

SECTION 23 51 00
BREECHINGS, CHIMNEYS AND STACKS

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. The work of this Section shall include, but is not limited to, the following:
 - 1. Self-supporting high temperature chimney, and breechings, including all fittings, structural supports, fastenings, bracing, sealant, shop and field painting, clean-outdoors, ventilated wall, floor or roof thimbles, flashing, rain hood, guy wires, seismic restraints and any related items.
 - 2. Double wall Type B gas vent pipe and fittings including supports, fastenings, bracing, draft hood connector, sealant, rain cap, ventilated wall, floor or roof thimbles, flashing, guy wires, seismic restraints and any related items.
 - 3. Self-supporting steel gas vent, including all fittings, structural supports, fastenings, bracing, sealant, shop and field painting, roof terminations, flashing, wall terminations, guy wires, seismic restraints and any related items.
 - 4. Calculations for vent sizing, seismic and thermal expansion design and associated details.
 - 5. As noted in #1 above from the fire pump discharge from the silencer/muffler/precipitator to the final termination point.
 - 6. Calculations for vent sizing, seismic and thermal expansion design and associated details.

1.02 RELATED DOCUMENTS

- A. Section 22 33 00 – Domestic Water Heating Systems
- B. Section 23 05 01 – HVAC General Provisions
- C. Section 23 05 48 – Vibration Isolation and Seismic Restraints
- D. Section 23 52 16 – Condensing Boilers

1.03 REFERENCE STANDARDS

Published specifications standards, tests or recommended methods of trade, industry or governmental organizations apply to work in this Section where cited below:

- A. NFPA – National Fire Protection Association
 - 1. NFPA 211 Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances

1.04 QUALITY ASSURANCE

- A. Units shall be UL Listed for use with heating equipment burning gaseous, solid or liquid fuels that do not exceed continuous operating flue gas temperature above 1,000 degrees F and not exceeding 1,400 degrees F under intermittent conditions as defined in NFPA 211.

- B. Units shall be UL Listed for use with heating equipment burning gaseous fuels that do not exceed the requirements for Type B vent as defined in NFPA 211.
- C. Units shall be UL Listed for use with heating equipment burning gaseous fuels that do not exceed continuous operating flue gas temperature above 550 degrees F as defined in NFPA 211.
- D. The venting system shall develop a positive flow adequate to exhaust flue gases to the atmosphere without condensation within the vent or flue gas spillage. The design shall compensate for thermal expansion.

1.05 SUBMITTALS

- A. Provide manufacturer chimney and vent draft calculations. Certify that the calculations are based on actual jobsite conditions and are coordinated with “released-for-construction” equipment submittal data, and that the complete stack and breeching systems stack draft range at equipment outlets are within the equipment manufacturer’s recommended range.
- B. Provide backpressure, draft and stack diameter calculations for all possible boiler and emergency generator firing combinations including emergency generator.
- C. Submit certification that chimney and vent will withstand maximum system pressure developed by the burner blowers, combustion and the venting system.
- D. Submit certified dimensioned shop drawings, construction details, mounting details, hardware and accessories.
- E. Submit seismic support and restraint calculations stamped and signed by a structural engineer licensed in Utah
- F. Submit thermal expansion compensation calculations and compensator details.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. High Temperature Chimneys: Selkirk/Metalbestos Model IPS, Metal-Fab Inc. Model IPIC, or equal
- B. Boiler Stacks: Metalbestos Model IPS, Metal-Fab Inc. Model IPIC, or equal
- C. Type B Vents: Metalbestos, Ameri-Vent, Ampco
- D. Condensing Gas Vents: Heat-Fab Inc. Model Saf-T CI, ProTech Systems Inc. FasNSeal, Flexmaster Z-Vent III

2.02 HIGH-TEMPERATURE CHIMNEYS, POSITIVE-PRESSURE VENTS AND BOILER STACKS

- A. Vent shall be double wall with an outer jacket of aluminized steel 0.025-inch thick for up to 24-inch diameter vents and 0.034-inch thick for larger sizes. The inner wall shall be Type 304 stainless steel of nominal 0.035-inch thickness with a minimum 2 inches of mineral wool insulation between the two metal walls for the boiler flue and 4 inches of

mineral wool insulation for engine generator flues.

- B. Vent shall be installed and supported in accordance with factory recommendations and factory-supplied components. Exposed metal protected by a minimum of one base coat and one finish coat of Rust-O-Crylic as manufactured by Rust-Oleum, or approved equal.
- C. Inner pipe joints shall be sealed by use of flange draw bands with captive nuts and bolts, and RTV Silicone Sealant for flue gas temperatures up to 600 degrees F; above this temperature joints shall be sealed with high temperature joint cement as outlined in the installation instructions and supplied by the manufacturer.
- D. Provide pressure tight expansion joints as required for the anticipated thermal expansion.
- E. The boiler flues shall be complete with bottom drain and conical vertical discharge.

2.03 EXCESSIVE PRESSURE RELIEF VALVE

- A. Pressure relief valves shall be selected based on the flue vent design for the emergency generator taking into account the flue size, length, offsets and the actual emergency generator maximum exhaust pressure to disperse excessive pressure in case on an engine malfunction in order to protect the physical integrity of the exhaust system.
- B. The Excessive Pressure Relief Valve shall be set to open at pressures exceeding the emergency generator exhaust pressure of 27.7 inches of w.c. or as otherwise indicated by the generator manufacturer.
- C. The unit shall consist of the relief plate, guide plate, relief valve, springs and associated flange adaptors and installation bands, support rods, guides, etc. as necessary.

2.04 TYPE "B" GAS VENT

- A. Vent shall be double wall with an outer jacket of galvanized steel 0.025-inch thick for up to 24-inch diameter vents and 0.030-inch for larger sizes. The inner wall shall be 26-gauge aluminized steel with a 1-inch air space between the two metal walls.
- B. Vent shall be installed and supported in accordance with factory recommendations and factory-supplied components. Exposed metal protected by a minimum of one base coat and one finish coat of Rust-O-Crylic as manufactured by Rust-Oleum, or approved equal.

2.05 CONDENSING GAS VENT

- A. Vent shall be double wall with an outer jacket of Type 430 stainless steel. The inner wall shall be type AL29-4C stainless steel alloy with a minimum 0.15-inch air space between the two metal walls.
- B. Vent shall be installed and supported in accordance with the UL Listing, manufacturer's recommendations and using manufacturer-supplied components.
- C. Inner pipe joints shall be sealed by use of tapered closure system with external hardware, sealant for flue gas temperatures up to 600 degrees F. Penetrations of the inner liner for joint fastening are not permitted.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Comply with local codes, UL Listing, NFPA 211 and factory installation requirements. Coordinate chimney and vent requirements with boiler or appliance listing.
- B. Support breeching from structure. Breeching shall not impose load on appliance or chimney.
- C. Install breeching and chimney with positive slope back to the appliance. Provide easily accessible condensate drainage connection, configured to prevent condensation from entering the boiler.
- D. All branch fittings shall be 45-degree long radius sweep elbow connections in the direction of flue gas flow. All 90-degree elbows shall be long radius.
- E. Transitions to increase breeching diameter shall be with an increaser fitting angle of 10 degrees maximum. Increase common breeching manifolds at each branch, and locate the connection within the 10-degree fitting as a “wye” connection.
- F. Coordinate exact dimensions and other requirements of floor, roof, wall and partition penetrations with all other subcontractors.
- G. Roof penetrations shall be suitable for the roof construction shown and shall follow manufacturer's installation instructions and local codes.
- H. Maintain clearance to combustible or non-combustible construction in compliance with the vent listing.
- I. For condensing gas vents, install vent with ¼-inch per foot slope back to the appliance from the vertical riser. If the vent is a horizontal vent to a wall termination, slope from the boiler or appliance down to the wall termination. Provide manufacturer's condensate drainage connection, configured to prevent condensation from entering the boiler unless boiler is provided with internal condensate drainage as part of its construction and listing.
- J. Whenever Excessive Pressure Relief Valves are required, install where indicated on the drawings and where human contact is avoided and away from flammable or combustible materials. Provide a shroud specifically designed for the system as necessary or as identified on the drawings.

END OF SECTION 23 51 00