

SECTION 235100 – BREECHING, CHIMNEYS AND STACKS

PART 1 - GENERAL

1.01 GENERAL

- A. The General Provision of the Contract, including General and Supplementary General Conditions and Division 1 General Requirements, apply to the work specified in this Section.

1.02 RELATED WORK

- A. Section 232800-Insulation
- B. Section 23XXXX-Boiler, Burner and Controls

1.03 REFERENCES

- A. The following references apply to the extent noted here-in:
 - 1. ASTM A525 - Zinc Coating
 - 2. ASTM A527 - Galvanized Sheet Steel
 - 3. ASTM A569 - Carbon Steel
 - 4. NFPA 37 - Combustion Engines and Gas Turbines
 - 5. NFPA 54 - National Fuel Gas Code
 - 6. NFPA 211 - Standards for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances.
 - 7. UL 103 - Standard for Factory Built Chimneys (US)
ULC-ORD-C959 & ULC-S604 Standard for Factory Built Chimneys (CDA)
 - 8. UL-1978 - Standard for Safety Grease Ducts (US & CDA)
 - 9. UL 441 - Gas Vents (US)
ULC S-605 - Gas Vents (CDA)
 - 10. UL1738 - Standard for Safety Venting Systems for Gas Burning Appliances (US)
ULC S-636 Standard for Safety Venting Systems for Gas Burning Appliances (CDA)
 - 11. SMACNA - Duct Construction Standards
 - 12. UL 1777 - Chimney Liners (US)
ULC S-640 and ULC S-635 - Chimney Liners (CDA)
 - 13. UL641 - L-Vent (US)
ULC S-609 - L-Vent (CDA)

1.04 INSTALLATION

- A. The entire chimney installation shall comply with National Safety Standards and all building codes when installed.
- B. The Breeching System shall comply with National Safety Standards and all building codes when installed.
- C. The manufacturer's representation organization shall provide on-site instructions and technical support services, as required, prior to and during installation of the breeching chimney system. Upon completion of the installation, the manufacturer's representative organization shall certify, in writing, to the Engineer that the Breeching chimney system has been installed properly and in accordance with the manufacturer's installation instructions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. The system shall be as supplied by Security Chimneys International Ltd or equal, as follows:
1. Insulated Double Wall Positive Pressure Chimney (CIX/CAX)
 2. Condensing Heating or L-Vent Appliances Vent System (AL29-4C® stainless steel Venting Secure Seal SS or SSD or SSID)
 3. Chimney Liners (CT)
 4. On-Site Fabrication

2.02 INSULATED DOUBLE WALL POSITIVE PRESSURE CHIMNEY (CIX/CAX)

- A. The Insulated Breeching / Chimney System components, supports and terminations shall be the product of one manufacturer shall be fully factory fabricated and shall be laboratory tested and listed by Intertek Testing Services (ETL) for use with building heating equipment, burning gas or liquid fuels, as described in NFPA 211, Chapter 2.
- B. The Breeching / Chimney System shall be tested and listed as a breeching and chimney system suitable for 60 inch W.C. positive pressure by Intertek Testing Services (ETL), based upon compliance with the construction requirements and "Positive Pressure Applications Test" protocol described in Paragraph 9, 7 and Section 22 A respectively, of the Standard for Factory Built chimney, ANSI/UL103. Compliance with such standards/specification shall be confirmed by a statement on the safety certification label attached to the product, indicating "Suitable for positive pressure venting applications with maximum 60 inch water column internal static pressure at 1000 degrees F continuous, 1400 degrees F intermittent.
- C. The complete Breeching / Chimney System shall be fabricated as follows:
1. Inner wall
 - 0.035 inch type 304 or 316 stainless steel for all diameters.
 - Use 304 stainless for gas.
 - Use 316 stainless for all other fuels.
 2. Outer wall
 - 5 inch through 24 inch diameter 0.018 inch galvalum (Alu-Zinc) steel.
 - 26 inch through 36 inch diameter 0.024 inch galvalum (Alu-Zinc) steel.
 - Alt. Material – 304 or 316 stainless steel.

3. Insulation:
 - CIX– 2 inch 8 PCF mineral wool between inner and outer wall
 - Insulation CAX – Air insulated
4. Clearance to combustible:
 - CIX :From outer diameter one inch minimum air gap to combustibles for sizes 5 inch to 36 inches.
 - CAX : From outer diameter, four inches minimum air gap to combustibles for sizes 5 inches to 36 inches.

D. The complete Breeching / Chimney System, from appliance outlet to chimney, shall be designed to eliminate on-site welding through the use of a flanged male and female self-centering coupling configuration and by incorporating a wide type “V” locking band. The fastening of all locking bands shall be accomplished through the use of captive nuts and bolts to provide ease of locking. The chimney joints shall be field sealed using SCIL, model S-650 silicone sealant or equal.

E. The inner pipe and outer jacket shall be joined at the factory and shipped as a factory assembled unit to ensure ease of installation and product uniformity. A system where the outer jacket is attached during field installation is not acceptable.

F. Thermal expansion shall be compensated for through the use of manufacturer supplied insulated expansion joints.

G. The Breeching / Chimney shall be guaranteed by the manufacturer to be free from defects due to faulty material or workmanship for a period of 15 years minimum. Terms and conditions for the guarantee shall be as stated in the manufacturer’s standard guarantee which must be included with submittal drawings

H. Detailed manufacturer’s submittal drawings shall be provided for approval prior to manufacture or installation of the Breeching System.

2.03 CONDENSING HEATING OR L-VENT CERTIFIED APPLIANCES (AL29-4C® STAINLESS STEEL VENTING) SECURE SEAL SS OR SSD OR SSID

- A. SCIL Secure Seal shall be manufactured from AL29-4C stainless steel or equivalent, a super ferritic stainless steel specifically designed for extreme resistance to chlorine ion pitting, crevice corrosion, and stress corrosion induced by the generation of corrosive condensates by partially or fully condensing natural gas or propane fired heating appliances.
- B. The system components, supports and terminations shall be the product of one manufacturer, shall be fully factory fabricated, shall be laboratory tested and listed by Intertek Testing Services (ETL) for use with building heating equipment, burning gas as described in NFPA 54 and be listed to UL 1738 / ULC S-636 and UL-641 / ULC-S609.
- C. The complete Breeching / Chimney system shall be fabricated as follows
1. Inner Wall
 - 3 inch to 12 inches diameter: 0.020 thick, AL29-4C Stainless Steel or equivalent.
 - 14 inch to 24 inches diameter: 0.024” thick, AL29-4C Stainless Steel or equivalent.
 2. Outer Wall 1 (with Secure Seal SSD/SSID)
 - 3 inch to 10 inch diameter: 0.020” thick, 441 stainless steel or equivalent.
 - 12 inch to 24 inches diameter: 0.024” thick, 441 stainless steel or equivalent.
 3. Insulation (with Secure Seal SSD)
 - Annular 1” air space between walls
 4. Insulation (with Secure Seal SSID)
 - Annular 2” mineral wool space between walls
 5. Clearances to combustibles.

Single Wall Secure Seal SS (Fully enclosed, 4 sides):

- Sizes 3 to 24 inches diameter:
 - Non-combustible enclosure only.

Single Wall Secure Seal SS (Minimum clearance unenclosed, 2 sides max):

- Sizes 3 to 12 inches diameter:
 - 2 in. horizontal, 2 in. vertical
- Sizes 14 to 24 inches diameter:
 - 4 in. horizontal, 4 in. vertical

Double Wall Secure Seal SSD/SSID (Minimum Clearance fully Enclosed 4 sides):

Sizes 3 inches to 24 inches diameter:
1 inch vertical
2 inches vertical (L-Vent listing)

Double Wall Secure Seal SSD/SSID (Minimum clearance unenclosed, 2 sides max):

Sizes 3 inches to 12 inches diameter:
1 inch horizontal, 1 inch vertical
2 inches horizontal, 2 inches vertical (L-Vent listing)

Sizes 14 inches to 24 inches diameter:
3 inches horizontal, 1 inch vertical
3 inches horizontal, 2 inches vertical (L-Vent listing)

- D. The Breeching / Chimney shall be guaranteed by the manufacturer to be free from defects due to faulty material or workmanship for a period of 15 years minimum. Terms and conditions for the guarantee shall be as stated in the manufacturer's standard guarantee which must be included with submittal drawings.
- E. The complete Breeching / Chimney System, from appliance outlet to chimney, shall be designed to eliminate on-site welding through the use of a slip fit, rigid connection with reinforcing ribs, built in mechanical locking clips and a Viton® O-ring seal. Silicone gaskets are not allowed due to adverse reactions with sulphuric and carbonic acids. The use of silicone caulking at section joints is also not allowed.
1. The system, when sealed, shall maintain airtight integrity at pressures up to 35 inch of water column and be listed for an internal static pressure of 6 inches of water column at 550°F.
 2. Horizontal spacing between guides and supports shall be approved for 12 feet.
 3. Vertical free standing height above the roof shall be approved for 10 feet.
- F. Detailed manufacturer's submittal drawings shall be provided for approval prior to manufacture or installation of the breeching system.

2.04 CHIMNEY LINER (For oil and gas) (CT)

- A. The chimney liner system components, supports and terminations shall be the product of one manufacturer, shall be fully factory fabricated, shall be laboratory tested and listed by Underwriters Laboratories, Inc. for use with building heating equipment, burning gas or liquid fuels, as described in NFPA 211. Chapter 2.
- B. The chimney liner system shall be Underwriters Laboratories, Inc. tested and listed based upon compliance with the UL – 1777 / ULC S-640 and ULC S-636 Standard.
- C. The complete system shall be fabricated as follows:
 - 5 in. to 10 in. diameter: 0,024 in. type 316L or 304 stainless steel
 - 12 in. to 18 in. diameter: 0,032 type 316L or 304 stainless steel
 - 20 in. to 24 in diameter: 0,040 in. type 316L or 304 stainless steel
- D. The complete system, from appliance outlet to chimney, shall be designed to eliminate on-site welding through the use of a 3 inch overlap and locking band. The pipe joints shall be field sealed using SCIL ceramic-fibre, S-650 or S-2000 sealant.
- E. The liner shall be guaranteed by the manufacturer to be free from defects due to faulty material or workmanship for a period of ten (10) years minimum. Terms and conditions for the guarantee shall be as stated in the manufacturer’s standard guarantee which must be included with submittal drawings.
- F. Detailed manufacturer’s submittal drawings shall be provided for approval prior to manufacture or installation of the system.

2.05 ON-SITE FABRICATION – BY OTHERS

- A. Fabricate using ASTM A569 carbon steel. Fabricate breechings less than 24 inch diameter of ASTM A527 galvanized sheet steel, lock forming quality with ANSI/ASTM A525 (G90) (G165) zinc coating.
- B. Fabricate breechings from following minimum gauges. Refer to SMACNA HVAC Duct Construction Standards – Metal and Flexible.
 - 1. Sizes up to 12 inch: 18 gauge. (0.0478 inch)
 - 2. Sizes 13 inch to 24 inch: 16 gauge. (0.0625 inch)
 - 3. Sizes 25 inch to 36 inch: 14 gauge. (0.0800 inch)
 - 4. Sizes 37 inch to 60 inch: 12 gauge. (0.1055 inch)
 - 5. Sizes over 60 inch: 10 gauge. (0.1345 inch)
- C. Provide adjustable self-actuating barometric draft dampers, where indicated, full size of breeching
- D. Provide cleanout doors of same gauge as breeching, where indicated on drawings.
- E. Weld longitudinal seams. Fabricate joints by welding, tapping and bolting or with companion flanges. For breechings less than 24 inch diameter provide groove seam (pipe lock or flat lock) with end joints beaded and crimped.
- F. Reinforce rectangular breeching with angle frames and round breeching with flanged girth joints or angle frames. Refer to SMACNA HVAC Duct Construction Standards – Metal and Flexible.
 - 1. Sizes up to 30 inch: No reinforcing required
 - 2. Sizes 31 inch to 36 inch: 1-1/2 inch X 1-1/2 inch X 3/16 at 60 inches centers.
 - 3. Sizes 37 inch to 60 inch: 2 inch X 2 inch X ¼ inch, at 60 inch centers
 - 4. Sizes over 60 inches X 3 inch X ½ inch, at 60 inch centers.
- G. Fabricate breeching fittings to match adjoining breechings. Fabricate elbows with center-line radius equal to breeching (width) (diameter) Limit angular tapers 20 degrees maximum.

END OF SECTION