

DIVISION 23
SECTION 23 51 00
CHIMNEY LINER

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. This Section includes the requirements for provision of a factory prefabricated chimney liner and breeching connector for the existing masonry chimney, serving the natural gas-fired central steam boiler plant. The Contract Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Specifications, apply to this Section.
1. This Section **does NOT include** the requirements for provision of flue gas breechings nor combustion air intake breechings for the gas-fired domestic hot water heaters of any of the buildings of the Site. Refer to the specified requirements of Section 23 51 23, "Gas Vents", for provision of flue gas breechings and combustion air intake breechings for any of the gas-fired domestic hot water heaters of any buildings of the Site.
 2. This Section **does NOT include** the requirements for provision of the prefabricated double-wall insulated flue gas breeching system serving the gas-fired central steam boiler plant. Refer to the specified requirements of Section 23 51 16, "Prefabricated Breechings and Accessories", for provision of the prefabricated double-wall insulated flue gas breeching system serving the gas-fired central steam boiler plant.
- B. Related Sections:
1. Section 01 51 23 - Temporary Heating
 2. Section 23 05 00 – Common Work Results For HVAC
 3. Section 23 05 13 - Common Motor Requirements For HVAC Equipment
 4. Section 23 05 23 - General Duty Valves For HVAC Piping
 5. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment
 6. Section 23 05 53 - Identification for HVAC Piping and Equipment
 7. Section 23 05 93 - Testing, Adjusting and Balancing for HVAC
 8. Section 23 07 00 - HVAC Insulation
 9. Section 23 09 13 - Instrumentation and Control for HVAC
 10. Section 23 09 14 - Natural Gas and CO Gas Leak Detection Equipment
 11. Section 23 09 23 - Control Dampers
 12. Section 23 09 24 - Steam Flow Meters
 13. Section 23 22 13 - Steam and Condensate Heating Piping
 14. Section 23 25 19 - Water Treatment for Steam System Feedwater
 15. Section 23 31 13 - Metal Ducts
 16. Section 23 33 00 - Air Duct Accessories
 17. Section 23 34 16 - Boiler Room Combustion Air Makeup And Ventilation System
 18. Section 23 51 00 - Chimney Liner
 19. Section 23 51 16 - Prefabricated Breechings and Accessories

- 20. Section 23 51 23 - Gas Vents
- 21. Section 23 52 39 - Firetube Boilers
- 22. Section 23 53 12 - Vacuum Condensate Pumps
- 23. Section 23 53 13 - Boiler Feedwater Pumps

1.02 SUMMARY:

- A. This specification applies to the provision of a Chimney Liner for the existing masonry chimney, including means and methods for installation, of internal diameter as indicated on the Contract Drawings and for the full-height extent of the Projects existing masonry chimney, complete with new lateral connection to the new boiler breeching system, as shown on the Contract Drawings and as specified herein.
- B. The Work includes the provision of all chimney liner associated accessories, including but not limited to base supports, transverse peripheral spacers and guides, high-temperature rated expansion joints, supplemental supports, drain with P-Trap and automatic priming system for the trap at the base of chimney liner, provision of all labor, and other accessories as necessary to provide a complete and fully functional field assembly.

1.03 SUBMITTALS:

- A. Product Data - Technical data shall be presented prior to start of fabrication in an organized and bound submittal and shall include the following:
 - 1. Chimney liner system, including all factory furnished accessories, for field assembly, as specified.
 - a. Product General Arrangement Drawing, details and specifications.
 - b. Product dimensions including required clearances.
 - c. Unit weights.
 - d. Customer Order Data Sheet confirming job site conditions and requirements.
 - e. Scale drawings showing the entire field assembly of the liner system and the details of all assembly components.
 - f. Component Data Sheets.
 - g. Printed assembly instructions, published by the manufacturer.
 - h. Test reports.
 - i. Details, specifications, installation instructions and layout assembly shop drawings, including all associated fittings, expansion joints, supplemental supports and details and methods of joining of connection to the new boilers' breeching system to be provided as specified under Section 23 51 16.
 - j. Operating & Maintenance Manual and Instructions.

1.04 QUALITY ASSURANCE:

A. Fabricator's Qualifications:

1. Firms must be regularly engaged in the fabrication of field erected chimney liners for natural gas-fired scotch marine boilers of types and capacities required. The firm's products must have been in satisfactory use in similar service for not less than 10 years.
2. The firm shall have a written Quality Control manual and program which is currently maintained and includes the following information:
 - a. Authority and Responsibility for content and implementation of the QC program.
 - b. Company organization and individual authority and responsibility for each phase of the QC program's operation.
 - c. Sales order entry requirements, documentation, and control.
 - d. Design criterion requirements, documentation, and control.
 - e. Drawing requirements, documentation, and control.
 - f. Calculation requirements, documentation, and control.
 - g. Fabrication specifications, requirements, documentation, and control.
 - h. Material procurement requirements, documentation, and control.
 - i. Material handling and storage requirements, documentation, and control.
 - j. In-process inspection and examination program.
 - k. Non-conformity identification and correction program.
 - l. Record requirements and retention.

B. Codes and Standards:

1. The fabrication, assembly and its installation shall be in accordance with the 2014 Building Code of The City of New York, the requirements of NFPA, the NYC Department of Environmental Protection (DEP) Regulations, BAR Regulations, NY City Building Department requirements, and the requirements of all Authorities having Jurisdiction.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Packaged burner critical envelope dimensions shall be provided to allow review for clearances prior to transport or insertion into restricted spaces.
- B. Components that may be subject to transportation damage shall be wrapped and isolated with appropriate elastomer or weatherproofing material at the factory, and packaged to prevent deformation or damage.
- C. Exposed physical connections (flanges, pipe ends, etc.) shall be isolated for transport from ambient influences with appropriate blinds, caps, or weatherproofing materials.

1.06 WARRANTY:

- A. The field fabricated chimney liner system shall be warranted against functional failure due to defects in material and manufacturer's workmanship for a period of 10 years from date of substantial completion and successful performance of the required smoke testing requirements as specified under Section 23 05 93.
- B. The diameter of the chimney liner system shall be verified by the Contractor's venting computations. The computations used shall be technically sound, shall follow ASHRAE calculation methods and shall incorporate the specific flow characteristics of the inner pipe. The Contractor shall furnish the exact operating characteristics of all equipment to the factory representative.
- C. The fabricator shall provide "to scale" drawings depicting the actual layout. The prefabricated flue system shall be installed as designed by the manufacturer and in accordance with the terms of the manufacturer's warranty and in conjunction with sound engineering practices.
- D. The chimney liner system shall be furnished by a vendor organization that assures design, installation and services coordination, as well as providing "in-warranty" and "post-warranty" unified responsibility for NYCHA, the Engineer and the Contractor.

PART 2 - PRODUCTS

2.01 STAINLESS STEEL CHIMNEY LINER FOR BOILERS, INSTALLED CONCEALED WITHIN VERTICAL CHIMNEY

- A. Materials: 10-Gauge thick, Type 316 stainless steel, continuously welded airtight. Angle bracing and stainless steel plates at top, bottom and spacer guides regularly spaced at intermediate intervals along the full height of the liner to prevent side sway with free vertical movement. Provide heat resistant fiber gasket at flanged junction with chimney connector, for airtight seal. Liner shall be constructed of not lighter than 10-gauge thickness, Type 316 stainless steel, with continuously welded joints.
 - 1. Base Section: Provide anchor lugs for securing liner to foundation.
 - 2. Cleanout Section: Provide smoke-tight cleanout section with gasketed and bolt-tightened cleanout doors.
 - 3. Cleanout Doors: Same gage and material as the liner; size, quantity and location as outlined in NYC DEP BAR Code. Doors shall have steel or cast iron frames and shall be fitted with hinges and catches.
 - 4. Tee or Wye Section: 10-gauge, Type 316 stainless steel, smoke-tight tee or wye connectors at junctions with the boiler breeching system, with welded joints finished with smooth transition.

- B. Accessories: Provide accessories bearing UL label. Per Section FGC 501.12, low heat appliance listed chimney lining systems shall comply with UL 1777 and/or ULC-S640.
- C. Fabrication:
 - 1. Fabricate sections, fittings, and accessories as individual pieces or in combination lengths for field handling and installation.
 - 2. Provide tumble type of flashing over the brick chimney or top of chase.
 - 3. Fabricate liner with anchor lugs, cleanout, T-sections, flashing and counterflashing, and provisions for support, expansion, and contraction, including spacer guides installed at regular intervals to maintain the chimney liner centrally and vertically aligned as it freely expands and contracts longitudinally within the chimney.
- D. Assembly shall conform in full compliance with NFPA 211 requirements.
- E. The chimney liner shall be provided with a 10-gauge welded type 316 stainless steel horizontal rectangular chimney liner connector, that extends 6-inches beyond the outer envelope of the existing masonry chimney, terminating with a flanged gasketed and bolted connection to provide flanged connection to a horizontal rectangular 16-gauge welded black steel breeching connector, externally insulated with 2-1/2-inches thick magnesium silicate insulation, as shown on the Contract Drawings. At the wall penetration of the existing masonry chimney, the annular clearance space around the horizontal stainless steel chimney liner connector shall be safed-off and sealed with stainless steel angle safing, all around on four sides.
- F. The externally insulated horizontal rectangular 16-gauge welded black steel breeching connector shall provide the intermediate means of connection of the two (2) round double-wall insulated prefabricated boiler breeching systems, to be provided as specified under Section 235116, as shown on the Contract Drawings.

PART 3 – EXECUTION

3.01 INSTALLATION:

- A. Stainless Steel Chimney Liner
 - 1. Install the stainless steel liner as indicated on the approved Shop Drawings, extending from the chimney base to the roof with angle frames or collars to receive the linings and the cleanout doors near the bottom of the chimney.
 - 2. Assemble and erect lining sections and accessories in compliance with UL listing. Connect base section to foundation using anchor lugs of size and number shown on the Shop Drawings.

3. Joints: Weld joints. Comply with the workmanship quality standards specified in AWS D9.1, Specifications for Welding of Sheet Metal.
4. Per Section FGC 503.5.4.4 4, termination caps shall not be permitted on non-listed chimneys. A positive means shall be provided to prevent water from entering the appliance as shown on the Drawings.
5. Per DEP Rules Effective February 17, 2014 Article 2-11 Installation Design, chimneys shall not be fitted with rain caps or covers of any kind.
6. Install chimney drain with automatic-priming P-trap to remove rain water and condensation per Sections FGC 501.16 and FGC 503.5.4.4.4, Section MC 801.21 and Section PC 1002 of the 2014 NYC Plumbing Code. Coordinate with the Div. 22 Plumbing Sections of the Work for provision of the automatic-priming P-Trap.
- C. Chimney Height Termination Requirements: Per Sections MC 801.20 and FGC 503.5.4, terminations shall comply with the appliance listing and manufacturer's instructions, and the following:
 1. Chimney liner shall extend at least 3 feet above the highest construction, such as a roof ridge, parapet wall or penthouse, but within 10 feet of the chimney outlet, whether the construction is on the same building as the chimney or on another building. Any chimney located in an area that is more than 10 feet from such construction shall be at least as high as the highest construction in such area, and shall conform with the requirements of Equation 8-1 of Section MC 801.20 or Equation 5-1 of Section FGC 503.5.4. For purposes of determining the required height of a chimney, such construction shall not include other chimneys, vents or open structural framing.
- D. The Contractor shall provide all necessary supplemental base support systems, fabricated of welded or bolted, heavy-gauge Type 316 stainless steel.
- E. The Contractor shall provide a 2-1/2-inch dia. galvanized steel rain and condensate drain pipe connection at the base of the chimney liner, with a P-trap with automatic priming system and a manual isolation valve accessible from within the Boiler Room, immediately outside of the masonry chimney, run to spill over local floor drain, as indicated on the Contract Drawings. Installation shall conform with the specified requirements of Sections NYC FGC 501.16 and NYC FGC 503.5.4.4.4, Section NYC MC 801.21 and Section NYC PC 1002 of the 2014 NYC Plumbing Code. Coordinate with the Div. 22 Plumbing Sections of the Work for provision of the automatic-priming P-Trap.
- F. Perform smoke testing of the chimney liner system as required by the NYC DOB / DEP and as specified under Section 23 05 93, and submit Smoke Test Report and Results. Any deficiencies and/or defects evident as results of the testing shall be repaired, and the smoke test shall be subsequently repeated as may be necessary, until demonstrating and documenting successful completion of the smoke test.
- G. Per Section NYC FGC 503.5.4.4 4, a termination rain cap shall not be permitted on non-listed chimneys.

- H. Per NYC DEP Rules Effective February 17, 2014 Article 2-11 Installation Design, chimneys shall not be fitted with rain caps or covers of any kind.
- I. Install chimney liner with drain with automatic-priming P-trap to remove rainwater and condensation per Sections NYC FGC 501.16 and FGC 503.5.4.4.4, Section MC 801.21 and Section PC 1002 of the 2014 NYC Plumbing Code. Coordinate with the Div. 22 Plumbing Sections of the Work for provision of the automatic-priming P-Trap.

3.02 FIELD QUALITY CONTROL:

- A. Clean breeching, chimney connectors and chimneys internally during installation, to remove dust and debris. Clean external surfaces to remove welding slag and mill film. Grind welds smooth. A smoke test shall be performed in accordance with the Section BC 1704.26. Chimney connector(s) and the breeching system shall be subject to Special Inspection per Section BC 1704.25. Chimney liner shall be subject to Special Inspection per Section BC 1704.26. The Authority shall witness all smoke tests. Isolate the boilers per Section MC 811.1.5 from the tests. No work shall be covered or concealed before testing. The Contractor shall be responsible for inserting temporary plugs (plates, caps, etc.) in all openings, connecting any blower and providing instrumentation (static pressure taps, etc.). The Special Inspector shall provide smoke machines, smoke bombs, or other equivalent methods to fill the chimney and breeching chimney connector with a thick penetrating smoke. As the smoke appears at the chimney opening on the roof, such opening shall be tightly closed and a pressure equivalent to 1/2" column of water measured at the base of the chimney, shall be applied. Test shall be applied for a length of time sufficient to permit inspection of the chimney. If the test shows any evidence of leakage or other defects, such defects shall be corrected and the test shall be repeated until the results are satisfactory.

END OF SECTION

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