sample to clearly identify material and function, and specific specification section which is applicable.
B. Samples shall be in triplicate, one to be retained by the Architect, one to be returned to the Contractor and one to be placed on file in the Contractor's field office for comparison to the materials delivered.

1.06 Contractor Review:
A. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.
B. Coordinate submittals with requirements of work and of Contract Documents. All submittals shall be transmitted to the Architect/Engineer in ample time to prevent delays in the work. Shop drawings shall be submitted in advance of start of work of this project.
C. Sign or initial each sheet of shop drawings and product data, and each sample label to certify compliance with requirements of Contract Documents. Notify Architect in writing at time of submittal, of any deviations from requirements of Contract Documents.
D. Do not fabricate products or begin work which requires submittals until return of submittal with Architect/Engineer acceptance.
DIVISION 01 GENERAL REQUIREMENTS

SECTION 013323 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES (CONTINUED)

1.07 Submittal Requirements:
   A. All Shop Drawings, Project Data, and Samples shall be submitted to the Architect/Engineer, through the Contractor, for review.
   B. All Shop Drawings for the initial submission shall be submitted in the form of one reproducible copy (sepia media) and two prints for each sheet required. After the Architect/Engineer's review, this reproducible will be returned to the Contractor. Should printed catalog data be required with the submission, four copies shall be submitted. Two copies will be retained by the Architect who will forward one copy to the Owner, and the remainder will be returned to the Contractor.
   C. Transmit submittals in such sequence to avoid delay in the work or work of other contracts. All such submittals must be accompanied by a transmittal letter indicating:
      
      PROJECT NUMBER AND TITLE
      VENDOR'S OR MANUFACTURER'S NAME
      LIST OF SHOP DRAWINGS NUMBERS, TITLES & QUANTITIES OF EACH
   D. Provide 4" x 4" blank space on each submittal for Contractor and Architect/Engineer stamps.
   E. Apply Contractor's stamp, signed or initialed, certifying to review, verification of products, field dimensions and field construction criteria, and coordination of information with requirements of work and Contract Documents.
   F. Coordinate submittals into logical groupings to facilitate interrelation of the several items.
   G. Number of Submittals Required:
      1. Shop Drawings: Submit to the Architect/Engineer one (1) reproducible on mylar film and two (2) bluelines.
      2. Product Data: Submit the number of copies which the Contractor requires, plus two (2) additional copies to the Architect/Engineer, one of which will be forwarded to the Owner.
      3. Samples: Submit the number stated in each specification section but in no case less than two (2) samples shall be submitted.
   H. Submittals Shall Contain:
      1. The date of submission and the dates of any previous submissions.
      2. The Project title and number.
      3. Contract identification, including names of Contractor, Supplier and Manufacturer.
      4. Identification of the product, with the Specification section number.
      5. Field dimensions, clearly identified as such.
      6. Relation to adjacent or critical features of the work or materials.
      7. Applicable standards, such as ASTM or Federal Specification numbers.
      9. Identification of revisions on resubmittals.
      10. Contractor's stamp "For Approval Only". All submittals not so stamped will not be accepted for review.
      11. Contractor's stamp certifying review of submittal by the Contractor.

1.08 Resubmittals:
   A. When corrections are necessary and a resubmittal is not requested, two copies of corrected "field use" drawings will be forwarded to the Architect/Engineer for file purposes. Where resubmittal is requested, the Contractor shall make all corrections required by the Architect/Engineer and shall resubmit accordingly.
   B. Make resubmittals under procedures specified for initial submittals; identify changes made since previous submittal.
   C. Shop Drawings and Product Data:
      1. Revise initial drawings or data, and resubmit as specified for the initial submittal. Clearly indicate any changes which have been made other than those requested by the Architect/Engineer.
      2. When stamped for construction, submit two (2) reproducibles to the Architect/Engineer.
   D. Samples: Submit new samples, as required, for initial submittal.
DIVISION 01 GENERAL REQUIREMENTS

SECTION 013323 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES (CONTINUED)

1.09 Architect/Engineer Duties:
A. Review submittals with reasonable promptness and in accordance with schedule. Transmittal turnaround time shall be approximately seven (7) days after receipt by Architect/Engineer.
B. Affix stamp and initials or signature, and indicate requirements for resubmittal, or approval of submittal.
C. Return submittals to Contractor for distribution or for re-submission.

1.10 Owner's Duties:
A. Approval or acceptance of Shop Drawings, Product Data or Samples will not preclude the rejection of the completed Work. After approval, no change in brand or make will be permitted unless agreed to in writing by the Owner. The Owner reserves the right to require submission of examples of any materials whether or not required by the Contract Documents.
B. The Owner's review of Shop Drawings, Product Data or Samples shall not relieve the Contractor from its responsibility for complying with the Drawings and Specifications, for the accuracy of the Work, nor for the furnishing of all materials required for the Work.

PART 2 - PRODUCTS
Not Used.

PART 3 - EXECUTION
Not Used.

End of Section
DIVISION 01  GENERAL REQUIREMENTS

SECTION 014300 QUALITY CONTROL

PART 1 - GENERAL

1.01 The General Contractor shall maintain quality control over products, services, site conditions, and workmanship, to produce work of specified quality.

1.02 The General Contractor shall arrange with material and equipment manufacturers and representatives, if required or requested by the Architect/Engineer, to provide qualified personnel to instruct installers, the Owner's maintenance personnel, and any other parties designated by the Owner on the proper handling, installation, and maintenance of materials and equipment used on this project.

1.03 Contractor shall provide a complete set of Drawings, shop drawings, and Specifications at a designated location on the project at all times for the use of all parties.

1.04 Telephone:
   A. The Contractor shall provide at this expense, a job telephone, mobile telephone, cell telephone, or pager for project communications for the duration of the contract.
   B. Local calls shall be paid by the General Contractor, toll calls shall be paid by the party making the call.

1.05 Emergency Call List:
The Contractor shall supply the Owner with an Emergency Call List of the Contractor's Supervision responsible for contacting Contractor's personnel in emergencies. The Contractor shall furnish and maintain pagers for the Contractor's Supervision. The Contractor shall be responsible for designating its supervision which will carry the pagers.

1.06 PROGRESS SCHEDULE:
   A. The Contractor shall prepare and deliver to the Owner a Progress Schedule satisfactory to the Owner covering all Work on the Project within twenty (20) days after a written Notice to Proceed or of the Contract Date. The Progress Schedule shall describe, in written form, the general step-by-step procedure of Work.
   B. The Progress Schedule shall show the date when the operation of each Specification Section is to begin and is to be completed and the dollar value to be completed each month. Each Progress Schedule, after the first submission, shall incorporate a progress graph comparing the percent of the total work actually completed by the Contractor against that anticipated by the Progress Schedule. The Progress Schedule shall be updated bimonthly unless the Owner requires more frequent revision, in CPM format.
   C. If the Contractor at any time knows or has reason to believe that the delivery of any item of material or equipment or the shortage of qualified labor or delays caused by others or the occurrence of any other difficulty may cause a delay in carrying out the approved order of Work of the Progress Schedule, the Contractor shall notify the Architect in writing within three (3) days of acquiring such knowledge, but in any event, within three (3) calendar days of the commencement of the delay.

1.07 Work found to be in violation of the specifications, or not in conformance with acceptable construction practices, shall be subject to rejection including complete removal and replacement with new material at the Contractor's expense.

1.08 Discrepancies:
   If during the performance of the Work, the Contractor discovers errors or discrepancies in the Drawings or Specifications, then the Contractor shall promptly bring these to the attention of the Architect/Engineer in writing which shall promptly reconcile such errors or discrepancies. The Owner will not be liable for any costs incurred by the Contractor due to such errors or discrepancies if the Contractor proceeds with the Work in question without the written approval of the Architect/Engineer.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

End of Section
PART 1 - GENERAL

1.01 Utilities/Equipment:
A. Use of existing utilities, power and/or water will be furnished by the Owner for his work. Necessary connections to be by the Contractor.
B. Should usage become excessive, as determined solely by the Owner’s representative, the Contractor shall pay City rates for the utility usage.

1.02 Ventilation:
Provide, as required, facilities to maintain specific storage conditions as described within this specification and as recommended by materials manufacturers for use in construction.

1.03 Sanitary Facilities:
A. Toilets shall be designated for use by the Owner for use by the contractor and shall be kept in a clean and sanitary condition.
B. Failure to adequately maintain the Owner’s facilities may result in revocation of this privilege and require temporary toilet facilities be furnished for the remainder of the project.

1.04 Construction Aids:
A. Contractor shall provide scaffolding and ladders for access to roof and high work areas at all times during construction. Scaffolding and ladders shall meet all OSHA safety requirements. Contractor shall provide ladders for access to all adjacent work areas. Existing facilities of the Owner outside the area of construction may not be used for storage during construction.
B. Construction cranes shall be permitted on site only at times approved by the facility manager.
C. All existing entrances and/or fire exits are to be maintained by the Contractor during the period of construction. The contractor shall provide accident prevention signage per NC OSHA requirements.

1.05 Use of Site:
A. The Contractor shall be permitted access to the facility on the days noted at the prebid meeting or during normal business hours until the project completion date. Access at other times must be approved by the Alamance County Maintenance Department and the facility manager.
B. The Owner should be advised at least 24 hours prior to commencement of any work which could affect facility operations.
C. Utilities that effect use of the facility by the Owner are to be kept in operation, accidental damage to existing systems designated to remain operational must be corrected immediately by the Contractor after notification has been given to the Architect and the Owner. If damages are not corrected in a timely manner, the Owner reserves the right to make the necessary repairs and deduct this expense for the contract amount.

1.06 Cleaning During Construction:
A. The Contractor shall at all times, maintain the Owner's premises, property, and the Project site in a neat and orderly condition, free from accumulations of waste materials and rubbish during entire Project period. During the execution of the Work, adjoining areas shall not be littered or obstructed any more that necessary for the performance of the Work. The Contractor shall have the responsibility for removing and disposing of all cartons, crates, trash and all flammable waste materials from the Work areas and for complying with all codes and regulations pertaining to the disposal of debris.
B. Residue and debris from construction operations shall not be allowed to accumulate and shall be removed from the Site and disposed of daily, unless prior arrangement is made with the Architect/Engineer and the Owner's Representative.
C. Project debris and litter shall be disposed of in Contractor's dumpsters. The use of the Owner's trash bins and dumpsters is prohibited.
D. Streets and sidewalk adjacent to the site shall not be used to store debris or construction materials without prior approval. All areas used for construction staging shall be approved in advance.
DIVISION 01 GENERAL REQUIREMENTS

SECTION 015000 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS (CONTINUED)

1.07 Project Security
   1. Contractor shall provide all necessary security means to protect his work, materials, tools, and construction equipment from vandalism, theft, and fire. Provide fire watch when using kettles and torches.
   2. Private security services shall be supplied by the contractor as he deems necessary. Any security service set up by the contractor shall be approved by the Owner.
   3. The contractor shall be responsible for replacement of his materials, machinery, equipment, tools and supplies due to theft or mysterious disappearance.
   4. Contractor shall be responsible for placing identifying markings on all tools, equipment and job boxes. Contractors name shall be clearly marked on all job tool storage containers.
   5. The Contractor shall be responsible for scheduling and coordination all work to prevent damage to the existing building by inclement weather, or by unauthorized entry during unoccupied periods and shall, where necessary, to control and prevent such damage or entry, install temporary closures for openings.

1.08 Smoking:
   Smoking privileges will be as approved by the Owner.

1.09 Firearms:
   No firearms shall be allowed on Owner’s property.

1.10 Worker Conduct:
   1. If the conduct or performance of any of the Contractor's personnel, Sub-Contractor, material vendor or any other person performing work for the Contractor, or is otherwise on the Owner’s property as a result of the Contractor’s work, is improper, inappropriate, or is not in strict accordance with the Contract Documents, the Contractor shall remove such persons from the Work.
   2. Long pants and sleeved shirts are required to be worn at all times. Personnel wearing clothing with obscene designs or profane language will be asked to change clothes or be required to leave the site.
   3. Contractors personnel are prohibited from having firearms or drugs in their possession while on the Owner’s property.

1.11 Existing Building Exiting:
   All accessible entrance and/or fire exits are to be maintained by the general contractor during the period of construction.

1.12 Removal of Temporary Utilities and Facilities:
   General Construction Contractor shall remove all temporary utilities and facilities at the end of the construction period, earlier with the approval of the Architect and Owner’s Construction Project Manager. Removal of temporary utilities and facilities to be coordinated with the Owner’s Representative.

1.13 Work Site Restrictions:
   Working Hours:
   A. The contractor may establish a working schedule of his own choosing for the portions of construction involved in the project that do not require interruptions of utility services (electric, water, steam, etc.) to the facility facilities. The contractor shall submit to the Owner his regular daily work schedule, and shall notify the Owner in advance of any deviations from the schedule. The Owner reserves the right to limit the contractor's activities when they conflict with the Owner's operations. The Owner will solely approve the scheduling of all interruptions of utilities to the building or site facilities.
   B. Daily work hours:
      1. Hours of work shall generally be from 7:00 AM until 6:00 PM, Monday through Friday.
      2. Weekend work and extended work day hours may be permissible with written permission of the Owner.
      3. The use of generators, mechanical equipment, and other work items generating noise may be restricted within certain work hours.

1.14 Project Safety:
   A. It will be the Contractor's responsibility to maintain strict project safety standards and at all times take extreme caution to protect the safety of the public.
DIVISION 01 GENERAL REQUIREMENTS
SECTION 015000 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS (CONTINUED)

B. No unattended ladders may be left in place.
C. Area around all work must be roped-off with clear, highly visible, warning signs posted.
D. Protective measures must be maintained in all areas where work will be occurring that could endanger the safety of the public.
E. Scheduled times for deliveries, crane operation, and removal of debris will need to be coordinated with the local facility managers in order to cause the least amount of disturbance to facility activities.

PART 2 - PRODUCTS
Not Used.

PART 3 - EXECUTION
Not Used.

End of Section
DIVISION 01  GENERAL REQUIREMENTS

SECTION 016000 PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 Products:
   A. Products include materials, equipment and systems.
   B. Comply with specifications and referenced standards as minimum requirements.
   C. Do not use materials and equipment removed from existing structure, except as specifically required or allowed by Contract Documents.

1.02 Co-Operation:
   A. The Contractor and all Sub-Contractors shall co-ordinate their work with all adjacent work and shall cooperate with all trades to facilitate general progress of their work.
   B. It is the responsibility of all the Contractors to keep the Architect and the Owner fully informed of work schedules and to contact the Architect and the Owner at least 24 hours prior to commencement of any phase of work that may affect any of the Owners on site activities.

1.03 Workmanship:
   A. Work shall be performed by persons qualified to produce workmanship and quality specified.
   B. The Job Foreman shall provide full-time supervision. Job Foreman must speak and communicate in English. At no time shall mechanics and laborers be left on-site without supervision of the Job Foreman without notifying the Architect/Engineer.
   C. The Contractor shall appoint a suitably qualified and competent Superintendent/Project Manager to supervise all of the Work on site. Where the extent of the Work is such that a full time Superintendent/Project Manager is not justified, the Contractor's Foreman is to be appointed to oversee the Work of the others, attend Owner's meetings and to be the Contractor's representative on site for the purpose of making on-site decisions.

1.04 Personnel:
   A. If the conduct or performance of any Subcontractor, material-vendor or any other person or entity performing Work under a contract or agreement with the Contractor is improper or is not in strict accordance with the Contract Documents, the Contractor shall terminate the contract or agreement of such Subcontractor, material-vendor, person or entity and remove it from the Work. The Contractor shall have the responsibility of ensuring that a termination provision setting for the foregoing agreement is included in each contract, purchase order, Subcontract or service agreement into which it enters with respect to the Work.
   B. If the conduct or performance of any of the Contractor's personnel is improper or is not in strict accordance with the Contract Documents, the Contractor shall remove such persons from the Work.

1.05 Materials:
   A. All materials shall be new and of the quality specified. Workmanship shall be of the highest caliber of the particular trade involved. Also, except as exceeded or qualified by the Specifications, workmanship shall be as stipulated in written standards of recognized organizations of institutes of the respective trades.
   B. Should the Specifications and Drawings fail to particularly describe the material or kind of goods to be used in any place, then it shall be the duty of the Contractor to make inquiry of the Architect/Engineer for what is best suited. The material that would normally be used in this place to produce first quality finished Work shall be considered a part of the Contract.
   C. Materials as required by this Contract shall be provided by one manufacturer for each item unless specified otherwise or unless exception is made by the Architect/Engineer.
   D. Materials Containing Asbestos:
      No materials containing asbestos are to be used on this project. If the Contractor encounters any such materials other than what is noted on the drawings or in the specifications for removal, or if any such materials are submitted for approval, he should at once contact the Architect who will authorize removal or replacement.

1.06 Manufacturer's Instructions:
   Work shall be performed in accordance with the Material Manufacturer's specifications or as modified by Contract Documents. Conflicts between these specifications and the Materials
Manufacturer’s specifications shall be brought to the attention of the Architect/Engineer prior to beginning construction. Work as relates to conflict shall not proceed until conflicts are satisfactorily resolved by Architect/Engineer.

1.07 Transportation and Handling:
A. Transport products by methods to avoid product damage. Deliver all materials with Manufacturer’s labels intact and legible.
B. Provide equipment and personnel to handle products by methods to prevent damage.
C. Timing of deliveries of materials to the site to be coordinated with the Owner.

1.08 Storage and Protection:
A. Store any material susceptible to water damage in clean, dry, weather tight condition in a manner to protect against loss, damage, and wetting. On site storage of materials to be coordinated with the Owner’s representative. Wet materials shall be marked, rejected for installation, and removed from the site.
B. Materials subject to moisture intrusion and damage shall be stored on clean, dry, and raised platforms so as to prevent wetting or moisture absorption and yet provide sufficient ventilation to prevent condensation. These materials shall be covered so as to be completely weathertight. Factory-applied wrapping shall be unacceptable as the sole means of protection.
C. Any materials which when subject to moisture intrusion may have a detrimental effect on the installation of the roofing system, shall be stored as indicated Item 1.07B.
D. Materials that are damaged in any way or indicate moisture content above equilibrium shall be rejected as unacceptable.
E. Contractor shall employ all means possible to protect the remaining Owner’s Facilities from water intrusion. All materials used in the protection of the facilities shall be approved roofing membrane materials. The use of Visqueen, duct tape, or other similar materials by the Contractor is not acceptable for temporary protection.

1.09 Product Options:
Contractor Product Selection:
A. Products specified only by referenced standard: Any product meeting that standard.
B. Products specified by naming several manufacturers: Products of any named manufacturer meeting specifications.
C. Products specified by naming one or more manufacturers and “or as approved”; Submit a request for substitution in accordance with Item 1.09 of this Section.

1.10 Substitutions:
A. After award of the contract and prior to commencing work, the Architect/Engineer will consider requests from the Contractor for substitutions. Substitutions will then be considered only when a product becomes unavailable due to no fault of the Contractor.
B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
C. A substitution request constitutes a representation that the Contractor:
   1. Has investigated the proposed product and determined that it meets or exceeds, in all respects, specified product.
   2. Shall provide the same warranty for substitution as for specified product.
   3. Shall coordinate installation and make other changes which may be required for work to be complete in all respects.
   4. Waives claims for additional costs which may consequently become apparent.
D. Substitutions will not be considered when they are indicated or implied on Shop Drawings or Product Data submittals without separate written request, or when acceptance will require substantial revision of Contract Documents.
E. Samples of proposed substitutions shall be submitted with the request for substitution. Shop Drawings will not be considered for review on materials which have not been completely checked and stamped by the Contractor and, if substitutions, have not been previously submitted as called for in Section 013323.
F. The Architect/Engineer will determine acceptability of proposed substitution and will notify the Contractor of acceptance or rejection in writing within a reasonable time.
DIVISION 01 GENERAL REQUIREMENTS

SECTION 016000 PRODUCT REQUIREMENTS (CONTINUED)

PART 2 - PRODUCTS Not Used.
PART 3 - EXECUTION Not Used.

End of Section
DIVISION 01  GENERAL REQUIREMENTS

SECTION 017000 EXECUTION AND CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 Closeout Procedures:
   A. A final inspection shall be conducted at the completion of the project at a time and date acceptable to the Architect, Owner, and Contractor. The final inspection shall be attended by the General Contractor, Owner’s Representative, the Architect, Consulting Engineer, primary Sub-Contractors, and other designated persons.
   B. The results of the inspection conducted by these parties, shall be recorded by the Architect. Items found to be incomplete or not in accordance with the contract documents shall be noted and a written punchlist forwarded to the Contractor for remedial action. The Owner shall also receive a copy of the punchlist.
   C. Contractor shall remedy any and all deficiencies prior to final acceptance by the Architect.

1.03 Final Cleanup:
   Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.04 Closeout Documentation:
   A. Project Record Documents:
      1. At termination of work, the Contractor shall submit three sets of record drawings for approval by the Architect and submission to the Owner at the completion of the project.
      2. These drawings shall note the location of capped utilities, active utilities encountered during demolition in the area of work, or other such information which could be of use to the Owner or others in locating concealed utilities in the future.
      3. Submit "as built" documents with letter of transmittal indicating date, project number, Contractor’s name and address, list of documents, and signature of Contractor. “As-built” documents must be submitted prior to Owner releasing final payment for project.
   B. Guaranties/Warranties:
      1. Provide copies of all contractor’s and manufacturer’s guaranties and warranties requested properly executed in triplicate.
      2. Guaranties and warranties shall state name of project, location, name of Owner, name of Applicator, and date of substantial completion and final acceptance.
      3. Date of substantial completion and final acceptance will be as determined by the Architect for the entire project.
   C. Contractor’s Final Application and Certificate for Payment (AIA Document G702) or approved equivalent in triplicate, properly executed and notarized.
   D. Contractor’s Affidavit of Release of Liens (AIA Document G706A) in triplicate.
   E. Contractor’s Affidavit of Payment of Debts and Claims (AIA Document G706) in triplicate.

PART 2 - PRODUCTS
   Not Used.

PART 3 - EXECUTION
   Not Used.

End of Section
1.01 Section Includes:

Work of this Section includes demolition and removal of all materials shown on Drawings and as specified herein within boundaries of work.

A. Remove and protect the following items for reinstallation at the completion of the work:
   1. Lighting fixtures.
   2. Ceiling mounted fire alarm devices, speakers, etc. to be removed and reinstalled.
   3. Mechanical grilles and diffusers as noted on the mechanical drawings.

B. Remove the following items from the work:
   Existing ceiling tile and grid in the area of work.

C. Biological hazardous material removal:
   1. Remove the following items as shown on the mechanical drawings that may contain biological hazardous pathogens due to it’s use supplying air and ventilating the current airborne infection exam room:
      A. Sections of existing ductwork and exhaust fan shown for removal.
      B. Cap existing ductwork and piping where noted.
   2. All such materials to be removed by a demolition contractor that specializes in the removal of biohazardous materials.
   3. Area of demolition to be posted, sealed, air monitored and cleaned, and all demolition materials removed in accord with all OSHA, state, and federal requirements for materials that may contain infectious airborne agents that present a risk or potential risk to the well-being of man.
   4. All personnel should use appropriate personal protective equipment when removing and/or cleaning any remaining ducts, fans and filters, in the systems serving the current isolation room which may be assumed to be contaminated.
   5. Demolition contractor to submit evidence of training, certification, and credentials to perform the required work prior to the commencement of any demolition.

D. Remove or modify hot and chilled water piping as shown.

E. Miscellaneous items not listed above which must be removed for completion of the work.

F. Patch and repair all remaining materials suitable for installation of new finishes as noted on the drawings.

G. Removal of all debris from the site.

H. Obtain necessary permits and comply with all local ordinances for demolition work and disposal of construction debris.

I. Provide temporary partitions and dust barriers for noise, dust control and protection, existing construction to remain, and equipment.

J. Cap and identify exposed utilities, connect utilities to remain as shown on the drawings.

K. Security and safety measures, to include guardrails, barricades, roping, and safety tape around the area of work. Post warning signs as necessary to discourage unauthorized entry by the public in the areas of demolition.

L. Lead containing materials:
   1. Due to age of the facilities being demolished or renovated, the Contractor should expect to encounter building materials that contain lead or that are covered with lead containing coatings. The Contractor shall protect his workforce and worksite according to the provisions of 29 CFR 1926-the OSHA Construction Industry Standards during the course of the Work. The Owner considers the Contractor’s adherence to workplace safety and health standards a reasonable precaution to prevent excessive exposure to lead hazards.
   2. These standards include (but are not limited to) provisions for worker exposure assessments, engineering controls, work practices, written programs, administrative programs, respiratory protection, protective clothing/equipment, hygiene facilities, medical surveillance programs and/or employee information/training.
   3. In addition, following any disturbance of potentially lead-containing substances, the Contractor(s) shall perform adequate cleaning to prevent lead exposure of Owners’ employees, the general public and other trades.
DIVISION 02. SITE WORK

SECTION 024100 DEMOLITION (CONTINUED)

4. The Contractor shall be responsible for waste categorization of any lead coated material or debris and proper disposal of same in a disposal facility permitted to accept the material or debris.

1.02 Submittals:
A. Submit a copy of all permits and certificates required for work of this Section.
B. Submit demolition procedures and operational sequence for review and acceptance by the Owner. These procedures shall include the following:
   1. Description of methods and equipment to be used.
   2. Schedule of coordination of utility services.
   3. Methods to be used for disposal of debris.
   4. Scheduled hours of work to be approved in advance by the Owner.

1.03 Protection:
A. Safety measures and methods shall be used to protect personnel and property which is to remain undisturbed.
B. Schedule all work to cause minimum disturbance to facility operations. Advise the Owner 48 hours prior to beginning any work which could affect facility operations.
C. Do not interfere with use of the existing facility. Maintain free and safe passage to and from all areas normally trafficked by students, staff, and visitors.
D. Use approved methods to provide dust control during demolition.
E. Provide protection to adjacent construction and equipment not a part of this project from damage, and other areas where work is in progress.
F. Salvageable items noted for reuse shall be protected from damage, other items noted for salvage for the Owner, shall be turned over to him.
G. Contractor shall schedule and coordinate work to prevent damage to the existing building by un-authorized entry during unoccupied periods, and shall, where necessary, to control and prevent such damage or entry, install temporary closures for openings.
H. The Contractor is responsible for the protection of all public sidewalks that border the site. Any damage is to be repaired by removing damaged sections and replacement.

1.04 Existing Services:
A. The Contractor shall disconnect and remove utility services only under the direction of the Owner. All temporary disconnection of the permanent services, prior to removal of the services in and to a structure to be demolished, shall be planned and authorized by the Architect/Engineer and the Owner.
B. Contractor shall give minimum 48 hours notice prior to the scheduled disconnection of any utility.
C. Place markers to indicate location of disconnected services. Indicate service lines and capping locations on Project records.
D. Provide new connections and tie-ins to the utilities in the building as shown on the drawings.

1.05 Job Conditions:
A. Condition of Structures: The Owner assumes no responsibility for the actual condition of areas to be demolished.
   1. Bidders for this work shall make such investigations as they deem necessary to arrive at a contract price.
   2. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner in so far as practicable.

1.06 Site Examination:
The Contractor shall visit the site as necessary prior to beginning any work and examine all existing equipment and other conditions that might affect his work.

PART 2 - PRODUCTS

2.01 Salvaged Materials:
A. Any structures or items noted to be salvaged will be designated as such and shall be removed in a manner that will prevent breakage or undue damage. Material or parts of structures which are to be salvaged, such as lumber, pipe, brick, concrete, etc., shall be removed in the manner directed by the Owner and stacked at the Site for future use.
DIVISION 02. SITE WORK

SECTION 024100 DEMOLITION (CONTINUED)

B. Materials or parts of structures which, in the opinion of the Owner, are not salvageable, or which are designated as surplus by the Owner, shall be disposed of at locations off the job site as approved by the Owner.

2.02 Demolition Equipment: Equipment shall be selected for demolition operations which will not damage existing building components. Vibratory or percussion equipment shall be avoided whenever possible or whenever it will inflict damage to adjacent materials.

PART 3 - EXECUTION

3.01 Preparation:
A. Maintain exit requirements.
B. Erect and maintain measures as required to prevent spread of dust, fumes and smoke to other parts of the building. On completion, remove partitions and repair damaged surfaces to match adjacent surfaces.
C. Carry out demolition work to cause as little inconvenience to adjacent occupied building areas as possible.

3.02 Temporary Shoring and Bracing:
A. The Contractor shall be responsible for providing shoring and/or bracing for any building component from which support is removed during construction operations.
B. Shoring and bracing shall be designed to support the dead load of the shored element and any anticipated construction loads.
C. Shoring and bracing shall be installed at locations which will not overstress or damage existing structural members.

3.03 Demolition:
A. All demolition shall be performed in accordance with applicable codes and regulations of authorities having jurisdiction.
B. Demolish in an orderly and careful manner as required to accommodate new work, including that required for connection to the existing building. Protect existing structural members, flooring to remain, and adjacent partitions.
C. Repair all demolition performed in excess of that required, at no cost to the Owner.

3.04 Removal:
A. Remove from site contaminated or dangerous materials encountered and dispose of by safe means so as not to endanger health of workers and public.
B. Remove demolished materials, debris, dust, tools and equipment from site upon completion of work. Leave site in a condition acceptable to the Architect and the Owner’s Representative.
C. Transport all materials removed from demolished area and dispose of off-site. Off-site disposal shall be subject to agreement and provisions to be arranged and authorized by Architect, in accordance with local ordinances.

3.05 Repair:
All damage done to existing structures that are to remain shall be repaired to the satisfaction of the Architect and the Owner’s Representative. Any unsightly places shall be cleaned up and the site left in a neat and orderly condition.

End of Section
PART 1 - GENERAL

1.01 Description
A. Firestopping at penetrations of utility lines through floors, occupancy separations, and other fire or smoke rated assemblies.
B. Fire safing insulation.

1.02 References:
A. ASTM International (ASTM):
B. Underwriters Laboratories, Inc. (UL):
   1. 1479 - Fire Tests of Through-Penetration Firestops.
C. UL rated in accordance with penetration details noted on the drawings and / or approved for use on the project.

1.03 System Description:
Provide continuous protection against passage of heat, fire, smoke, and gases at perimeter of and penetrations through rated assemblies.

1.03 Submittals
A. General:
   Furnish manufacturer's specifications / recommendations / installation instructions.
   Include manufacturer's published data, letter of certification, or certified test laboratory report indicating each material complies with requirements and intended generally for applications shown.
B. Submittals for Review:
   1. Product Data:
      A. Firestopping schedule; prepare in tabular format and identify:
         1. Type of assembly receiving firestop and required fire rating.
         2. Type of penetrating item.
         3. Proposed firestop system.
      B. Include UL or equivalent details for each firestop system.
C. Quality Control Submittals:
   Certificates of Compliance: Indicate conformance of installed systems with specified requirements.

1.04 Quality Assurance:
A. Applicator Qualifications: Minimum five years documented experience in work of this Section.
B. Firestopping:
   1. Fire resistance rating equivalent to adjacent construction.
   2. Tested to ASTM E814, ASTM E1966, ASTM E2307, UL 1479, or UL 2079.

1.05 Project Conditions:
A. Do not apply sealants, mortars, or putties when temperature of substrate material and surrounding air is below 40 degrees F or is anticipated to drop below that temperature within 24 hours after installation.
DIVISION 07. MOISTURE PROTECTION

SECTION 078400 FIRESTOPPING (CONTINUED)

PART 2 - PRODUCTS

2.01 Acceptable Manufacturers:
2. 3M Fire Protective Products. (www.3m.com).

2.02 Materials:
A. Firestopping: One or more of the following:
   1. Silicone elastomer compound: Single or multiple component, low modulus, moisture curing silicone sealant.
   2. Ceramic sealant: Single component, moisture curing ceramic sealant.
   3. Intumescent sealant: Single component, water based intumescent sealant.
   5. Putty: Single component ceramic fiber base putty or intumescent elastomer putty that expands on exposure to surface heat gain.
   7. Pillows or blocks: Formed intumescent or mineral fiber pillows or blocks.
   8. Intumescent strips: Solvent free intumescent wrap strips.
   9. Mechanical devices: Incombustible fillers or silicone elastomer covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
B. As noted and required on the drawings and approved UL Assembly penetration details.

2.03 Fire safing insulation:
A. Mineral wood insulation.
B. USG Thermafiber Safing Insulation, or approved equal.
C. Unfaced.
D. 4 inches thick.
E. Density: 3.5 pounds per cubic foot.
F. UL Label R-10905.

2.04 Accessories:
A. Forming and Damming Materials: As recommended by firestopping manufacturer for intended use.
   1. Permanent: Mineral fiber board, mineral fiber matting, or mineral fiber putty.
   2. Temporary: Plywood, particle board, or other.

PART 3 - EXECUTION

3.01 Preparation:
A. Prepare openings to receive firestopping as directed by manufacturer:
   1. Remove incidental and loose materials from penetration opening.
   2. Remove free liquids and oil from involved surfaces and penetration components.
   3. Install damming materials to accommodate and ensure proper thickness and fire rating requirements and provide containment during installation.
   4. Remove combustible materials and materials not intended for final penetration seal system.
3.02 Installation:
A. Install firestopping at perimeter of and penetrations through [fire] [and] [smoke] rated assemblies.
B. Apply materials in accordance with manufacturer’s instructions.
C. Apply firestopping material in sufficient thickness to achieve required ratings.
D. Compress fibered material to achieve a density of 40 percent of its uncompressed density.
E. Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.
F. Place intumescent coating in sufficient coats to achieve rating required.
G. Remove dam material after firestopping material has cured.
H. Finish exposed surfaces to smooth, flush appearance.
I. Provide manufacturer’s label at each new penetration above finished ceiling denoting:
   1. Materials used.
   2. UL Assembly number followed.
   3. Date penetration was protected.
   4. Contractor and installer’s name.

End of Section
DIVISION 07  MOISTURE PROTECTION

SECTION 079200 CAULKING AND SEALANTS

PART 1 - GENERAL

1.01 At areas of new work.
1.02 Interior:
   A. Joints at dissimilar materials.
   B. General use.
   C. Where noted on drawings.
1.03 Other caulking to make building watertight in areas of renovation.
1.04 Submittals:
   Furnish manufacturer's specifications / recommendations / installation instructions for each type material required. Include manufacturer's published data, letter of certification, or certified test laboratory report indicating each material complies with requirements and intended generally for applications shown.
1.05 Warranty:
   Furnish a written warranties as specified below, covering loss of adhesion or cohesion, deterioration, leaking, and other defects. In addition, warrant that material has been installed according to manufacturer’s written specifications.
   Prior to the start of work, the Manufacturer shall provide a full-time employee to verify that materials are suitable for intended applications, will provide long-term adhesion, and are compatible when dissimilar materials intersect or contact one another. No claims for additional costs shall be allowed because of changes of sealants required to comply with the provisions of this paragraph.
   A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
   B. Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period. Warranty Period: Two years from date of Substantial Completion.
   C. Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period. Warranty Period: 10 years from date of Substantial Completion.
   D. Warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
      1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer’s written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
      2. Disintegration of joint substrates from natural causes exceeding design specifications.
      3. Mechanical damage caused by individuals, tools, or other outside agents.

PART 2 - PRODUCTS

2.01 All items:
   A. Oakum joint filler:
      1. Untreated hemp or jute fiber rope, free of oil / tar / and / or other compounds which might stain surfaces, contaminate joint walls, or not be compatible with
DIVISION 07 MOISTURE PROTECTION

SECTION 079200 CAULKING AND SEALANTS (CONTINUED)

2. Hand packed, dry spun.

B. Sealant backer rod:
Compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam, or other flexible / permanent / durable / non-absorptive material recommended for compatibility with sealant by sealant manufacturer.

C. Joint primer / sealer:
Provide type of joint primer / sealer recommended by the sealant manufacturer for the joint surfaces to be primed or sealed.

2.02 General use, exterior:
A. Silicone Sealant Compound:
1. Compound shall be a single-component, silicone-based sealant. Cured sealant shall have the following physical properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>ASTM D412</td>
<td>170 psi</td>
</tr>
<tr>
<td>Tear Strength</td>
<td>ASTM D624</td>
<td>27 psi</td>
</tr>
<tr>
<td>Hardness (Shore A)</td>
<td>ASTM D642</td>
<td>30 (min)</td>
</tr>
<tr>
<td>Peel Strength</td>
<td>MIL-S-8802D</td>
<td>32 lb/in.</td>
</tr>
</tbody>
</table>

2. Sealant shall meet or exceed all requirements of MIL-S-8802 and FS-TT-S-001543A.

3. One of the following:
A. "Dow Corning 795" as manufactured by Dow Corning Corp., Midland MI 48640.
B. "Silpruf 2000" as manufactured by General Electric Construction Products.
C. "Pecora 864" as manufactured by Pecora
D. "CRL 95C" as manufactured by CR Lawrence

4. Color shall be as approved by Designers and Owner.

2.03 General interior use, non-elastomeric sealants, paintable - use at door frames etc.:
Acrylic Emulsion Sealant:
Acrylic emulsion or latex rubber modified acrylic emulsion sealant compound; permanently flexible, non-staining / non-bleeding; recommended by manufacturer for general interior exposure and capable of being painted. Products offered by manufacturers to comply with requirements include:

- Sonolac by Contect-Sonneborn
- DAP Acrylic Latex caulk by DAP, Inc.
- Easaply by W.R. Meadows, Inc.
- AC-20 Acrylic Latex by Pecora
- Sikaflex 420 by Sika Chemical
- Acrylic Latex Caulk by Tremco, Inc.

PART 3 - EXECUTION

3.01 Installation:
A. Clean surfaces to be caulked, free from mortar and other foreign matter.
B. Allow surfaces to dry before caulking.
DIVISION 07 MOISTURE PROTECTION

SECTION 079200 CAULKING AND SEALANTS (CONTINUED)

C. Fill surfaces deeper than 3/4 inch with oakum or compressible backer rod for elastomeric sealants, packed tight.

D. Force compound into joints and recessed with gun having nozzle of proper size and at sufficient pressure to fill joints to depths shown; if not shown, as recommended by sealant manufacturer but within following general limitations, measured at center of bead:
   1. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but never more than 1/2 inch deep not less than 1/4 inch deep.

E. Form concave joints, slightly behind adjoining materials, unless otherwise shown, so compressed units will not protrude from joint.

F. Remove excess material.

G. Remove stains and soil from other work caused by this work.

H. Color selected by architect from a list of manufacturer’s full range of colors.

End of Section
DIVISION 09  FINISHES

SECTION 092900 GYPSUM DRY WALL

PART 1 - GENERAL

1.01 Work Included:
   A. Gypsum board.
   B. Drywall suspension system.
   C. Casing beads.
   D. Corner beads.
   E. Drywall screws.
   F. Joint treatments.

1.02 Related Sections:
   Cold Formed Metal Framing (SECTION 054000).

1.03 Shop Drawings:
   A. As required by Section 013323.
   B. Provide manufacturer’s product literature for each product specified and used on the project.

PART 2 - PRODUCTS:

2.01 Gypsum board:
   A. By United States Gypsum Company; Gold Bond; Georgia-Pacific; or approved equal.
   B. 5/8 inch fire-rated gypsum board, tapered.
   C. All applicable accessories to make a complete job.

2.02 Accessories:
   1. Trim:
      Sheet steel zinc-coated by hot dip process.
   2. Fasteners:
      Type S-12, bugle or wafer head, 1" - 1.1/4" long, drill point fine thread self-tapping, rust resistant.
      3. Conform to requirements of ASTM C 840.

2.03 Casing beads:
   Galvanized wallboard casing "J" trim, sized for wallboard thickness.

2.04 Corner beads:
   1.1/4" x 1.1/4" galvanized corner reinforcement.

2.05 Drywall screws:
   A. Corrosion-resistant.
   B. 7/16" crown x length required to adequately penetrate substrate.
   C. Conform to requirements of ASTM C 840.

2.06 Suspension system:
   1. Channels: 1.1/2 inch, cold rolled steel, 500 pounds per thousand, painted.
   2. "Hat" furring channels:
      A. USG, Gold Bond, Georgia-Pacific metal furring channels.
      B. USG, Gold Bond, Georgia-Pacific metal furring channel clips.
   3. Hanger wire: Galvanized, 8 gauge.
   4. Tie wire: Galvanized, 18 gauge.

2.07 Joint treatments:
   A. Joint compound, perforated tape:
   B. To comply with ASTM C 475.
PART 3 - EXECUTION

3.01 General:
This installation to be in complete conformance with all recommendations of the approved drywall manufacturer.

3.02 Gypsum board:
A. Install in accordance with manufacturer’s written instructions and ASTM C 840 and GA 216.
B. Apply single layer gypsum board in most economical direction with ends and edges occurring over firm bearing.
C. Erect single layer fire rated gypsum board with edges and ends occurring over firm bearing.
D. Erect exterior gypsum sheathing horizontally, with edges butted and ends occurring over firm bearing.
E. Double Layer Applications: Use gypsum first layer, placed perpendicular or parallel to framing or furring members. Place second layer with offset joints from joints of first layer.
F. Place control joints consistent with lines of building spaces as indicated on drawings.
G. Locate joints at openings so no end joint will align with edges of opening.
H. Screw attach gypsum board horizontally. Gypsum board shall be attached to steel studs in accordance with ASTM Specification C-840, except that the steel drill screws used (Specification ASTM C-954) shall be spaced not more than 8 inches on center along edges and ends, and not more than 12 inches on center in the field of the board.
I. Stagger all joints, horizontally and vertically, on opposite faces of partition 16 inches minimum.
J. Where structural or mechanical systems penetrate wall system, tightly fill all voids and cracks with acoustical blanket material.
K. Place edges of boards in contact with each other but do not break surface.
L. Provide for deflection of load bearing members above non-loadbearing partitions.
M. Application of taping compound:
1. Prefill openings wider than 1/4” (6.4 mm).
2. Dimple fasteners slightly below surface of wall board, but do not break surface.
3. All dimples and other depressions to be filled with joint compound.
4. Application of taping compound:
   A. Completely fill the recess formed by the tapered edges of the panel with taping compound.
   B. Center joint tape and press into the taping compound by drawing the knife along the joint at a 45 degree angle.
   C. Apply sufficient pressure to remove excess taping compound above, and at the edges of the joint tape.
   D. Leave sufficient quantity of taping compound under the joint tape to ensure an adequate bond, but not more than 1.32” (0.8 mm) at the feathered edge.
   E. As soon as joint tape has been embedded, apply a skim coat of taping compound over the joint tape and allow to dry completely.
5. Apply corner beads at all external corners, apply coat of taping compound.
N. Apply casing beads at intersections of gypsum and masonry or concrete and other dissimilar surfaces where gypsum wall board terminates without trim to cover. Place
corner beads at external corners. Use longest practical length.

Application of finishing compound:

1. When taping compound has dried completely, apply additional coats of ready-mix finishing compound until finish level is achieved.
2. Sand to smooth finish with 220 or 320 grit sand paper or screen cloth, smooth with a damp sponge.

3.03 Suspension system:

1. Space 8 gauge hanger wires 48 inches on center along carrying channels and within 6 inches of ends of carrying channels. Anchor to structure with manufacturer approved anchors or tie to structural support members.
2. Install 1 1/2 inch channels 48 inches on center maximum, level and secure with hanger wire saddle-tied along channel. Provide 1 inch clearance at walls.
3. At channel splices, interlock flanges; overlap ends 12 inches and secure with double-strand 18 gauge tie wire.
4. At vertical channels, turn 90 degree angle at roof deck, minimum 6 inch leg, secure to deck or structural members with two approved fasteners.
5. Where horizontal channels intersect vertical channels, secure together with thru-bolts.
6. Brace channels if required for secure installation.
7. Erect furring channels at right angles to 1 1/2 inch channels, maximum spacing 16 inches on center interior, 12 inches on center exterior.
8. Secure furring channels to carrying channels with clips; at splices, nest minimum 8 inches and wire tie each end with double strand 18 gauge tie wire.

3.04 Finishing:

General: Comply with ASTM C 840, GA 214 and GA 216 as applicable for the following use areas:

A. Level 1:
   Plenums, service corridors; above ceilings
B. Level 2:
   Areas of water resistant gypsum backing board under tile; exposed areas where appearance is not critical.
C. Level 3:
   Areas to receive heavy or medium textured coatings; heavy-grade wall coverings.
D. Level 4:
   Areas to receive flat sheen paint finish; light textured coatings; lightweight wall coverings.
E. Level 5:
   Areas to receive gloss, semi-gloss sheen paints; critical lighting conditions (Typical finished areas).

End of Section
DIVISION 09  FINISHES

SECTION 095100  ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 Work included:
A. Suspension system.
B. Acoustical ceiling tile.
C. For use where shown on the drawings in the areas of renovation and repair.

1.02 Samples:
Provide samples and product literature of tile and ceiling grid for approval.

1.03 Related sections:
Gypsum Dry Wall (SECTION 092900).

PART 2 - PRODUCTS

2.01 Exposed grid system:
A. As manufactured by Armstrong Ceiling Systems, or approved equal.
B. Main runners, cross runners, wall molding.
C. Materials:
   1. Exposed grid system:
   2. As manufactured by Chicago Metallic; Armstrong Ceiling Systems; Gordon Architectural Aluminum Specialties, Inc.; or approved equal.
   3. Main runners, cross runners, wall molding.
   4. Materials:
      A. For use with moisture resistant washable surface panels:
         1. 15/16" aluminum capped grid with baked enamel finish.
         2. Armstrong Prelude Plus XL, or approved equal.
         3. USDA approved.
      B. For use elsewhere:
         1. 15/16" baked enamel finish on steel, color to match existing grid.
         2. Armstrong Prelude XL, or approved equal to match existing ceiling grid.
   5. Size to accommodate 24" x 24" lay-in panels.

2.02 Ceiling Tile:
A. Ceiling AT-1 (new washable ceiling for replacement in Waiting 160, and Exam 161):
   1. One of the following:
      A. Armstrong Ceramaguard, moisture resistant, 24" x 24" x 5/8", square edge, #607.
      B. Celotex Hytone Baroque Unperforated with Plastigard, Protectone, moisture resistant, 24" x 24" x 5/8", square edge, #BET-157.
      C. USG Radar Ceramic ClimaPlus, moisture resistant, 24" x 24" x 5/8", square edge, Class 100 panels, #56644.
      D. Or approved equal.
   2. Class A Label per ASTM E 1264.
B. Ceiling AT-2 (for general repair in Corridor 171, Exam 170, and Exam 169):
   1. One of the following (or as required to match the existing ceiling tile):
      A. Armstrong Minaboard Cortega, 24" x 24" x 5/8", #770.
      B. Celotex Hytone Baroque, random fissured, 24" x 24" x 5/8", #BET-157.
DIVISION 09  FINISHES

SECTION 095100  ACOUSTICAL CEILINGS (CONTINUED)

C. USG Radar, 24” x 24” x 5/8”, square edge.
D. Or approved equal.

2. Class A Label per ASTM E 1264.

PART 3 - EXECUTION

3.01 Installation by a factory approved applicator.
3.02 Install in compliance with manufacturer's printed instructions.
3.03 Install under normal operating temperature and humidity conditions.
3.04 Install systems to ceiling layout pattern as shown on drawings, or to permit border units of greatest possible size.
3.05 Check all members for horizontal and vertical alignment.
3.06 Cleaning:
   1. Clean soiled or discolored surfaces of units.
   2. Remove and replace damages or improperly installed units.
3.07 Leave one full package of tile on the job for the Owner.

End of Section
DIVISION 09. FINISHES

SECTION 099000 PAINTING

PART 1 - GENERAL

1.01 Work Included:
   A. Interior:
      1. Existing gypsum board walls where noted on the drawings and as necessary to
         repair construction damage to the existing surfaces.
      2. Existing hollow metal door frames in Waiting 160 and Exam 161.
      2. Existing surfaces to remain that are marred or damaged as a result of work
         included in this contract.

1.02 Related Sections:
   Gypsum Dry Wall (SECTION 092500).
   Refer to the drawings for specific color selections noted on the Finishes Schedule.

PART 2 - PRODUCTS

2.01 Approved paint of the type required, manufactured by Benjamin Moore, or approved equal, refer
   to the Finishes Schedule on the drawings.
2.02 Prior to ordering materials submit list of materials and descriptions thereof for approval.
2.03 Deliver materials to building in original containers with labels intact and seals unbroken.
2.04 Pigments for tinting:
   A. For oil paints: color ground oil.
   B. Enamels: colors ground in oil.
2.05 Shellac:
   A. White or orange, gum, cut in pure denatured alcohol.
   B. Orange, limited to covering knots, resin sap.
2.06 Paint Interior:
   A. Provide primer produced by the same manufacturer as the finish coats.
   B. Provide following paint systems for various substrates, as indicated.
   C. Drywall wall surfaces in areas other than Waiting 160 and Exam 161 as required to repair
      damaged or marred surfaces, semi-gloss enamel finish (or as required to match existing
      finishes):
         1st coat: Interior latex emulsion, TT-P-29.
         2nd coat: Interior enamel undercoat, TT-E-543.
         3rd coat: Interior enamel undercoat, TT-E-543.
         Not less than 2.50 mils dry film thickness.
   D. Existing drywall surfaces in Waiting 160 and Exam 161, full gloss enamel finish:
         1st coat: Interior latex emulsion, TT-P-29.
         2nd coat: Enamel undercoat, TT-E-543.
         3rd coat: Gloss enamel, TT-E-506.
         Not less than 2.50 mils dry film thickness.

PART 3 - EXECUTION

3.01 Number of paint colors:
   Approximately six, refer to the finishes schedule and interior elevations on the drawings.
3.02 Store materials in space designated and protect space from damage.
   A. Keep paints covered at all times, protect from freezing.
   B. Safeguard against fire, provide metal containers for oil, cloth and waste.
3.03 Inspection of surfaces:
DIVISION 09. FINISHES

SECTION 099000 PAINTING (CONTINUED)

A. Before starting work have defects remedied. Commencing work implies acceptance of surfaces.

B. If dryness of surfaces is doubtful, use dampness indicating meter for test.

3.04 Painting:

A. Preparation of surfaces:
   1. Do not start painting and finishing until surfaces are suitable.
   2. Report unsuitable surfaces to the Architect before application of paint or finish.
   3. Remove all efflorescence, chalk, and dust from cementsitious surfaces.
   4. Remove rust and scale from metal surfaces with wire brushing and sanding.
   5. Remove oil and grease from metal surfaces with turpentine or benzine.
   6. Remove dirt and mildew in accordance with the paint manufacturer's recommendations.

B. Determine alkalinity of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint.

C. Wood:
   1. Clean wood surfaces to be painted of all dirt, oil, or other foreign substances.
   2. Scrape off loose paint, and if necessary, lightly sand and dust off existing woodwork exposed to view to insure adhesion.
   3. Scrape and clean small, dry seasoned knots on new wood and apply a thin coat of white shellac or other recommended knot sealer before application of primer coat.
   4. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sand smooth when dried.
   5. Prime, stain, or seal wood required to be job painted immediately upon delivery to job.
   6. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, trim, etc.
   7. When transparent finish is required, use spar varnish for backpriming.
   8. Seal tops, bottoms, and cut-offs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

D. Shop primed metals:
   1. Touch-up shop-applied and field-applied prime coats wherever damaged or bare and keep touched-up as necessary, before and after installation or erection of the items, to maintain protection of the metal from rust and corrosion.
   2. Clean and touch-up with the same type primer as initially used.
   3. Prime welds, new bolts, rivets and other fastening devices in metal work.
   4. Touch-up primed surfaces to be concealed in the construction prior to concealing.

E. Application:
   1. Quality work is recognized and will be demanded. Sloppy striking, holidays, inadequate coverage, etc., will not be accepted.
   2. Spread materials evenly and flow on smoothly free from sags, runs, brush marks and corduroy, not less than manufacturer's recommended spreading rate to establish a total dry film thickness as specified, or if not specified, as recommended by the coating manufacturer.
   3. Allow undercoats to dry hard before application of subsequent coat.
   4. Mix and apply paints and finishes in accordance with manufacturer's detailed specifications or directions.
   5. Prime as soon as practical after delivery or placement of all uncoated work
DIVISION 09. FINISHES

SECTION 099000 PAINTING (CONTINUED)

requiring painted finish. Retouch bare areas caused by working or handling.

6. On surfaces of door frames, trim and metal work that will be concealed or inaccessible in the finished work, apply one coat of paint after the work is fitted but before it is placed.

7. Provide adequate protection to prevent paint being splashed or dropped on adjacent surfaces or different finish.

8. Mechanical and electrical work: Painting of mechanical / electrical work is limited to those items exposed in the finished areas.

9. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

10. Cleaning up:
   Remove paint from fixtures, glass, furniture, fittings, etc.

3.05 Protection:
   A. Loosen canopies of lighting fixtures, cover while painting, replace upon completion.
   B. Remove electric plates, surface hardware; protect and replace upon completion.
   C. Mask off all convenience outlets after removing cover plates before painting.
   D. Mask all areas to be left unfinished that are adjacent to painted surfaces.

End of Section
PART 1  GENERAL

1.1  SUMMARY

A. Basic Mechanical Requirements specifically applicable to Division 23 Sections, in addition to Division 1, General Requirements. The following are included in this section to expand the requirements specified in Division 1.
   1. Submittals.
   2. Regulatory requirements.
   3. Project/site conditions.
   4. Sequencing and scheduling.
   5. Record documents.

B. Related Documents: The Contract Documents, as defined in Section 011000-Summary, apply to the Work of this Section. Additional Requirements and information necessary to complete the Work of this Section may be found in other documents.

1.2  SUBMITTALS

A. Submit under provisions of Division 1, Section 013300 Submittal Procedures.

B. Increase the number of mechanical related product data, samples, and shop drawings required for your distribution by three copies of each submittal. The owner, architect and engineer will each retain a copy of every submittal.

C. Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal.

D. Mark dimensions and values in units to match those specified.

1.3  REGULATORY REQUIREMENTS

A. Conform to North Carolina State Building Code.

B. Obtain permits, and request inspections from authority having jurisdiction.

1.4  PROJECT/SITE CONDITIONS

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.

B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.

1.5  RECORD DOCUMENTS

A. Prepare record documents in accordance with the requirements in Division 1, Section 017839 Project Record Documents. In addition to the requirements specified in Division 1, indicate the following as-built conditions:
1. Size and location of all ductwork, locations of all filters, boxes, terminal units, dampers and other control devices requiring periodic maintenance and repair.
2. Size and location of all piping systems with valves and control devices located and numbered, location of all concealed unions, and other piping accessories requiring maintenance (i.e., tanks, expansion joints, steam traps, strainers, etc.). Underground piping's actual locations shall be dimensioned from building columns and actual inverts shall be indicated on the as-built drawings.
3. Valve location diagrams, complete with valve tag chart, refer to Section 230553, “Mechanical Identification”.
4. Equipment locations dimensioned from building columns.
5. Contract modifications, including actual equipment and materials installed.

PART 2
PRODUCTS

Not Used

PART 3
EXECUTION

3.1 MECHANICAL INSTALLATIONS

A. Coordinate mechanical systems, equipment, and material installation with other building systems.
B. Verify all dimensions by field measurement.
C. Verify final locations for rough-ins with field measurements and with the actual equipment to be connected.
D. Coordinate the installation of the required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.
E. Install systems, equipment, materials which conform with approved submittals, including coordination drawings, to the greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work shown are only diagrammatic in form. Notify Architect where coordination requirements conflict with individual system requirements.
F. Where mounting heights are not given, install systems, and/or equipment to provide the maximum headroom possible.
G. Install systems, and equipment level and plumb, and parallel or perpendicular to other building systems.
H. Systems that are must be installed at a specific slope (e.g., sanitary waste and vent, steam and condensate piping, etc...) shall have a right of way priority. Provide offsets in other systems as required to allow the priority systems to maintain a proper slope.
I. Arrange for chases, slots, and openings in other building components during progress of construction, as required to install mechanical systems, and equipment.
J. Install access doors or panels where equipment, dampers, or valves are concealed behind finished surfaces.

BASIC MECHANICAL REQUIREMENTS
K. Coordinate connection of mechanical systems with exterior underground and overhead utilities. Comply with requirements of the governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

L. Install mechanical equipment to facilitate servicing, maintenance, and repair, or replacement, of all equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum interference to other installations.

3.2 CUTTING AND PATCHING

A. Remove from site and legally dispose of, unless specifically noted to be turned over to the owner, all material which your workman cut, and/or demolished in the course of completing the project.

B. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed. Repair any damage to existing, and/or newly added, building systems occurring as a result of cutting and patching operations of your workman.

C. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

D. Existing surfaces and building components shall be patched using new materials to match existing materials by workmen experienced in installing the building component being patched.

E. Perform cutting and patching of mechanical equipment and materials required to:
   1. Uncover work to provide for ill-timed work.
   2. Remove and replace defective work, and work not conforming to the requirements of the Contract Documents.
   3. Install new equipment and materials in existing structures.
   4. Remove samples of installed work as specified for testing.
   5. Upon written instructions from the Architect/Engineer, uncover and restore work to provide for the observation of concealed work by the Architect/Engineer.

End of Section
SECTION 23 05 29 SUPPORTS AND ANCHORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Pipe hangers and supports.
   2. Accessories.
   3. Inserts.
   4. Flashing.
   5. Equipment curbs.

B. Related Documents: The Contract Documents, as defined in Section 011000-Summary, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

1.2 REFERENCES

A. ASME B31.9 - Building Services Piping

B. ASTM F708 - Design and Installation of Rigid Pipe Hangers.

1.3 SUBMITTALS

A. Submit under provisions of Division 1, Section 013300 Submittal Procedures.

B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.

C. Product Data: Provide manufacturers catalog data including load capacity.

D. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Manufacturer’s Installation Instructions: Indicate special procedures and assembly of components.

PART 2 PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
   1. Pipe hangers and supports shall be manufactured by one of the following acceptable manufacturers:
      a. B Line Systems, Inc.
      b. Grinnell Corp.
      c. Michigan Hanger Company.

B. Refrigerant Piping:
   1. Conform to ASTM F708.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch (13 to 38 mm): Carbon steel, adjustable swivel, split ring.
3. Wall Support for Pipe Sizes to 3 Inches (75 mm): Cast iron hook.

2.2 ACCESSORIES
   A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.3 INSERTS
   A. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.4 FLASHING
   A. Metal Flashing: 26 gage (0.5 mm thick) galvanized steel.
   B. Metal Counterflashing: 22 gage (0.8 mm thick) galvanized steel.
   C. Caps: Steel, 22 gage (0.8 mm) minimum; 16 gage (1.5 mm) at fire resistant elements.

2.5 EQUIPMENT CURBS
   A. Fabrication: Welded 18 gage (1.2 mm) galvanized steel shell and base, mitered 3 inch (75 mm) cant, 1-1/2 inch thick insulation, factory installed wood nailer.

2.6 SLEEVES
   A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage (1.2 mm thick) galvanized steel.
   B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage (1.2 mm thick) galvanized steel.
   C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed, refer to Section 078446.
   D. Sleeves for Round Ductwork: Galvanized steel.
   E. Sleeves for Rectangular Ductwork: Galvanized steel or wood.
   F. Firestopping Insulation: Glass fiber type, noncombustible, refer to Section 078446.
   G. Sealant: Acrylic; refer to Section 079200.

PART 3 EXECUTION

3.1 INSTALLATION
   A. Install in accordance with manufacturer's instructions.

3.2 INSERTS
A. Provide inserts for placement in concrete formwork.
B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches (100 mm).
D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.3 PIPE HANGERS AND SUPPORTS
A. Support horizontal piping as scheduled.
B. Install hangers to provide minimum 1/2 inch (13 mm) space between finished covering and adjacent work.
C. Place hangers within 12 inches (300 mm) of each horizontal elbow.
D. Use hangers with 1-1/2 inch (38 mm) minimum vertical adjustment.
E. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
F. Support riser piping independently of connected horizontal piping.
G. Provide copper plated hangers and supports for copper piping.
H. Design hangers for pipe movement without disengagement of supported pipe.
I. Prime coat exposed steel hangers and supports. Refer to Section 099123. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

3.4 EQUIPMENT BASES AND SUPPORTS
A. Provide housekeeping pads of concrete, minimum 4 inches (100 mm) thick and extending 6 inches (150 mm) beyond supported equipment. Refer to Section 033000.
B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.
C. Construct supports of steel members. Brace and fasten with flanges bolted to structure.
D. Provide rigid anchors for pipes after vibration isolation components are installed.

3.5 FLASHING
A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
B. Flash pipes projecting 3 inches (75 mm) minimum above finished roof surface with lead worked one inch (25 mm) minimum into hub, 8 inches (200 mm) minimum clear on sides with 24 x 24 inches (600 x 600 mm) sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counterflash, and seal.

C. Provide acoustical lead flashing around ducts and pipes penetrating equipment rooms, installed in accordance with manufacturer’s instructions for sound control.

D. Provide curbs for mechanical roof installations 14 inches (350 mm) minimum high above roofing surface. Flash and counterflash with sheet metal; seal watertight. Attach counterflashing mechanical equipment and lap base flashing on roof curbs. Flatten and solder joints.

E. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

3.6 SLEEVES

A. Set sleeves in position in formwork. Provide reinforcing around sleeves.

B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

C. Extend sleeves through floors one inch (25 mm) above finished floor level. Caulk sleeves.

D. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and caulk, air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

E. Install chrome plated steel escutcheons at finished surfaces.

3.7 SCHEDULES

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<td>Feet (m)</td>
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End of Section
SECTION 230593 TESTING, ADJUSTING, AND BALANCING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Submittals
   2. Report Forms
   3. Test and Balance Procedures.

B. Related Documents: The Contract Documents, as defined in Section 01110-Summary of Work, apply to the Work of this Section. Additional Requirements and information necessary to complete the Work of this Section may be found in other documents.

1.2 REFERENCES

A. AABC - National Standards for Field Measurement and Instrumentation, Total System Balance.


1.3 SUBMITTALS

A. Submit name of adjusting and balancing agency for approval within 30 days after award of Contract.

B. Prior to commencing work, submit draft reports indicating adjusting, balancing, and equipment data required.

C. Include detailed procedures, agenda, sample report forms, and copy of AABC National Project Performance Guaranty prior to commencing system balance.

D. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect/Engineer and for inclusion in operating and maintenance manuals.

E. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

1.4 REPORT FORMS

A. Submit reports on AABC National Standards for Total System Balance or NEBB forms.

B. Forms shall include the following information:
   1. Title Page:
      a. Company name
      b. Company address
c. Company telephone number
d. Project name
e. Project location
f. Project Architect
g. Project Engineer
h. Project Contractor
i. Project altitude

2. Instrument List:
   a. Instrument
   b. Manufacturer
c. Model
d. Serial number
e. Range
f. Calibration date

3. Air Moving Equipment:
   a. Location
   b. Manufacturer
c. Model
d. Air flow, specified and actual
e. Return air flow, specified and actual
f. Outside air flow, specified and actual
g. Total static pressure (total external), specified and actual
h. Inlet pressure
i. Discharge pressure
j. Fan RPM

4. Exhaust Fan Data:
   a. Location
   b. Manufacturer
c. Model
d. Air flow, specified and actual
e. Total static pressure (total external), specified and actual
f. Inlet pressure
g. Discharge pressure
h. Fan RPM

5. Return Air/Outside Air Data:
   a. Identification/location
   b. Design air flow
c. Actual air flow
d. Design return air flow
e. Actual return air flow
f. Design outside air flow
g. Actual outside air flow
h. Return air temperature
i. Outside air temperature
j. Required mixed air temperature
k. Actual mixed air temperature
l. Design outside/return air ratio
m. Actual outside/return air ratio

6. Electric Motors:
   a. Manufacturer
   b. HP/BHP
c. Phase, voltage, amperage; nameplate, actual, no load.
d. RPM
e. Service factor
7. V-Belt Drive:
   a. Identification/location
   b. Required driven RPM
   c. Driven sheave, diameter and RPM
   d. Belt, size and quantity
   e. Motor sheave, diameter and RPM
   f. Center to center distance, maximum, minimum, and actual

8. Duct Traverse:
   a. System zone/branch
   b. Duct size
   c. Area
   d. Design velocity
   e. Design air flow
   f. Test velocity
   g. Test air flow
   h. Duct static pressure
   i. Air temperature
   j. Air correction factor

9. Air Distribution Test Sheet:
   a. Air terminal number
   b. Room number/location
   c. Terminal type
   d. Terminal size
   e. Area factor
   f. Design velocity
   g. Design air flow
   h. Test (final) velocity
   i. Test (final) air flow
   j. Percent of design air flow

1.5 PROJECT RECORD DOCUMENTS

A. Submit record documents under provisions of Division 1, Section 017839 Project Record Documents.

B. Accurately record actual locations of balancing valves and rough setting.

1.6 QUALITY ASSURANCE

A. Agency shall be company specializing in the adjusting and balancing of systems specified in this Section with minimum three years documented experience, and be certified by AABC or NEBB. Perform Work under supervision of AABC Certified Test and Balance Engineer, or a NEBB Certified Testing, Balancing and Adjusting Supervisor. Reports shall be sealed by a registered Professional Engineer.


1.7 SEQUENCING AND SCHEDULING

A. Schedule work under the provisions of Section 013100.
B. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project.

1.8 PRE-INSTALLATION CONFERENCE

A. Convene a conference one week prior to commencing work of this Section, under provisions of Section 013100.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXAMINATION

A. Before commencing work, verify that systems are complete and operable. Ensure the following:
   1. Equipment is operable and in a safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   5. Duct systems are clean of debris.
   6. Correct fan rotation.
   7. Fire and volume dampers are in place and open.
   8. Coil fins have been cleaned and combed.
   9. Access doors are closed and duct end caps are in place.
  10. Air outlets are installed and connected.
  11. Duct system leakage has been minimized.
  12. Hydronic systems have been flushed, filled, and vented.
  13. Proper strainer baskets are clean and in place.
  14. Service and balance valves are open.

B. Report any defects or deficiencies noted during performance of services to Architect/Engineer.

C. Promptly report abnormal conditions in mechanical systems or conditions which prevent system balance.

D. If, for design reasons, system cannot be properly balanced, report as soon as observed.

E. Beginning of work means acceptance of existing conditions.

3.2 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

3.3 INSTALLATION TOLERANCES

TESTING, ADJUSTING, AND BALANCING
A. Adjust air handling systems to plus or minus 5 percent for supply systems and plus or minus 10 percent for return and exhaust systems from figures indicated.

B. Adjust hydronic systems to plus or minus 10 percent of design conditions indicated.

3.4 ADJUSTING

A. Adjust work under provisions of Section 016000.

B. Recorded data shall represent actually measured, or observed condition.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

F. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

3.5 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

E. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels.

F. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

G. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

I. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
J. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

K. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near the building entries.

End of Section
SECTION 230700 DUCTWORK INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glass fiber, flexible.

B. Related Documents: The Contract Documents, as defined in Section 011000-Summary, apply to the Work of this Section. Additional Requirements and information necessary to complete the Work of this Section may be found in other documents.

1.2 REFERENCES

A. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
C. ASTM C553 - Mineral Fiber Blanket and Felt Insulation.
G. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
H. UL 723 - Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

A. Submit under provisions of Division 1, Section 013300 Submittal Procedures.
B. Product Data: Provide product description, list of materials and thickness for each service, and locations.
C. Manufacturer's Installation Instructions: Indicate procedures which ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

A. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E84.
B. Applicator: Company specializing in performing the work of this section with minimum three years experience.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Deliver, store, protect and handle products to site under provisions of Division 1, Section 016000 Product Requirements.

B. Deliver materials to site in original factory packaging, labeled with manufacturer's density and thickness.

C. Store insulation in original wrapping and protect from weather and construction traffic.

D. Protect insulation against dirt, water, chemical, and mechanical damage.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 GLASS FIBER, FLEXIBLE

A. Manufacturers:
   1. Product shall be manufactured by one of the following acceptable manufacturers.
      a. Owens Corning Fiberglas Corp..
      b. Schuller International, Inc..
      c. Knauf Fiber Glass GmbH..

B. Insulation: ASTM C553; flexible, noncombustible blanket.
   1. 'K' ('Ksi') value: ASTM C518, 0.27 at 75 degrees F (0.039 at 24 degrees C).
   3. Maximum moisture absorption: 3.0 percent by volume.
   4. Density: 1.0 lb/cu ft (16 kg/cu m).

C. Vapor Barrier Jacket
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film 0.0032 inch (0.081 mm) vinyl.
   2. Moisture vapor transmission: ASTM E96; 0.02 perm.
   3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that ductwork has been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

DUCTWORK INSULATION
A. Install materials in accordance with manufacturer's instructions.

B. Insulated ductwork conveying air below ambient temperature:
   1. Provide insulation with vapor barrier jackets.
   2. Finish with tape and vapor barrier jacket.
   3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
   4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

C. Insulated ductwork conveying air above ambient temperature:
   1. Provide with or without standard vapor barrier jacket.
   2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

D. For ductwork exposed in mechanical equipment rooms and/or finished spaces, insulate with rigid glass fiber, finish with canvas jacket sized for finish painting.

E. Ductwork conveying pretreated outside air from the discharge of the air to air heat exchanger to the inlet of the heat pumps shall be insulated as “outside air intake ducts” as per insulation schedules below.

F. Ductwork conveying exhaust air from the space to the inlet of the air to air heat exchangers shall be insulated as “Return duct” as per insulation schedules below.

3.3 TOLERANCE

A. Substituted insulation materials shall provide thermal resistance within 10 percent at normal conditions, as materials indicated.

3.4 FLEXIBLE GLASS FIBER DUCTWORK INSULATION SCHEDULE

<table>
<thead>
<tr>
<th>DUCTWORK</th>
<th>THICKNESS</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside Air Intake Ducts</td>
<td>1-1/2</td>
<td>(37)</td>
</tr>
<tr>
<td>Supply Ducts</td>
<td>1-1/2</td>
<td>(37)</td>
</tr>
<tr>
<td>Return and Relief Ducts</td>
<td>1</td>
<td>(25)</td>
</tr>
</tbody>
</table>

End of Section
SECTION 233000 DUCTWORK ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Volume Control Dampers.
   2. Fire Dampers
   4. Flexible Duct Connectors.
   5. Duct Access Doors.

B. Related Documents: The Contract Documents, as defined in Section 011000-Summary, apply to the Work of this Section. Additional Requirements and information necessary to complete the Work of this Section may be found in other documents.

1.2 REFERENCES

A. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
B. SMACNA - Low Pressure Duct Construction Standards.
C. UL 33 - Heat Responsive Links for Fire-Protection Service.
D. UL 555 - Fire Dampers and Ceiling Dampers.

1.3 SUBMITTALS

A. Submit shop drawings and product data under provisions of Division 1, Section 013300 Submittal Procedures.

B. Submit manufacturer’s installation instructions under provisions of Section 013300 , for fire dampers.

PART 2 PRODUCTS

2.1 VOLUME CONTROL DAMPERS.

A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.

B. Fabricate single blade dampers for duct sizes to 12 x 36 inch (300 x 900 mm).

C. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 12 x 72 inch (300 x 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

D. Except in round ductwork 12 inches (300 mm) and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.
E. Provide locking, indicating quadrant regulators on single and multi-blade dampers. Where rod lengths exceed 30 inches (750 mm) provide regulator at both ends.

F. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

2.2 FIRE DAMPERS

A. Manufacturers:
   1. Fire Dampers shall be manufactured by one of the following acceptable manufacturers:
      a. Prefco Products, Inc..
      b. Ruskin Mfg..
      c. Safe Air/Dowco, Inc..
      d. United Air; Division of Leader Industries Inc..

B. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.

C. Fabricate ceiling dampers of galvanized steel, 22 gage (0.76 mm) frame, stainless steel closure spring, and light weight, heat retardant non-asbestos fabric blanket closure.

D. Fabricate curtain type dampers of galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations. Configure with blades out of air stream.

E. Fabricate multiple blade fire dampers with 16 gage (1.5 mm) galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 1/8 x 1/2 inch (3.2 x 12.7 mm) plated steel concealed linkage, stainless steel closure spring, blade stops, and lock.

F. Fusible links, UL 33, shall separate at [60 degrees F (71 degrees C). Provide adjustable link straps for combination fire/balancing dampers.

2.3 BACKDRAFT DAMPERS

A. Manufacturers:
   1. Backdraft Dampers shall be manufactured by one of the following acceptable manufacturers:
      a. American Warming & Ventilating, Inc..
      b. Arrow United Industries.
      c. Ruskin Mfg..
      d. Safe Air/Dowco, Inc..

B. Gravity backdraft dampers, size 18 x 18 inches (457 x 457mm) or smaller, furnished with air moving equipment, may be air moving equipment manufacturers standard construction.

C. Fabricate multi-blade, parallel action gravity balanced backdraft dampers of 16 gage (1.5 mm) galvanized steel with pivoted blades of maximum 6 inch (150 mm) width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.4 FLEXIBLE DUCT CONNECTIONS
A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.

B. UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 36 oz per sq yd (1.22 kg/sq m), approximately 6 inches (150 mm) wide, crimped into metal edging strip.

C. Leaded vinyl sheet, minimum 0.55 inch (14 mm) thick, 0.87 lbs per sq ft (4.2 kg/sq m), 10 dB attenuation in 10 to 10,000 Hz range.

2.5 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards and as indicated.

B. Review locations prior to fabrication.

C. Fabricate rigid and close-fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one inch (25 mm) thick insulation with sheet metal cover.

D. Access doors smaller than 12 inches (300 mm) square may be secured with sash locks.

E. Provide two hinges and two sash locks for sizes up to 18 inches (450 mm) square, three hinges and two compression latches with outside and inside handles for sizes up to 24 x 48 inches (600 x 1200 mm). Provide an additional hinge for larger sizes.

F. Access doors with sheet metal screw fasteners are not acceptable.

2.6 DUCT TEST HOLES

A. Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent test holes shall be factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturer’s instructions.

B. Provide balancing dampers at points on low pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing.

C. Use of splitter dampers is not acceptable.

D. Provide balancing dampers on medium and high pressure systems where indicated.
E. Provide fire dampers at locations indicated, where ducts and outlets pass through fire rated components. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

F. Demonstrate re-setting of fire dampers to authorities having jurisdiction and Owner’s representative.

G. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

H. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment. Cover connections to medium and high pressure fans with leaded vinyl sheet, held in place with metal straps.

I. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch (200 x 200 mm) size for hand access, 18 x 18 inch (450 x 450 mm) size for shoulder access, and as indicated.

J. Provide duct test holes where indicated and required for testing and balancing purposes.

End of Section
SECTION 233100 DUCTWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Low Pressure Duct.

B. Related Documents: The Contract Documents, as defined in Section 011000-Summary, apply to the Work of this Section. Additional Requirements and information necessary to complete the Work of this Section may be found in other documents.

1.2 REFERENCES

C. ASTM A 90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
E. ASTM A 525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
F. ASTM A 527 - Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality.
G. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
H. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
I. SMACNA - Low Pressure Duct Construction Standards.
J. SMACNA - High Pressure Duct Construction Standards.
K. UL 181 - Factory-Made Air Ducts and Connectors.

1.3 DEFINITIONS

A. Duct Sizes: Inside clear dimensions. For lined ducts, maintain sizes inside lining.
B. Low Pressure: Three pressure classifications: 1/2 inch WG (125 Pa) positive or negative static pressure and velocities less than 2,000 fpm (10 m/sec); 1 inch WG (250 Pa) positive or negative static pressure and velocities less than 2,500 fpm (12.7 m/sec) and 2 inch WG (500 Pa) positive or negative static pressure and velocities less than 2,500 fpm (12.7 m/sec).

1.4 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A and NFPA 90B standards.
1.5 SUBMITTALS
   A. Submit shop drawings and product data under provisions of Section 01330, Submittal Procedures.
   B. Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for low pressure, medium and high pressure systems.

1.6 DELIVERY, STORAGE, AND HANDLING
   A. Deliver products to site under provisions of Division 1, Section 01600 Product Requirements.
   B. Store and protect products under provisions of Section 01600.

PART 2 PRODUCTS

2.1 MATERIALS
   A. General: Noncombustible or conforming to requirements for Class 1 air duct materials, or UL 181.
   B. Steel Ducts: ASTM A525 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz per sq ft (382 g/sq m) for each side in conformance with ASTM A90.
   C. Flexible Ducts: fabric supported by helically wound spring steel wire or flat steel bands; rated to 2 inches WG (500 Pa) positive and 1.5 inches WG (375 Pa) negative for low pressure ducts and 15 inches WG (3.75 kPa) positive or negative for medium high pressure ducts.
   D. Insulated Flexible Ducts: Flexible duct wrapped with flexible glass fiber insulation, enclosed by seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 K value at 75 degrees F (0.034 KSI at 24 degrees C).
   E. Fasteners: Rivets, bolts, or sheet metal screws.
   F. Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
   G. Hanger Rod: Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 LOW PRESSURE DUCTWORK
   A. Fabricate and support in accordance with SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
   B. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
   C. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes.
D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.

E. Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.

F. Connect flexible ducts to metal ducts with liquid adhesive plus tape.

G. Use crimp joints with or without bead for joining round duct sizes 8 inch (200 mm) and smaller with crimp in direction of air flow.

H. Use double nuts and lock washers on threaded rod supports.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

B. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

C. Set plenum doors 6 to 12 inches (150 to 300 mm) above floor. Arrange door swings so that fan static pressure holds door in closed position.

D. Connect terminal units to medium or high pressure ducts with one foot (300 mm) maximum length of flexible duct. Do not use flexible duct to change direction.

E. Connect diffusers or troffer boots to low pressure ducts with 6 feet (1.8 m) maximum length of flexible duct. Hold in place with strap or clamp.

F. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 DUCTWORK APPLICATION SCHEDULE

<table>
<thead>
<tr>
<th>AIR SYSTEM</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Pressure Supply (Heating Systems)</td>
<td>Steel,</td>
</tr>
<tr>
<td>Low Pressure Supply (System with Cooling Coils)</td>
<td>Steel</td>
</tr>
<tr>
<td>Return and Relief</td>
<td>Steel</td>
</tr>
<tr>
<td>General Exhaust</td>
<td>Steel</td>
</tr>
</tbody>
</table>

DUCTWORK
3.3 ADJUSTING AND CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

B. Clean duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes.

End of Section
SECTION 233400 HVAC FANS

PART 1 GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Ceiling fans.
B. Related Documents: The Contract Documents, as defined in Section 011000-Summary, apply to the Work of this Section. Additional Requirements and information necessary to complete the Work of this Section may be found in other documents.

1.2 REFERENCES
B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
C. AMCA 261 - Directory of Products Licensed to Bear the AMCA Certified Ratings Seal.
D. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
F. NEMA MG1 - Motors and Generators.
G. NFPA 70 - National Electrical Code.
H. NFPA 96 - Installation of Equipment for the Removal of Smoke and Grease Vapors from Commercial cooking Equipment.
I. UL 705 - Power Ventilators.

1.3 SUBMITTALS
A. Submit under provisions of Division 1, Section 013000 Submittal Procedures.
B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, sound power levels at rated capacity, and electrical characteristics and connection requirements.
C. Manufacturer’s Installation Instructions.

1.4 OPERATION AND MAINTENANCE DATA
A. Submit under provisions of Division 1, Section 017823 Operation and Maintenance Data.
B. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.5 EXTRA MATERIALS

POWER VENTILATORS
A. Furnish under provisions of Section 017700.

B. Provide two sets of belts for each fan.

PART 2 PRODUCTS

2.1 CEILING FANS

A. Manufacturers:
   1. Fans shall be manufactured by one of the following acceptable manufacturers:
      a. Carnes Company, Inc.
      b. Greenheck Fan Corp.
      c. Loren Cook Company.
      d. Penn Ventilator Company.

B. Performance
   1. See schedules on plans for performance and electrical requirements.

C. Centrifugal Fan Unit: Direct driven with galvanized steel housing lined with 1/2 inch (13 mm) acoustic insulation, resilient mounted motor, gravity backdraft damper in discharge opening, integral outlet duct collar. Discharge position convertible by moving interchangeable panels.

D. Disconnect Switch: Fan mounted toggle switch for thermal overload protected motor.

E. Grille: Molded white.

F. Wheel: Centrifugal forward curved type constructed of injection molded or polypropylene resin.

G. Motor: Open drip proof type with permanently lubricated sealed bearings and thermal overload protection.

H. Accessories:
   2. Fan speed controller.
   3. Time delay relay.

I. Electrical Characteristics and Components
   1. Motor: Refer to Section 231700.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install flexible connections specified in Section 233000 between fan inlet and ductwork. Ensure metal bands of connectors are parallel with minimum one inch (25 mm) flex between ductwork and fan while running.

C. Provide sheaves required for final air balance.
D. Install backdraft dampers on inlet to roof and wall exhausters.

E. Provide backdraft dampers on outlet from cabinet and ceiling exhauster fans and as indicated.

F. Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

End of Section
SECTION 233700  AIR OUTLETS AND INLETS

PART 1  GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Rectangular Ceiling Diffusers.
   2. Perforated Face Ceiling Grilles.

B. Related Documents: The Contract Documents, as defined in Section 011000-Summary, apply to the Work of this Section. Additional Requirements and information necessary to complete the Work of this Section may be found in other documents.

1.2 REFERENCES

B. AMCA 500 - Test Method for Louvers, Dampers and Shutters.
D. ARI 650 - Air Outlets and Inlets.
F. SMACNA - Low Pressure Duct Construction Standard.

1.3 QUALITY ASSURANCE

A. Test and rate performance of air outlets and inlets in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.
B. Test and rate performance of louvers in accordance with AMCA 500.

1.4 REGULATORY REQUIREMENTS

A. Conform to ANSI/NFPA 90A.

1.5 SUBMITTALS

A. Submit product data under provisions of Division 1, Section 013300 Submittal Procedures.
B. Provide product data for items required for this project.
C. Submit schedule of outlets and inlets indicating type, size, location, application, and noise level.
D. Review requirements of outlets and inlets as to size, finish, and type of mounting prior to submitting product data and schedules of outlets and inlets.
E. Submit manufacturer's installation instructions.
F. Submit two color charts for finish of external louvers, Architect shall select color.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - CEILING DIFFUSERS

A. Unless noted otherwise in this specification section all air distribution shall be manufactured by one of the following acceptable manufacturers:
   1. Carnes Company, Inc..
   2. E.H. Price Limited
   4. Metal Industries, Inc..
   5. Nailor Industries, Inc..

B. See schedules on plans for size and model numbers.

C. Substitutions: Under provisions of Section 01600.

2.2 RECTANGULAR CEILING DIFFUSERS

A. Rectangular, stamped, multicore type diffuser to discharge air in 360 degree pattern with sectorizing baffles where indicated.

B. Provide surface mount or inverted T-bar type frames to match ceiling type, coordinate frame type with architectural plans.

C. Fabricate of steel with baked enamel off-white finish.

D. Provide radial opposed blade or butterfly damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

2.3 PERFORATED FACE CEILING EXHAUST OR RETURN GRILLES

A. Perforated face with removable face.

B. Provide flush surface mount or inverted T-bar type frame to match ceiling type, coordinate frame type with architectural plans.

C. Fabricate of aluminum with baked enamel off-white finish.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install items in accordance with manufacturers’ instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement. Refer to Section 09900.

C. Install diffusers to ductwork with air tight connection.

AIR OUTLETS AND INLETS
D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, regardless of whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09900.

End of Section