

SECTION 15550 – BREECHING AND STACKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK INCLUDED

- A. Furnish and install all breeching, flues and stacks to vent to atmosphere all fuel fired equipment.
- B. This system shall also include all cleanout doors, drain fittings, vent caps, draft divertors, supports, hangers, collars, dampers, thimbles and expansion compensators.
- C. All system components shall be UL listed.
- D. The system shall include an all stainless steel inner liner at all lengths, elbows, fittings and joints without exception.
- E. All outer jackets clearances from the building components shall be strictly enforced.

1.3 RELATED SECTIONS

- A. Examine all drawings and criteria sheets and all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.
- B. All stacks, breeching and supports shall be installed using vibration isolation and Seismic restraints as specified under Section 15241.

1.4 REFERENCES

- A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of the Contract Documents.

B. Material standards shall be as specified or detailed hereinafter and as follows:

1. ANSI Z21.66 – Automatic Vent Damper Devices for Use with Gas-Fired.
2. ASTM A 569/A 659M – Steel, Sheet and Strip, Carbon (0.15 Maximum Percent) Hot-Rolled Commercial Quality.
3. ASTM A653/A 653M – Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM A 666 – Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar.
5. ASTM A 924/A 924M – Standard Specification for General Requirements for Steel Sheets, Metallic-Coated by the Hot-Dip Process.
6. ASTM C 401 – Classification of Castable Refractories.
7. NEMA MG 1 – Motors and Generators.
8. NFPA 31 – Standard for the Installation of Oil Burning Equipment.
9. NFPA 54 – The National Fuel Gas Code.
10. NFPA 70 – National Electrical Code.
11. NFPA 82 – Standard on Incinerators, Waste and Linen Handling Systems and Equipment.
12. NFPA 211 – Standard for Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances.
13. SMACNA (DCS) – HVAC Duct Construction Standards – Metal and Flexible; Sheet Metal and Air Conditioning Contractors’ National Association.
14. UL 103 – Standard for Factory Built Low Heat Chimneys.
15. UL 127 – Standard for Factory Built Fireplaces.
16. UL 378 – Standard for Draft Equipment.
17. UL 441 – Standard for Gas Vents.
18. UL 641 – Standard for Low Temperature Venting Systems.
19. UL 959 – Medium Heat Appliance Factory Built Chimneys.

1.5 SUBMITTALS

- A. See Section 15050 and General Conditions for Additional Requirements.
- B. Product Data: Provide data indicating factory built stacks, breeching and accessories, including dimensional details of components and flue caps, dimensions and weights, electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate general construction, dimensions weights, support and layout of breechings. Submit layout drawings indicating plan view and elevations of all breeching and vent systems.
- D. Manufacturer’s Instructions: Include installation instructions, and indicate assembly, support details and connection requirements.
- E. Manufacturer’s Certificate: Certify that metal stacks meet or exceed all UL requirements and all local and State codes.

- F. The scope of this work to be provided by the stack manufacturer will be shown on shop drawings prepared by the stack manufacturer and approved by a registered structural engineer. Computer printouts summarizing the design calculations for tension, compression, cantilever, vibration ovaling, dynamical stability and other seismic forces characteristic to this installation, shall be provided by a structural engineer registered within the state where the project exists and designated by the stack manufacturer. The drawings shall show all features of the work including the steel shell thickness, overall height, diameter of the chimney, the design of the base anchor system and any chimney accessories to be provided, as well as work to be provided by others.
- G. The shop drawings are to be submitted to the Architect for review, before the start of fabrication. The Architect's review shall in no way relieve the stack manufacturer of his full responsibility for the accuracy of the design calculations and the structural integrity of the stack. The stack shall conform to the overall dimensions and design shown on the drawings after the manufacturer has confirmed such.

1.6 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** Company specializing in manufacturing the type of products specified in this section, with minimum ten (10) years of documented experience.
- B. The inner diameter of the stack and breeching shall be verified by the manufacturer's computations. The computations shall be technically sound, shall follow the latest version of the ASHRAE calculation methods, and incorporate the specific flow characteristics of the inner pipe. The Contractor shall furnish the equipment model and operating characteristics to the stack manufacturer. Operating characteristics shall include flue gas flow rate, BTU input, outlet operating temperature, local altitude, stack layout, allowable backpressure at the boiler outlet, and any other information necessary to determine system operation at maximum efficiency.
- C. **Installer Qualifications:** Company specializing in performing the type of work specified in this section with minimum ten (10) years of documented experience and approved my manufacturer.
- D. Design stacks under direct supervision of a Professional Structural Engineer experienced in design of the type of work specified and licensed within the State in which the project is located.
- E. The stack and breeching shall be fabricated by one manufacturer to ensure proper fit and compatibility of the breeching system to the stack. This single manufacturer shall ensure agency conformity of this system and make any recommendations deemed necessary for proper installation.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable code and NFPA 54 for installation of natural gas burning appliances and equipment.
- B. Conform to applicable code and NFPA 31 for installation of oil burning appliances and equipment such as emergency generators.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. and testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE AND HANDLING

- A. The Installing Contractor shall use special care in unloading the breaching and stack. It shall be handled in such a way as to minimize damage and to avoid scarring of the steel. If temporary lifting cars, clips or braces are used, care must be used to prevent unsightliness upon removal. Tack welds should be ground smooth. All holes shall be filled with weld metal and ground smooth. All finish welds are to be clean, showing good fusion and 100% penetration with extensive visual inspection. Installation details and instructions shall be included on the shop drawing.

1.9 WARRANTY

- A. Manufacturer shall confirm sizing and design and unconditionally guarantee the stack for a minimum of 10 years.

PART 2 - PRODUCTS

2.1 BOILER STACK AND BREECHING

- A. Acceptable manufacturers subject to compliance with the specification.
 - 1. Metal Bestos
 - 2. Scheblen
 - 3. Metal Fab
- B. Provide complete breechings and stacks for the new boilers.
- C. Factory built modular exhaust system shall be laboratory tested and listed by UL for use with gas fired low pressure heating equipment which produces exhaust flue gases at a temperature not exceeding 500°F under continuous operating conditions. Manufacturer shall provide a (10) year warranty on all components of the system. This stack and breeching system shall be designed to compensate for all flue gas inducted thermal expansions.

- D. The stack and breeching system shall be double wall and have an outer jacket of Type 304 stainless steel for indoor locations and 316 stainless steel for outdoor locations, minimum 0.024 inches thick. All inner flue gas carrying conduit shall be Type 316 stainless steel. The inner liner shall be 0.035 inches nominal thickness for all diameters.
- E. Double wall air insulated/fiber insulated exhaust system shall have a minimum two (2) inch thick ceramic insulation and the outer wall. Maximum surface temperature shall not exceed 70°F above ambient temperature.
- F. The breeching and stack shall be installed according to the boiler and domestic hot water heater manufacturer's installation instructions and the limits of it's listing and shall comply with National Safety Standards and Building Codes.
- G. Inner pipe joints shall be sealed by use of V-bands with P-2000 ceramic sealant, as outlined in the installation instructions and supplied by the manufacturer.
- H. The stack shall be supported above the roof by rigid stainless steel guys (minimum 2 inch by 3/16 inch) with tensioners that will allow for the required stack expansion. Provide ventilated thimbles at the roof penetrations. The entire installation shall be capable of withstanding 120 mph wind loads. All necessary bracket assemblies, cleanouts, guys, support rings, drain fittings, vent caps, etc., shall be provided as necessary for a complete system.
- I. All parts exposed to the atmosphere shall be stainless steel.
- J. The system shall be installed by the Mechanical Contractor in accordance with the terms of the manufacturer's (10) year warranty.
- K. The system shall be type IPSC2 as manufactured by Selkirk/Metalbestos.

2.2 STACK ACCESSORIES SHALL INCLUDE THE FOLLOWING:

- A. Boiler Stack
 - 1. Cleanout section with drain to provide access and a drain at the base of the chimney. Cleanout/access door shall be 20" x 20" and shall be flanged and bolted. Drain shall be 4" threaded 316 stainless steel. Refractory at the base of the chimney shall be pitched to the center drain. The 4" chimney drain shall be piped to a 4" threaded drain connection in the base (side) of the stack.
- B. General
 - 1. All drain connections shall be piped with a 4" 316 stainless steel to acid neutralization basin.
 - 2. The top of the stack shall be provided with a removable cone sized to the proper velocity.

- 1) Initial construction shall include two (2) 350 BHP dual-fuel (gas/oil) firetube boilers.
- 2) Future Phase Two construction shall add two (2) additional 500 BHP dual-fuel (gas/oil) firetube boilers for a total plant capacity of 1700 BHP.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NFPA 54 and NFPA 31.
- C. Install breechings with minimum of joints. Align accurately at connections, with internal surfaces smooth.
- D. Support breechings from building structure, rigidly with suitable ties, braces, hangers and anchors to hold to shape and prevent buckling. Support vertical breechings and stacks at 12 foot spacing, to adjacent structural surfaces, or at floor penetrations. Refer to SMACNA HVAC Duct Construction Standards – Metal and Flexible for equivalent duct support configuration and size. Refer to Section 15241 for Vibration Isolation and Seismic Restraint requirements.
- E. Install concrete inserts for support of breechings and stacks in coordination with formwork.
- F. Pitch breechings with positive slope up from fuel-fired equipment to stack.
- G. Coordinate installation of dampers and induce draft fans.
- H. Maintain UL listed minimum clearances from combustibles.
- I. Assemble pipe and accessories as required for complete installation.
- J. Install vent dampers, locating close to draft hood collar and secured to breeching.
- K. Assemble and install stack sections in accordance with NFPA 82, industry practices and in compliance with UL listing.
- L. Level and plumb stacks.
- M. Clean breechings and stacks during installation, removing dust and debris.
- N. At appliances, provide slip joints permitting removal of appliances without removal or dismantling of breechings, breeching insulation or stacks.

- O. Provide continuous insulated breeching to connect appliance to stacks.
- P. The stack shall be installed according to the manufacturer's installation instructions and the limits of its listing and shall comply with national building standards and building codes.
- Q. The system shall be installed by the contractor as designed by the manufacturer.

END OF SECTION