

SECTION 23 24 16 - INTERNAL-COMBUSTION ENGINE EXHAUST PIPING

PART 1 - GENERAL

1.01 BUY AMERICAN REQUIREMENTS

A. Provide certificates to show that all products meet the following requirements.

1. American Iron and Steel (AIS)
2. Build America, Buy America Act

B. See Supplementary Conditions for details.

1.02 SUMMARY

A. Section Includes:

1. Engine exhaust.
2. Equipment drains and overflows.
3. Unions and flanges.
4. Pipe hangers and supports.

B. Related Sections:

1. Section 23 05 53 - Identification for HVAC Piping and Equipment: Product requirements for pipe identification for placement by this section.
2. Section 23 07 00 - HVAC Insulation: Product requirements for Piping Insulation for placement by this section.

1.03 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME B16.3 - Malleable Iron Threaded Fittings.
2. ASME B16.4 - Gray Iron Threaded Fittings.
3. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
4. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
5. ASME B31.1 - Power Piping.
6. ASME B31.9 - Building Services Piping.
7. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

B. ASTM International:

1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
3. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

4. ASTM A536 - Standard Specification for Ductile Iron Castings.
5. ASTM B32 - Standard Specification for Solder Metal.
6. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
7. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
8. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

C. American Welding Society:

1. AWS D1.1 - Structural Welding Code - Steel.

1.04 SYSTEM DESCRIPTION

- A. Provide factory-built modular connector, manifold and stack system that is tested and listed by the Underwriters' Laboratories, Inc. to the UL 103 test standard.
- B. Flexible Connectors: Use at or near engine driven equipment where piping configuration does not absorb vibration.
- C. Where more than one piping system material is specified, provide compatible system components and joints. Use non-conducting dielectric connections whenever jointing dissimilar metals in open systems.
- D. Provide pipe hangers and supports in accordance with ASME B31.1, ASME B31.9, ASTM F708, MSS SP 58, MSS SP 69, and MSS SP 89.
- E.
- F. Use 3/4 inch ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment. Pipe to floor.
- G. Flexible Connectors: Use at or near engine driven equipment where piping configuration does not absorb vibration.

1.05 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate schematic layout of piping system, including equipment, critical dimensions, and sizes.
- C. Product Data:
 1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturer's catalog information.
 2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.

3. Hangers and Supports: Submit manufacturers catalog information including load capacity.

D. Design Data: Indicate pipe size. Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Test Reports: Indicate results of piping system pressure test.

F. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures and isolation.

G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

H. Welders' Certificate: Include welders' certification of compliance with ASME Section IX.

1.06 CLOSEOUT SUBMITTALS

A. Section 01 77 00 - Closeout Procedures: Closeout procedures.

B. Project Record Documents: Record actual locations of valves, equipment and accessories.

C. Operation and Maintenance Data: Submit instructions for installation and changing components, spare parts lists, exploded assembly views.

1.07 QUALITY ASSURANCE

A. Perform Work in accordance with ASME B31.1 code for installation of piping systems and ASME Section IX for welding materials and procedures.

B. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.

C. Maintain one copy of each document on site.

1.08 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Fabricator or Installer: Company specializing in performing Work of this section with minimum three years documented experience.

C. Design piping system under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State of Alaska.

1.09 PRE-INSTALLATION MEETINGS

- A. Section 01 31 00 – Project Management and Coordination: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 40 00 - Quality Requirements: Product storage and handling requirements.
- B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.11 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.01 ENGINE EXHAUST PIPE

- A. Manufacturers: Selkirk Metalbestos IPS C4
- B. Furnish double wall insulated metal stacks, tested to UL 2561, suitable for venting gases at a temperature not exceeding 1,400 deg F under continuous operating conditions.
- C. Fabricate with 4 inch minimum insulated space between walls. Insulation to be ceramic fiber. Construct inner jacket of 20 gage ASTM A167 Type 316 stainless steel. Construct outer jacket of Type 316 stainless steel.
- D. Clearance to Combustibles: 1/2 inch.
- E. Accessories, UL labeled:
 - 1. Ventilated Roof Thimble Assembly (MVT) consisting of ventilated thimble, ventilated tall flashing, ventilated storm collar, and associated clamp flanges.
 - 2. Miter Cut Stack Termination (MC).
 - 3. Drain Section (DS)
 - 4. Adjustable Pipe Lengths (AG) for expansion and field adjustments
 - a. One in vertical stack
 - b. One horizontal stack

5. Lined Bellows Joint (BJ)
6. Horizontal drain section (DS)
7. Excessive Pressure relief valve (ER)
8. High temperature sealant rated to 2,000 degrees F.
9. Plate supports (P-PA)
10. Guy Section (GS) and three Guy Tensioners (GT)

PART 3 - EXECUTION

3.01 ENGINE EXHAUST ASSEMBLY:

- A. When installed according to the manufacturer's installation instructions, the flue system and its supporting system shall resist side loads at least 1.5 times greater than the weight per foot of the piping for both horizontal and vertical portions of the system.
- B. The prefabricated flue system shall be installed according to the manufacturer's installation instructions and shall conform to all applicable state and local codes.
- C. Provide all modular straight sections, fittings, supports, guides, expansion joints, guy sections, guy tensioners, roof thimbles, roof flashings, storm collars and stack cap terminations as required to provide a complete system per the manufacturer's installation instructions.
- D. The entire flue system from the appliance outlet to the termination point, including all accessories, except as noted, shall be from one manufacturer.
- E. The vertical stack termination shall be no less than three feet above any portion of the building within ten feet of the stack penetration.
- F. Roof penetrations shall be suitable for the specified roof construction and shall comply with the manufacturer's installation instructions.

3.02 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Install pipe hangers and supports in accordance with Section 22 05 29.

3.03 PREPARATION

- A. Remove scale and dirt on inside and outside before assembly.
- B. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.04 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Install in accordance with ASME B31.1, ASTM F708, and MSS SP 89.

- B. Support horizontal piping as scheduled.
- C. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- D. Place hangers within 12 inches of each horizontal elbow.
- E. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
- F. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
- G. Provide sheet lead packing between hanger or support and piping.
- H. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- I. Install pipe hangers and supports in accordance with Section 22 05 29.

3.05 INSTALLATION - ABOVE GROUND PIPING SYSTEMS

- A. Install engine exhaust piping in accordance with ASME B31.1.

3.06 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Test engine exhaust piping in accordance with ASME B31.9.

END OF SECTION