

HVAC SPECIFICATION
PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The work includes the furnishing of all labor, materials and equipment necessary for a complete installation of work as shown or described on the drawings.

1.02 WORK INCLUDED

A. The MECHANICAL CONTRACTOR shall fulfill all of the requirements and responsibilities of the General Contractor as the prime contractor for this project. This contractor shall assume responsibility to solicit additional contractors required to accomplish the project activities. These activities include but are not limited to oil tank demolition and removal, HVAC, gas piping, electrical service upgrade and equipment connections, plaster and lathe wall and ceiling repairs, carpentry wall openings, masonry wall openings and repairs, painting, and roofing.

B. This Contractor shall coordinate all his work with the work of others for a finished installation.

C. Remove existing equipment, oil tank, ductwork, and piping as shown on the drawings. NOTE: The Town shall assume responsibility to coordinate the removal of the existing oil in the tank and coordinate where the oil is to be delivered.

D. Provide new equipment, ductwork and piping as shown on the drawings and listed in the equipment schedules.

E. This Contractor shall be responsible for all wall and floor openings, patching, and repairs to match existing conditions.

F. The Roofing Contractor shall be responsible for all roof penetrations, flashing, and counter-flashing.

G. The Balancing Contractor shall be responsible for the adjustment of the equipment and airflow devices and to commission the system.

H. This Contractor shall be responsible for all automatic temperature control wiring.

I. The Painting Contractor shall be responsible for the final priming and painting of the new construction activities back to match existing conditions.

J. This Contractor shall be responsible for all rigging and staging required for this project.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. The following shall be provided by others:

1. Power wiring.
2. Motor starters, except where noted.

1.04 CODES, ORDINANCES AND PERMITS

A. Comply with all applicable Codes and ordinances for legal installation and operation of HVAC systems.

B. Obtain all required permits for work.

1.05 SHOP DRAWINGS

A. Submit six (6) sets of all equipment and materials used on work for Engineer review and approval.

1.06 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. Contractor is required to visit the site to compare document/intent with actual field conditions prior to submitting bid price.

1.07 RECORD DRAWINGS

A. Maintain two (2) sets of prints at site showing progress of work.

B. Contractor shall furnish for record three (3) hard copy sets of project drawings to the Owner for the completed installation.

1.08 ELECTRICAL CHARACTERISTICS

A. Shall comply with the following:

Motors Below 1/2 HP	120 Volt,
Single Phase	
Motors 1/2 HP and Over	240 Volt,
Single Phase	

B. All motors shall be premium-efficiency type, NEMA B, 1750 RPM, ODP.

1.09 TEMPORARY LIGHT, POWER, WATER AND HEAT

A. To be coordinated by this contractor if required.

1.10 SCHEDULE OF VALUES

A. Provide price breakdown by major equipment, systems and labor for processing requisitions.

1.11 GUARANTEE

A. All work done under this section shall be guaranteed for one (1) year from acceptance.

B. Contractor shall provide the Owner with contact person and phone number for 24 hour available equipment service.

PART 2 – PRODUCTS

2.01 INSULATION MATERIALS

A. Insulation shall be installed in a neat, workmanlike manner. All materials shall comply with NFPA 90A requirements.

B. Furnace supply air ductwork and return air ductwork shall have 1-1/2 inch thick, 1-1/2 pound density fiberglass blanket and reinforced foil vapor barrier jacket.

C. Outside fresh air intake ducts shall have 1-1/2 inch thick, 1-1/2 pound density fiberglass blanket and reinforced foil vapor barrier jacket.

D. Supply and return air ducts routed in the attic eaves spaces shall be constructed with 3" external duct wrap insulation reinforced foil vapor barrier jacket.

E. Supply and return air ducts shall be internally sound-lined for the first 10' from the unit connections.

F. All duct insulation shall be continuous through wall openings.

2.02 SHEET METAL WORK

A. All sheet metal work shall comply with appropriate SMACNA Standards. Air distribution ductwork from the furnace discharge to the system terminals shall be low pressure / low velocity systems. All ductwork joints and connections shall be duct sealed. Branch duct takeoff fittings shall be duct sealed complete.

2.03 SLEEVES, INSERTS AND OPENINGS

A. All cutting and patching for mechanical systems shall be accomplished by the HVAC Contractor. All openings shall be sleeved and sized to suit item plus any covering and 1/2 inch clearance. Sleeves shall be mounted flush for walls, with 1 inch thick extension in floors. Inserts shall suit the application and installed in a timely manner.

B. Contractor will be required to create openings in the first floor plaster and lathe ceiling for the new HVAC air-distribution devices. These new devices shall be centered as best possible in the ceiling grid cells while avoiding the ceiling joists at 30" OC. Extreme care shall be taken to avoid any ceiling damage while these openings are being accomplished. Contractor shall be responsible for any required ceiling damage repairs back to match existing conditions at no additional cost to the Owner.

C. Contractor will be required to create openings in the mezzanine plaster and lathe ceiling and walls for the new HVAC ductwork and roof penetrations. One additional opening shall be created to allow access to one side of the mezzanine attic joist space. Extreme care shall be taken to avoid any damage to the first floor ceiling while these openings are being accomplished. Contractor shall be responsible for any required ceiling damage repairs back to match existing conditions at no additional cost to the Owner. Unless otherwise directed by the Owner, the openings around the mezzanine duct wall and ceiling penetrations shall be repaired to match existing and to seal the duct openings and separate the furnace equipment area from the attic joist space.

D. HVAC duct penetrations thru the roof shall be accomplished by a licensed and insured roofing contractor approved by the Owner.

2.04 VIBRATION ISOLATION

A. All motor-driven equipment shall be furnished with internal vibration isolation by the respective manufacturer to suit the application.

2.05 FURNACE UNITS

A. Furnish and install, where indicated on the Drawings, furnace units having the capacity and size as scheduled on the Drawings, having the characteristics as indicated herein, and shall be manufactured by Lennox, Carrier, or Trane.

B. Provide the following accessories:

1. Variable speed fan and associated controls.
2. Two-stage heating and associated controls.
3. Two-stage cooling and associated controls.
4. Low-ambient components and controls.
5. Return air duct filter rack and spare filters for each unit.
6. 4" high house-keeping pad.
7. Direct expansion cased cooling coil with cooling coil drain pan.
8. Condensate pump and associated drain tubing.
9. Concentric vent kit.

2.06 AUTOMATIC TEMPERATURE CONTROLS

A. Provide a stand-alone automatic temperature control for each of the furnace units. The systems serving the first floor are F-1, and F-2. The systems serving the basement are F-3 and F-4.

B. A separate wall-mounted thermostat shall control each of these furnace units. The first floor thermostats shall be installed on the wall at the rear of the room unless otherwise directed by the Owner. Each thermostat shall be digital, programmable, and be able to control 2-stage heating, 2-stage cooling, low-ambient controls and variable speed ECM fan motor. Each thermostat shall be provided with a plastic locking cover.

C. The basement floor thermostats shall be installed on the side wall of the duct chases unless otherwise directed by the Owner. Each thermostat shall be digital, programmable, and be able to control 2-stage heating, 2-stage cooling, low-ambient controls and variable speed ECM fan motor. Each thermostat shall be provided with a plastic locking cover.

D. Acceptable thermostats shall be the same manufacturer as the furnace or by Honeywell.

E. All electric wiring done in conjunction with the control work shall be done in accordance with applicable electrical codes.

2.07 BAROMETRIC RELIEF

A. This Contractor shall furnish and install one manual barometric relief damper to be installed in a duct located above the stage area. This damper shall relieve the excess pressure within the space when the two furnaces are in operation. This damper shall be manual and be operated with a weighted control arm adjusted be installed a minimum of 18" above the ceiling joists to prevent infiltration of dust and debris. Duct shall be installed with 3" external Duct Wrap insulation with reinforced foil vapor barrier jacket from the ceiling penetration to 6" beyond the damper to prevent condensation. Seal tight to the ceiling opening.

2.08 FRESH AIR INTAKE STORM LOUVER

A. This Contractor shall furnish and install one fresh air intake storm louver to be installed in the existing basement foundation window. The rough-opening is approximately 36" wide by 17" high. The window and frame shall be removed and the new louver shall be installed in its place.

B. The new louver shall be fully recessed, stationary, drainable blade, 4" depth, aluminum blades and frame, mill finish with anodized coating, and insect screen. Louver shall be similar to Ruskin ELF445DX. The louver is being installed in a window well area so a low intake velocity below water penetration velocity is essential.

2.09 PIPING MATERIALS

A. All piping materials installed under this section shall be new and shall consist of the following materials of construction:

System	Piping Class
Condensate Drain Piping	2
PVC Vent Piping	2
Refrigerant Piping (R410A)	12

B. Class 2 Piping System:

3 Inches and Smaller

Constr. Glued connections.
Piping PVC Sch 40.
Fittings PVC Sch 40.
Coupling PVC Sch 40.

C. Class 12 Piping System:

All Pipes Sizes
Hard brazed joints.
Piping Copper tubing, Type ACR, hard drawn; cleaned, dehydrated and capped for refrigeration service, ANSI B70.1, ASTM A280.
Fittings Wrought copper, brazed joint type, ANSI B16.22.
Couplings Same as "Fittings" above.
Brazing Alloy East Flo, Sil Fos, Phos, Co. Minimum 1100 degrees F. melting temperature ASTM B260.

2.10 NATURAL GAS PIPING

A. This Contractor shall coordinate with the local natural gas company utility to obtain new natural gas service to this building. The utility company shall determine the size of the required service based upon the equipment loads as indicated on the equipment schedule. The utility company shall also determine the actual location of the new meter to be installed. This activity shall include the Owner for coordination and authorization.

B. This contractor shall install new natural gas piping and valving of the sizes indicated on the plans to each of the new furnace units. The actual pipe routings shall be finalized on site once the meter location is determined.

C. This contractor shall Sch 40 black iron piping for this system. Piping and valving shall be screwed fittings type. This system shall be leak-checked prior to being connected to the equipment.

D. The exposed gas piping located outside of the building shall be cleaned, primed, and painted. Final color selection shall be by the Owner.

E. New piping shall be identified as "Natural Gas" with the appropriate stick-on labels or painted labels of the proper size and color scheme.

2.11 AIR COOLED CONDENSING UNITS

A. Furnish and install condensing units of sizes and capacities as scheduled. Each condensing unit shall utilize two-stage scroll compressors for improved efficiency and operational flexibility, designed to be used with 2-stage heating/cooling thermostats. Units shall be furnished with low-ambient components and controls. Each unit shall be installed on a contractor furnished exterior pad.

B. Condensing cabinets shall be constructed of 18 gauge galvanized steel which shall be phosphatized and be finished with a weatherized coating in a color suitable for pedestrian exposure. The cabinet shall not exceed 41-3/4" in height to provide a low silhouette. Condensing unit base shall be constructed of 16 gauge steel with bolt-down holes for mounting and provisions for drainage of water. Compressor shall be located in a separate compartment with a removable service panel to provide access to controls and compressor components.

C. Scroll compressors shall be of the welded hermetic type designed for use with Refrigerant R410A. Each compressor shall include completely tamper-proof internal line break motor protection. Compressor shall be mounted on isolators to prevent vibration and minimize sound level. Compressors shall be protected with crankcase heater, filter dehydrator, suction line accumulator and liquid line sight glass all factory installed. Compressor shall have a limited five-year warranty.

D. Electric controls shall include magnetic contactor, 24 volt control transformer with high/low pressure cutoff switches and anti-short cycling device all factory installed.

E. Condenser coil shall be constructed of 3/8" diameter copper tubes and aluminum fins. Provide phenolic epoxy coating on condenser coils and base section.

F. Condenser air shall be discharged vertically. Condenser fan shall have aluminum blades and shall be permanently lubricated with built-in automatic reset thermal overload protector and shall be mounted on condenser fan motor shaft to prevent water from entering the motor bearings. The fan motor shall be mounted to the fan venturi with the entire assembly capable of being removed for servicing.

G. Condensing unit shall be pre-charged and furnished with service valves factory inside the condensing unit. Valves shall be complete with factory installed quick connect fittings for precharged tubing. All components other than the compressor shall have a one-year warranty.

H. The following accessories shall be furnished for field mounting:

1. Low-ambient components and controls.
2. Condenser coil guards for protection of coil surface.
3. Circuit breaker type disconnect switch.

I. Units shall be as manufactured by Lennox, Carrier, Trane or approved equal.

PART 3 – EXECUTION

3.01 MATERIALS AND WORKMANSHIP

A. All materials used shall be new and without damaged parts. All work shall be accomplished by workmen trained in that particular function or task.

3.02 COORDINATION

A. The HVAC Contractor shall coordinate his work with other trades, providing timely information on his needs and responding on a timely manner to requests by others.

3.03 PROTECTION AND CLEAN-UP

A. All new materials shall be suitably stored for the duration of the construction activities to prevent damage and/or deterioration. Cap/seal or otherwise protect piping and ductwork from foreign material during construction.

B. Contractor shall keep the site clean of debris during the duration of the construction activities. The site shall be kept clean and neat. Excess material and trash outside of the building shall be minimized to maintain the aesthetics of the area respective of the adjacent residential occupants. Owner shall approve any and all outside lay-down areas and trash container location.

C. Contractors shall protect the existing first floor wood floor finish from construction damage. If the floor finish is damaged in any way this contractor shall assume the responsibility of having the floors refinished to the satisfaction of the Owner at no additional cost to the Owner.

D. Contractors shall protect the existing basement floor painted finish from construction damage. If the floor finish is damaged in any way this contractor shall assume the responsibility of having the floors repainted to the satisfaction of the Owner at no additional cost to the Owner.

3.04 OPERATING AND MAINTENANCE MANUALS

A. Provide Owner with maintenance manuals on all equipment and control systems.

3.05 OPERATING INSTRUCTIONS

A. Instruct Owner's personnel on operation of systems.

3.06 SYSTEM START-UP AND OPERATION

A. Provide all labor, materials and equipment to place the HVAC systems into operation. Maintain operation during balancing and instruction periods. Insure that all equipment is operating properly with adequate lubrication, without vibration and with proper electrical characteristics.

3.07 SYSTEMS IDENTIFICATION

A. Label all equipment and systems with stenciled markings. Provide valve lists for all system's remote isolation valves (not equipment valves).

3.08 SYSTEMS BALANCING

A. All air systems shall be balanced to the design flows as noted on the project drawings. The Balancing Contractor selection shall be approved by the Owner. The Balance Contractor shall be certified by NEBB or AABC and be a member in good standing in that respective organization. The Balance Contractor shall submit four (4) copies of the balance report to the Engineer and Owner for review and approval.

3.09 SAFETY REQUIREMENTS

C. All trade contractors shall comply with the provisions of the "Construction Safety Act", as well as all other applicable Federal, State and local requirements.

GRIFFITH & VARY, INC.

Consulting Engineers

12 Kendrick Road
Wareham, MA 02571
508-295-0050 (T)
508-295-0003 (F)
www.griffithandvary.com

FREEDOM
HALL
FURNACE
REPLACEMENT

Cotuit, MA

Notes:

North Arrow

Keyplan

Drawing Name:

MECHANICAL
SPECIFICATIONS

Scale: AS NOTED

Job No:

Drawn By: TEP

Date: Sept. 16, 2013

Drawing Number:

M-4