

SECTION 23010
HVAC GENERAL

1.0 GENERAL

1.01 DESCRIPTION

A. This Division 23 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the air conditioning, ventilating, and heating systems as specified herein and as shown.

B. The General Provisions and Division 1, including the general, supplementary and other conditions and other Divisions, as appropriate, apply to work specified in this Division.

1.02 EXISTING CONDITIONS

A. Attention is called to the fact that the work is to be performed within an existing, operational facility. Prior to the submission of bids, each bidder shall visit the project site, thoroughly investigate and be familiar with all existing conditions which will affect their work; especially the work to be performed above the existing ceilings.

B. Connect new work to existing work in a neat and workmanlike manner. Where an existing structure must be cut or existing utilities interfere, such obstructions shall be bypassed, removed, replaced or relocated, patched and repaired. Work disturbed or damaged shall be replaced or repaired to its prior condition.

C. Prior to the start of any demolition or construction, secure the services of a qualified, EPA Certified asbestos abatement agency to check the existing insulation, etc. for asbestos. Should asbestos be found, do not proceed with demolition or construction; notify the Architect in any case in writing of the agency's findings.

1.03 INTENT OF DRAWINGS AND SPECIFICATIONS

A. The implied and stated intent of the drawings and specifications is to establish minimum acceptable standards for materials, equipment and workmanship, and to provide operative mechanical systems complete in every respect.

B. The engineering drawings are diagrammatic, intended to show general arrangement and sizes of system components, and shall not be scaled. Rather, the architectural and structural drawings shall govern space constraints, dimensions and finishes. All offsets and fittings which will be necessary to accomplish the finished installation shall be provided at no additional cost or increase in the Contract.

1.04 SPACE PRIORITY

A. Ensure optimum use of available space for materials and equipment installed above ceilings. Allocate space in the order of priority as listed below except as otherwise detailed. Items are listed in the order of priority, with items of equal importance listed under a single priority number.

1. Gravelly flow piping systems
2. Vent piping systems
3. Recessed lighting fixtures
4. Concealed HVAC terminals and equipment
5. Air duct systems
6. Sprinkler piping systems
7. Pressurized piping systems
8. Electrical conduit, wiring, control air tubing

B. Order of space priority does not dictate installation sequence. Installation sequence shall be as required to install all affected trades.

C. The work of this Division 23 shall not obstruct access for installation, operation and maintenance of the work of any other Division.

D. All major items of equipment shall be arranged so as to provide a minimum of 28" clear aisle space. Additional space shall be provided between and around equipment for maintenance and proper operation as shown in the equipment manufacturer's literature.

1.05 COORDINATION

A. Coordinate all work under this Division 23 with work under all other Divisions, providing adjustment as necessary.

B. Coordination of space requirements with respect to Division 26 shall be performed such that:

1. No equipment, piping or ductwork, other than electrical, shall be installed within 42" of switchboards or panelboards.
2. No piping or ductwork which ever operates at a temperature in excess of 120 degrees F. shall be installed within 3" of any electrical conductor.

C. All items mounted in or below the ceiling, and all items penetrating the ceiling, shall be coordinated with the architectural reflected ceiling plans. If any items are not shown on these plans, or any items need to be relocated for coordination purposes, prepare a reflected ceiling plan and submit it to the Architect for approval.

1.06 CODE COMPLIANCE

A. All workmanship and materials provided under this Division 23 shall comply with all laws, ordinances, codes and regulations of all Federal, State and Local Authorities having jurisdiction.

B. All fire suppression, plumbing, heating, ventilating, and air conditioning materials and workmanship shall comply with the following codes and standards as minimum requirements:

1. NEC - 2017 edition
2. Life Safety Code (NFPA 101) - 2016 edition.
3. All other NFPA Codes and Standards - 2016 edition.
4. North Carolina State Building Code - 2018 edition.
5. North Carolina State Energy Code - 2018 edition.
6. North Carolina State Fire Prevention Code - 2018 edition.
7. North Carolina State Mechanical Code - 2016 edition.
8. North Carolina State Plumbing Code - 2016 edition.
9. North Carolina Accessibility Code - 2018 edition.
10. American with Disabilities Act.

C. Where applicable, all applicable codes, permits and licenses required for execution of the work shall be provided. Where requirements of the drawings or specifications exceed the code requirements, the work shall be provided in accordance with these drawings or specifications. In the event of conflict or ambiguity between the various codes, the most stringent requirement shall govern.

1.07 ELECTRICAL REQUIREMENTS AND INTERFACE

A. All electrical equipment and wiring provided under this Division 23 shall comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 26.

B. Electric controls, contactors, starters, pilot lights, push buttons, etc., shall be provided complete as part of the motor, heater or other equipment which it operates. All electrical components shall be in conformance with the requirements of the National Electrical Code and Division 26. Reference Division 26 and the electrical engineering drawings for those motor starters provided under this Division 26. All starters not shown shall be provided under this Division 23. Unless specified otherwise under other individual equipment Sections, motor starters shall conform to the following minimum requirements:

1. Starters for motors 1/3 horsepower or smaller shall be manual unless remote or automatic starting is required, in which case the starters shall be magnetic, full voltage, non-reversing, single-speed, unless otherwise indicated. All other starters shall be magnetic.

2. Each starter for a three-phase motor shall be furnished with three (3) overload relays sized for the full load running current of the motor actually provided. Provide an external "HAND-OFF-AUTO" selector switch with red "RUNNING" light. Provide a green pilot light to indicate motor "STOPPED". Each pilot light shall have a legend plate indicating reason for signal.

3. Each overload relay shall have a normally open alarm contact which will close only when actuated by an overload (not to be confused with N.O. or N.C. auxiliary contacts). These contacts shall be properly wired to their respective alarm light, provided on the starter front cover and having a "TRIPPED" legend plate.

4. Individually mounted motor starters shall be in a NEMA Type 1 general purpose enclosure in unfinished areas and shall be flush mounted in all finished areas. All starters mounted in exterior areas shall have a NEMA 3R enclosure. Each starter shall have a laminated nameplate to indicate equipment unit number, function and circuit number.

5. All motor starters, push buttons and pilot lights shall be of the same manufacturer as the switchboard and shall be General Electric, Square D, Siemens I.L.C. or Westinghouse.

C. Motor starters for the following equipment shall be provided under this Division 23 by the manufacturer of the equipment:

1. Packaged air conditioning equipment
2. Other equipment hereinafter specified in other Sections to be provided with integral starters.

D. Unless otherwise noted or specified in individual Sections, all 3-phase motors shall be standard NEMA continuous duty "B" type, with Class B insulation, open drip-proof frame for indoor service, IEC for outdoor service and a service factor of 1.15. Motors 3 HP and larger shall be U.S. Motors HI-Efficiency Model or Reliance XE HI-Efficiency Model.

E. All power wiring and final connections to equipment shall be provided under Division 26.

F. Control components, all interlocks (motor-operated dampers, fire alarm motors, etc.) and control wiring (277 volt, single phase and less) shall be provided under this Division 23 as required to achieve the specified control sequences.

G. All control wiring over 30 volts shall be installed by a Licensed Electrician working under this Division 23.

1.08 SLEEVES, SEALS AND ESCUTCHEONS

A. Sleeves shall be provided through all pipe penetrations of concrete or masonry walls, elevated floors and roofs, except those plumbing piping penetrations for fixtures, vents, etc.

B. Sleeves shall be fabricated from Schedule 40 steel pipe through 10" and Standard Wall steel pipe for sleeve sizes 12" and larger. All sleeves penetrating exterior walls, underground walls, pit or vault walls shall be provided with a 3" x 3/8" thick waterstop ring welded completely to the midpoint of the sleeve.

C. All sleeves penetrating exterior walls, underground walls, pit or vault walls and elevated floors shall be packed and sealed watertight.

D. Sleeves through roofs shall extend above the roof surface and be flashed watertight.

E. Sleeves through walls shall be cut and finished flush with each surface of the wall in which they are installed.

F. Sleeves shall be sized to provide a minimum of 1/2" clearance between the inside surface of the sleeve and the outside finished surface of the pipe plus any insulation specified.

G. Fire-stops shall be provided as specified herein. All annular spaces between piping and sleeves which do not require fire-stops shall be packed with mineral wool and caulked.

H. Provide round, chrome-plated escutcheons on all exposed piping penetrations passing through walls, floors, partitions and ceilings.

1.09 FIRE-STOPS

A. Where ductwork, piping, conduit, etc. pass through fire partitions, fire walls and floors, a fire-stop shall be provided that will ensure an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight and completely fill gaps between the ductwork, piping, conduit, etc. and the perimeter of their rough openings.

B. Fire-stopping material shall maintain its dimensions and integrity while preventing the passage of flames and smoke. The material shall be installed and used when exposed to the ASTM E119 fire temperature for a time period equivalent to the rating of the assembly penetrated. Fire-stopping material shall be non-combustible as defined in ASTM E 136, and for insulation materials, melt point shall be a minimum of 2700 degrees F. for 1-hour protection and 1850 degrees F. for 2-hour protection. Fire-stopping material shall be Dow-Corning RIV Foam or Fire-Resistant Products or Solite Corborandum Fire Putty.

C. See Section 22400 for fire-stopping of Plumbing.

1.10 CORE DRILLING

A. Cutting of holes through concrete and masonry shall be by diamond core or concrete saw. Pneumatic hammer impact electric and hand or manual hammer type drills will be allowed, except as permitted by the Architect where required by limited opening specifications. Locate holes such that they will not affect structural members. Holes shall be laid out well in advance of the installation. These layout locations shall be approved by the Architect prior to drilling.

1.11 EROSION CONTROL

2.01 BASIS OF DESIGN SUBSTITUTION PROCEDURES

A. Manufacturer, names, series and model numbers, as noted or specified, are for the purpose of describing type, capacity, and quality of equipment, materials and products to be used. Unless "or equal" is specifically stated, bids shall be based only on the specified "basis of design" manufacturer. The listing of a particular manufacturer as an "equal" or "acceptable substitute" manufacturer shall not be misconstrued as approving nor allowing the substitution of that manufacturer's standard product in place of the basis of design. No consideration will be given to a product which would require dimensional, spatial or aesthetic changes to the project. "Acceptable substitute" and "equal" manufacturers shall only bid those products which exactly match the size and other characteristics of the specified basis of design. Any changes to other disciplines and trades of work required by an "equal" or "substitute" product shall be duly considered and priced accordingly prior to bidding or pricing. The decision as to whether or not a proposed substitute or "equal" product is actually equal to that specified shall rest solely with the Architect.

B. Requests to provide "equal" products in lieu of those specified shall be submitted to the Architect in writing at least ten (10) days prior to final pricing and execution of the Contract. No consideration will be given to substitute products after final pricing and execution of the Contract.

C. Any "or equal" product or proposed product substitution which will cause a change in the appearance, dimensions or design of any part of the building, its structure, electrical system or any other engineered systems shall be accompanied by a sealed drawing and written description of the required change(s) for approval by the Architect. If deemed necessary by the Architect, design changes shall be signed and sealed by a registered Professional Engineer, currently licensed in this State.

2.02 MINIMUM STANDARDS

A. Every piece of energy consuming equipment, all fire suppression products and life safety equipment shall comply with the following standards as applicable; especially in regard to prevailing codes:

1. Factory Mutual Laboratories (FM)
2. Industrial Risk Insurers (IRI)
3. Underwriters Laboratories, Inc. (UL)
4. ADC: Air Diffusion Council

5. AGA: American Gas Association

6. AMCA: Air Moving and Conditioning Association, Inc.

7. ANSI: American National Standards Institute

8. API: American Petroleum Institute

9. ARI: American Refrigeration Institute

10. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers

11. ASME: American Society of Mechanical Engineers

12. ASTM: American Society of Testing and Materials

13. AWWA: American Water Works Association

14. IBR: Institute of Boiler and Radiator Manufacturers

15. MSS: Manufacturers Standardization Society

16. NBBI: National Board of Boiler and Pressure Vessel Inspectors

17. NEMA: National Electrical Manufacturer's Association

18. OSHA: Occupational Safety & Health Administration

19. PDI: Plumbing Drainage Institute

20. PPI: Plastic Pipe Institute

21. SMACNA: Sheet Metal and Air Conditioning Contractors National Association, Inc.

3.0 EXECUTION

3.01 SUBMITTALS

A. Before preparing submittals, study all Contract Drawings and specifications in detail, obtain manufacturer's recommended instructions, and have submittals prepared based on specific equipment and material proposed for installation. An officer of the contracting firm shall sign all shop drawings (certifying conformance with plans and specifications) before submitting to the Architect or releasing to the field.

B. The submittal process shall not be utilized as an avenue to substitute products after the execution of the contract. Should an unspecified or unequal product be submitted, it will be rejected. If a second attempt at substitution is made during the resubmittal of the same product, then no more reviews of that product will be performed without direct compensation to the Engineer being paid for the additional services required for the third review and any further reviews.

C. No more than four (4) copies of submittal data will be reviewed. Any additional copies will be returned unmarked. The responsibility of copying review comments on any additional copies will rest solely with the Contractor.

D. Submittals will not be accepted for review unless they:

1. Comply with the requirements of Division 1.
2. Include complete information pertaining to all appearances and accessories.
3. Are submitted as complete packages which pertain to all related items in Division 23. Separate packages shall be submitted as follows:
 - a. All HVAC equipment and components
 - b. The automatic controls and EMS
4. Are properly marked with equipment, service or function identification as related to the project and are marked with pertinent schedule paragraph number.

E. Describe catalog information, factory design drawings, field installation drawings and certifications in detail. The submittal data shall provide ample, unquestionable compliance with the Contract documents.

F. Review of submittals shall not be construed as authorizing any deviations from the plans and specifications unless such deviations are clearly identified and explicitly submitted in the form of letter that is enclosed with the submittal.

G. Submittals of equipment on all manufactured equipment, especially energy consuming equipment shall include, but are not limited to, the following items of equipment:

1. Piping specialties
2. Insulation
3. Pumps
4. Heat Tracing
5. Water Heaters
6. Split Systems
7. Heat Pumps
8. Air Distribution Devices
9. Ductwork Accessories
10. Centrifugal Fans
11. Louvers and Hoods

3.02 EXCAVATION, TRENCHING AND BACKFILLING

A. Perform all excavation, trenching and backfilling for underground work under this Division 23. During excavation, the excavated material shall be piled back from the banks of the trench to avoid overloading, slides or cave-ins. Do not exceed the angle of repose unless written approval is obtained in advance from the Architect. Owner for shoring, bracing or other alternate excavation methods. All excavated material not used for backfilling shall be removed from the building and disposed of as indicated or directed by the Architect. Take measures to prevent surface water from flowing into trenches and other excavations and any water accumulating therein shall be removed by pumping. All excavation shall be made by open cut. Tunneling shall not be allowed.

B. The bottom of all trenches shall be evenly graded to provide firm support and an even bearing surface. Pipe shall be laid on firm soil, laid in straight lines and on uniform grades. Provide bell holes so that the barrel of the pipe rests evenly on the bottom of the trench along the entire length of the pipe.

C. Pipe shall be inspected and tested prior to backfilling. Trench shall be handfilled to a minimum of 12" above the top of pipe with suitable earth (free of rocks, trash, large clods and organic material) and compacted to a minimum 95% proctor. After the first layer is completed, subsequent layers shall be filled and compacted the same as the first layer. Settling the backfill with water shall not be permitted.

3.03 INSTALLATION REQUIREMENTS

A. All equipment shall be installed in strict conformance with the recommendations of the equipment manufacturer, as indicated on the Drawings and as specified.

B. Provide installation manuals for each piece of equipment. Submit in separately bound volumes after review of submittals.

C. Provide supplementary steel framing and welded steel equipment support stands as required for proper hanging and support of the mechanical systems. Steel angles, channels and tubing utilized for such framing shall be selected for a maximum deflection of 1/360th of the span.

D. All roof curbs shall be a minimum of 12" high and selected for the various roof pitches. Curbs installed on roofs having pitches of not more than 1/4" per foot may be standard curbs shimmed level with steel channels or Zs to provide suitable support and flashing surfaces.

3.04 CLEANING, LUBRICATION AND ADJUSTMENT

A. The exterior surfaces of all mechanical equipment, piping, ductwork, conduit, etc., shall be cleaned and free of all dirt, grease, oil, paint splatter, and other construction debris.

B. Ducts, plenums, and air unit casings shall be cleaned of all debris and either vacuumed or blown free of all dirt, rubbish, dirt, and dust before installing grilles, registers or diffusers.

C. Bearings that require lubrication shall be lubricated in strict accordance with the manufacturer's recommendations.

D. All control equipment shall be adjusted to the settings required for the performance specified.

E. Fans shall be adjusted to the speed indicated by the manufacturer to meet the installed final system pressure at the airflow indicated. Any additional shrouds and belts required for final adjustments shall be provided with no increase in the Contract amount.

F. Any fans operated during construction shall have temporary filters. Temporary filters shall be changed regularly to minimize contamination of the equipment and duct systems. Permanent filters shall be installed prior to final inspection.

G. All coils shall be thoroughly cleaned and combed prior to final inspection.

3.05 PAINTING

A. All uncoated and uninsulated steel surfaces exposed to sight inside the building, such as piping, equipment hangers and supports which are not provided with factory prime coat or galvanizing, shall be cleaned and primed with one coat of rust-inhibiting primer. In addition, all surfaces in finished spaces shall also be painted with two coats of finish paint in a color selected by the Architect.

B. All ductwork surfaces visible through grilles, registers and diffusers in finished areas shall be painted flat black.

C. Steel items exposed outside the building, such as equipment supports, uninsulated piping and hangers which are not factory painted or galvanized shall be cleaned and primed with one coat of rust-inhibiting primer and two coats of asphaltic base aluminum paint. Insulated steel pipes outside the building shall be cleaned and primed with one coat of rust-inhibiting primer before installing insulation.

D. Factory painted equipment that has been scratched or marred shall be repainted to match the original factory color.

3.06 DUCTWORK AND PIPING LEAK TESTING

A. Underground, concealed and insulated ductwork and piping shall be tested for leaks in place before backfilling, concealing or covering. Tests shall be conducted in the presence of the Architect or his designated representative.

B. All low pressure ductwork (design operating pressure of 1.0" W.C. (P.S.P. or less) shall be tested for leakage in the system to which it is connected.

C. All medium and high pressure ductwork (operating pressure of more than 1" W.C. (P.S.P.) shall be tested at 1.5 times the design operating pressure of the system to which it is connected for all the total fan pressure at 2000 ft. whichever is greater.

D. All visible and audible air leaks from the ductwork systems shall be repaired.

E. The pressure systems shall be tested at a minimum pressure of 125 psi and proven tight at this pressure for not less than thirty (30) minutes or longer if required to permit inspection of all joints. No loss in pressure will be permitted.

F. All gas piping shall be tested pneumatically and proved tight at a pressure of not less than 100 psi for a period of not less than two (2) hours. No loss in pressure will be permitted.

G. All refrigerant piping shall be 100% tested with a halide torch leak detector.

H. All leaks shall be repaired by tightening, remaking joints, or replacing pipe and fittings. Caulking of joints shall not be permitted.

3.07 RECORD (AS-BUILT) DRAWINGS

A. At the completion of the project, provide a set of reproducible copies to the Architect which reflect all changes, deviations and revisions made to the original design documents. Locations of all underground piping and utilities shall be clearly shown and dimensioned from permanent reference points such as building column lines.

3.08 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS

A. Complete operating and maintenance manuals shall be provided to the Owner. Four copies shall be provided. Each copy shall be bound in a separate 3-ring, loose leaf notebook. Operating instructions shall be provided for each mechanical system, and shall include a brief system description, a simple schematic and a sequence of operation. Operating and maintenance instructions shall be provided for each piece of equipment. A control system wiring diagram shall be included in each operating and maintenance manual.

B. Prior to final acceptance or beneficial occupancy, provide the services of a competent technician for not less than one (1) day to instruct the Owner in the operation of the mechanical systems.

3.09 TESTING AND BALANCING

A. Testing and balancing of the HVAC system shall be performed in accordance with the standards of ASAC and shall be performed under the direct supervision of a Certified Test and Balance Engineer as specified in Section 23043. Note that this work is to be performed under a separate Contract directly under the General Contractor. Submit four (4) copies of the test and balance report directly to the Architect.

3.10 WARRANTY

A. All work provided under this Division 23 shall be subject to a minimum one year warranty. The warranty shall include prompt repair or replacement of equipment or system failures and shall include all parts and labor. In addition, all recirculating air conditioning compressors shall carry an additional four year parts-only warranty. Extended warranties shall be provided on all other equipment so specified in other Sections.

END OF SECTION

SECTION 23043
HVAC TEST & BALANCE

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the HVAC General Section 23010.

B. This Section 23043 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the testing and balancing (T&B) of the heating, ventilating and air conditioning (HVAC) systems as specified herein and as shown. These systems include, but are not limited to, the following:

1. Supply distribution systems
2. Return and exhaust air systems
3. Heating, ventilating and air conditioning equipment (all scheduled equipment as a minimum)

1.02 INTENT

A. It is the intent of this Section of the specifications to provide a complete operable and balanced HVAC system as shown and specified which is reasonably airtight, comfortable and free of objectionable noise and vibration.

1.03 SCOPE OF WORK

A. HVAC test and balance shall be performed by an independent agency certified by the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB) under direct contract to the General Contractor. All work performed by this agency shall be performed by qualified technicians under the direct supervision of an AABC or NEBB certified test and balance engineer. The agency shall be independent and shall not be associated in any way with the installing HVAC subcontractor.

B. HVAC test and balance shall be performed in accordance with the 6th edition of the AABC National Standards, 2002 for Total System Balance or the NEBB Procedural Standards for TAB of Environmental Systems, 7th Edition, 2005 together with the NEBB TAB Manual for Technicians, 2nd Edition.

C. The final T&B report shall serve to substantiate compliance with the intent of the Contract Documents, specifically the HVAC systems.

D. HVAC test and balance shall not begin until the systems are substantially complete.

E. Upon the completion of the T&B work, the Agency shall submit four copies of the complete HVAC Test and Balance Report directly to the Architect.

F. The Agency, as a part of its contract with the General Contractor, shall act as an authorized inspection agency, responsible to the General Contractor, the Architect and shall, during the test and balance, list those items which require correction or have not been installed in accordance with the Contract Documents.

G. The Agency shall plainly mark the settings on all dampers and adjustable devices. If a balancing device is provided with a history strip, it shall be set, locked and marked.

1.04 SUBMITTALS

A. The name and certification of the Agency, along with the name and certification of the Certified Test and Balance Engineer, shall be submitted to the Architect for review within 7 days after the award of the general contract.

B. The selected Agency shall submit to the Owner:

1. Professional Manual
2. Report
3. Owner NEBB Performance Guaranty
4. Instrument List and Calibration Dates
5. Schedule

C. A reviewed copy of each of the above shall be returned to the Agency before the HVAC test and balance begins.

D. If a complete submittal in accordance with these requirements is not received 15 calendar days from award of the general contract, then the Architect reserves the right to select the Agency.

1.05 PERFORMANCE GUARANTY

A. The agency shall guaranty that all work will be performed in accordance with the applicable standards and procedures, and evidence of the firm's certification shall be provided.

B. In addition to the agency's guaranty, the agency shall provide a written certification from their national governing body that the agency will perform its contracted services in accordance with the applicable standards for the work on this project.

C. Rules and procedures for the quality assurance program shall be provided with the national certification.

2.0 PRODUCTS

2.01 (Not applicable).

3.0 EXECUTION

3.01 GENERAL CONTRACTOR'S DUTIES

A. The General Contractor shall provide the following, within 10 days after his receipt, to the Agency:

1. Contract drawings
2. Contract applicable specification division 23 (others as applicable)
3. Addenda
4. Change orders
5. Reviewed submittals

B. The General Contractor shall start-up and maintain the HVAC systems and shall continue the operation of the HVAC systems during each day of testing and balancing. Start-up and operation shall include, as a minimum, the following:

1. All equipment operable and in safe condition.
2. Temperature control system complete.
3. Proper thermal overload protection in place for electrical equipment.
4. Ductwork leakage rates not exceeding those specified and all duct systems clean of debris.
5. Air transfer systems shall have:
 - a. Correct fan rotation and RPM.
 - b. Coil fins cleaned and combed.
 - c. Filters clean and in place.
 - d. Access doors closed.
 - e. All dampers in place and open.
 - f. All grilles, registers and diffusers installed.

C. Provide sufficient time before final completion date so that testing and balancing can be accomplished. Coordinate the submitted T&B schedule.

D. Provide immediate labor and tools to make required corrections and repairs without undue delay.

E. The General Contractor and his subcontractors shall cooperate fully with the Agency to provide the following:

1. Access to HVAC system components.
2. The right to adjust the systems.

F. Any conditions which prevent a proper HVAC Test and Balance shall be reported by the Agency to the General Contractor and Architect within 7 days of their discovery.

G. If it is determined by the Agency and confirmed by the Architect that drive changes or additional balancing dampers are required, the Contractor shall obtain and install all necessary components.

H. The Agency shall cooperate with the Architect and the Contractor and all his subcontractors to perform the work in such a manner as to meet the job schedule.

I. The Agency shall verify that all system components are in place and in proper working order prior to leaving the project.

J. All reported, recorded data shall represent true measured conditions.

END OF SECTION

QUALITY
Quail Hollow
EST. 1988

MAINTENANCE
BUILDINGS

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CHARLOTTE, NC 28210

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REVISIONS:

No.	Description	Date
01	ISSUED FOR CONSTRUCTION 04/26/20	

PROJECT: 9606-197950
DATE: 19 JUNE 2020
DRAWN BY: NPD
CHECKED BY: BUR

SPECIFICATIONS
- MECHANICAL

M-003

CONSTRUCTION DOCUMENTS