SECTION 235133 - INSULATED SECTIONAL CHIMNEYS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

Listed chimney liners.

Listed building-heating-appliance chimneys.

Listed, refractory-lined stacks.

Field-fabricated metal chimneys.

Guying and bracing materials.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For each type of product.

Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for product.

* + - * 1. Shop Drawings: For chimneys and stacks.

Include plans, elevations, sections, and attachment details.

Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

Detail fabrication and assembly of hangers and seismic restraints.

Retain "Welding certificates" paragraph below if retaining "Welding Qualifications" paragraph in "Quality Assurance" Article.

* + - * 1. Welding certificates.

Retain "Seismic Qualification Certificates" paragraph below if required by seismic criteria applicable to Project. Coordinate with Section 230548 "Vibration and Seismic Controls for HVAC." See ASCE/SEI 7 for certification requirements for equipment and components.

* + - * 1. Seismic Qualification Certificates: For factory-fabricated chimneys and stacks, accessories, and components from manufacturer.

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity, and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

* + - * 1. Sample Warranty: For special warranty.
			1. QUALITY ASSURANCE

Retain "Welding Qualifications" Paragraph below if shop or field welding is required. If retaining, also retain "Welding certificates" Paragraph in "Informational Submittals" Article. The American Welding Society (AWS) states that welding qualifications remain in effect indefinitely unless welding personnel have not welded for more than six months or there is a specific reason to question their ability.

* + - * 1. Welding Qualifications: Qualify procedures and personnel according to the following:

AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.

AWS D9.1,/D9.1M, "Sheet Metal Welding Code," for shop and field welding of joints and seams in stacks.

* + - * 1. Certified Sizing Calculations: Manufacturer shall certify venting system sizing calculations.
			1. WARRANTY

Retain this article for chimneys and stacks containing refractory.

When warranties are required, verify with Director’s Representative's counsel that special warranties stated in this article are not less than remedies available to Director’s Representative under prevailing local laws.

* + - * 1. Special Warranty: Manufacturer agrees to repair or replace components of venting system that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, structural failures caused by expansion and contraction.

Verify available warranties and warranty periods for units and components.

Warranty Period: [**10**] [**15**] [**25**] <**Insert number**> years from date of Substantial Completion.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. LISTED CHIMNEY LINERS
				1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

American Metal Products.

[Bernard Dalsin Manufacturing Company](http://www.specagent.com/Lookup?uid=123457137810).

[Deflect-O Corp](http://www.specagent.com/Lookup?uid=123457137811).

[Heatfab Saf-T Vent](http://www.specagent.com/Lookup?uid=123457137812).

[Industrial Chimney Company](http://www.specagent.com/Lookup?uid=123457137813).

[M&G DuraVent, Inc.; a member of the M&G Group](http://www.specagent.com/Lookup?uid=123457137814).

[Metal-Fab, Inc](http://www.specagent.com/Lookup?uid=123457137815).

[Selkirk Corporation](http://www.specagent.com/Lookup?uid=123457137816).

[Shook Manufactured Products, Inc](http://www.specagent.com/Lookup?uid=123457137817).

[Tru-Flex Metal Hose Corp](http://www.specagent.com/Lookup?uid=123457137818).

Approved equivalent.

Straight, stainless-steel chimney liners can be used for dishwasher exhaust ducts and Type II, commercial-kitchen hood exhaust ducts.

* + - * 1. Description: [**Straight**]single-wall chimney liner tested according to UL 1777 and rated for 1000 deg F continuously or 2100 deg F for 10 minutes; with negative or positive flue pressure complying with NFPA 211.
				2. Straight Liner Materials: ASTM A666, [**Type 304**] [**Type 316**] stainless steel.
				3. Accessories:

Fittings: Tees, elbows, increasers, draft-hood connectors, metal caps with bird barriers, adjustable roof flashings, storm collars, support assemblies, thimbles, firestop spacers, and fasteners; fabricated from similar or compatible materials and designs.

Retain "Sealant" Subparagraph below for positive-pressure applications.

Sealant: Manufacturer's standard high-temperature sealant.

Insulating Fill: Manufacturer's standard high-temperature insulation fill material in annular space surrounding chimney liner, including high-temperature, ceramic-fiber insulation required to seal chimney at top and bottom.

* + - 1. LISTED BUILDING-HEATING-APPLIANCE CHIMNEYS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=6201) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[American Metal Products](http://www.specagent.com/Lookup?uid=123457137819).

[Cleaver-Brooks](http://www.specagent.com/Lookup?uid=123457137820).

[FAMCO](http://www.specagent.com/Lookup?uid=123457137821).

[Hart & Cooley Inc](http://www.specagent.com/Lookup?uid=123457137822).

[Heatfab Saf-T Vent](http://www.specagent.com/Lookup?uid=123457137823).

[Industrial Chimney Company](http://www.specagent.com/Lookup?uid=123457137824).

[LSP Products Group](http://www.specagent.com/Lookup?uid=123457137825).

[M&G DuraVent, Inc.; a member of the M&G Group](http://www.specagent.com/Lookup?uid=123457137826).

[Metal-Fab, Inc](http://www.specagent.com/Lookup?uid=123457137827).

[Schebler Co. (The)](http://www.specagent.com/Lookup?uid=123457137828).

[Security Chimneys International](http://www.specagent.com/Lookup?uid=123457137829).

[Selkirk Corporation](http://www.specagent.com/Lookup?uid=123457137830).

[Tru-Flex Metal Hose Corp](http://www.specagent.com/Lookup?uid=123457137831).

Approved equivalent.

Retain first three paragraphs below for building-heating-appliance chimneys suitable for dual-fuel boilers, oven vents, water heaters, or exhaust for engines.

* + - * 1. Description: Double-wall metal vents tested according to UL 103 and rated for 1000 deg F continuously or 1700 deg F for 10 minutes; with neutral or negative flue pressure complying with NFPA 211.
				2. Construction: Inner shell and outer jacket separated by at least a [**1/2-inch**] [**1-inch**] [**2-inch**] [**3-inch**] [**4-inch**] annular space[**filled with high-temperature, ceramic-fiber insulation**].
				3. Inner Shell: ASTM A666, [**Type 304**] [**Type 316**] stainless steel.

Retain first three paragraphs below for 1400 deg F chimneys suitable for dual-fuel boilers, oven vents, water heaters, or exhaust for engines.

* + - * 1. Description: Double-wall metal vents tested according to UL 103 and UL 959 and rated for 1400 deg F continuously or 1800 deg F for 10 minutes; with positive or negative flue pressure complying with NFPA 211.
				2. Construction: Inner shell and outer jacket separated by at least a [**1-inch**] [**2-inch**] [**3-inch**] [**4-inch**] annular space filled with high-temperature, ceramic-fiber insulation.
				3. Inner Shell: ASTM A666, [**Type 304**] [**Type 316**] stainless steel.

Retain first three paragraphs below for Type HT chimneys suitable for fireplaces and other solid-fuel-burning appliances.

* + - * 1. Description: Double-wall metal vents tested according to UL 103 and rated for 1000 deg F continuously or 2100 deg F for 10 minutes; with neutral or negative flue pressure complying with NFPA 211.
				2. Construction: Inner shell and outer jacket separated by at least a [**1-inch**] [**1-1/2-inch**] [**2-inch**] [**4-inch**] annular space filled with high-temperature, ceramic-fiber insulation.
				3. Inner Shell: [**ASTM A666, Type 304**] [**ASTM A666, Type 316**] [**ASTM A240/A240M, Type 430**] stainless steel.
				4. Outer Jacket: [**Galvanized**] [**Aluminized**] [**Stainless**] steel.
				5. Accessories: Tees, elbows, increasers, draft-hood connectors, terminations, adjustable roof flashings, storm collars, support assemblies, thimbles, firestop spacers, and fasteners; fabricated from similar materials and designs as vent-pipe straight sections; all listed for same assembly.

Retain one of first three "Termination" subparagraphs below or insert type to suit Project. Use caution because many systems are tested with specific terminations.

Termination: Stack cap designed to exclude minimum 90 percent of rainfall.

Termination: Round chimney top designed to exclude minimum 98 percent of rainfall.

Termination: Exit cone with drain section incorporated into riser.

Termination: <**Insert termination**>.

* + - 1. LISTED, REFRACTORY-LINED METAL CHIMNEYS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11076) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Van-Packer Company, Inc](http://www.specagent.com/Lookup?uid=123457137833).

[Warren Environment, Inc](http://www.specagent.com/Lookup?uid=123457137834).

Approved equivalent.

* + - * 1. Comply with ASME STS-1.

Retain and revise first two paragraphs below to suit Project conditions for freestanding stacks.

* + - * 1. Design Wind Loads: [**150 mph**] <**Insert wind speed**>.
				2. Design for seismic conditions at Project site.
				3. Chimney Outer Jacket: [**Aluminized**] [**Galvanized**] steel with [**riveted**] [**welded**] seams.
				4. Refractory Lining: Tested according to UL 959 for temperature and acid resistance and bearing the testing laboratory label.

Temperature Rating: 1800 deg F continuously and 2000 deg F intermittently.

Acid Extraction: Maximum of 0.2 percent.

Cold Crushing Strength: Minimum of 3200 psig.

Thickness: Minimum of 2 inches.

Paint materials and applications are specified in Section 099600 "High-Performance Coatings."

* + - * 1. Finish: Factory-applied, high-heat-resistant paint; color as selected by Director’s Representative.

Components and accessories in remaining paragraphs are typically used for prefabricated chimneys and stacks. Revise to suit Project. "Base Section" and "Reinforced Cleanout Section" paragraphs must be revised for freestanding stacks.

* + - * 1. Base Section: Acid-resistant-coated, cast-iron anchor lugs for securing stack to foundation[**with anchorage designed by manufacturer**].
				2. Reinforced Cleanout Section: Smoke-tight connection, with gasketed and bolt-tightened inspection plate; neck shall be welded to stack section.
				3. T or Y Sections: Smoke-tight connection, with welded joints and refractory lining; finished with smooth transition and with no exposed metal on inside.
				4. Spark Screen: ASTM A666, Type 316 stainless steel; 0.0625 inch thick; maximum 1/2-by-1/2-inch mesh; with ASTM A666, Type 304 stainless-steel rolled angle and drawband.
				5. Guy Bands: 8-inch- wide bands of same material as jacket, with bolted fasteners.
				6. Roof Penetration: Factory-fabricated thimbles, flashings, and counterflashings.
				7. Fabricate sections, fittings, and accessories as individual pieces or in combination lengths for field handling.
				8. Fabricate components with centrifugally cast refractory lining in lengths suitable for connection with drawbands.
				9. Bond refractory to steel jacket with calcium aluminate cement to prevent separation in finished product during shipping, handling, and installation.
				10. Fabricate stacks with anchor lugs; cleanout; T sections; flashings and counterflashings; and provisions for support, expansion, and contraction.
			1. FIELD-FABRICATED METAL CHIMNEYS

Retain first paragraph below for freestanding stacks. Insert dimensions unless they are indicated on Drawings.

* + - * 1. Fabricate freestanding chimneys according to SMACNA's "Guide for Free Standing Steel Stack Construction." Design for minimum <**Insert feet**> high and <**Insert inches**> in diameter.

Retain first paragraph below for low-heat appliances.

* + - * 1. Fabricate chimneys from ASTM A1011/A1011M hot-rolled steel with continuously welded joints, complying with NFPA 211 for minimum metal thickness.

Equal to or Less Than 1.069 Sq. Ft. or 14 Inches in Diameter: 0.053 inch.

Up to 1.396 Sq. Ft. or 16 Inches in Diameter: 0.067 inch.

Up to 1.764 Sq. Ft. or 18 Inches in Diameter: 0.093 inch.

Larger Than: 0.123 inch.

Retain first paragraph below for oil-fired appliances, solid-fuel-burning appliances, or appliances listed for venting with Type L vents.

* + - * 1. Fabricate chimneys and vent connectors from galvanized steel, complying with NFPA 211 for minimum metal thickness.

Equal to or Less Than 6 Inches in Diameter: 0.019 inch.

Up to 10 Inches in Diameter: 0.024 inch.

Up to 16 Inches in Diameter: 0.029 inch.

Larger Than: 0.056 inch.

Retain two paragraphs below for appliances not installed in attics that are listed to be vented by Type B or L vents.

* + - * 1. Fabricate chimneys and vent connectors from ASTM B209, Type 1100 or 3003, aluminum or stainless steel, complying with NFPA 211 for the following minimum metal thicknesses:

Aluminum: 0.027 inch.

Stainless Steel: 0.012 inch.

* + - * 1. Fabricate cleanout doors from compatible material, same thickness as breeching, bolted and gasketed.

Retain paragraph below for engine exhaust applications that use steel pipe.

* + - * 1. Fabricate engine exhaust from ASTM A53/A53M, Type E (electric-resistance welded), Grade B; or ASTM A106/A106M, Type S, Grade B, [**Schedule 40**] [**Schedule 80**] pipe; with welded joints and carbon-steel fittings and flanges.

Wrought-Steel Fittings: ASME B16.9, wall thickness to match adjoining pipe.

Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, Class 150, including bolts, nuts, and gaskets.

* + - 1. GUYING AND BRACING MATERIALS

This article contains materials recommended by one manufacturer that also advises that a professional engineer design components and connections to adjacent structures.

* + - * 1. Cable: [**Three**] [**Four**] <**Insert number**> galvanized, stranded wires of the following thickness:

Retain appropriate size in subparagraphs below.

Minimum Size: 1/4 inch in diameter.

For ID Sizes 4 to 15 Inches: 5/16 inch.

For ID Sizes 18 to 24 Inches: 3/8 inch.

For ID Sizes 27 to 30 Inches: 7/16 inch.

For ID Sizes 33 to 36 Inches: 1/2 inch.

For ID Sizes 39 to 48 Inches: 9/16 inch.

For ID Sizes 51 to 60 Inches: 5/8 inch.

* + - * 1. Pipe: [**Two**] [**Three**] <**Insert number**> galvanized steel, NPS 1-1/4.
				2. Angle Iron: [**Two**] [**Three**] <**Insert number**> galvanized steel, 2 by 2 by 0.25 inch.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of Work.
				2. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. APPLICATION
				1. Listed Chimney Liners: High-efficiency boiler or furnace vents in masonry chimney.
				2. Listed Building-Heating-Appliance Chimneys: Dual-fuel boilers, oven vents, water heaters, exhaust for engines, fireplaces, and other solid-fuel-burning appliances.
				3. Listed, Refractory-Lined Metal Chimneys: Freestanding dual-fuel boiler vents, oven vents, water heaters, exhaust for engines, fireplaces, and other solid-fuel-burning appliances.
				4. Field-Fabricated Metal Chimneys: Dual-fuel boilers, oven vents, water heaters, exhaust for engines, fireplaces, and other solid-fuel-burning appliances.
			3. INSTALLATION OF LISTED CHIMNEYS

Retain first paragraph below for chimneys and stacks supported on concrete bases.

* + - * 1. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Comply with requirements in Section 033000 "Cast-in-Place Concrete" for concrete, reinforcement, and formwork.
				2. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Accessories."
				3. Comply with minimum clearances from combustibles and minimum termination heights according to product listing or NFPA 211, whichever is most stringent.

Retain first paragraph below if specifying positive-pressure vents.

* + - * 1. Seal between sections of positive-pressure vents according to manufacturer's written installation instructions, using sealants recommended by manufacturer.
				2. Lap joints in direction of flow.

Retain three paragraphs below for refractory-lined chimneys.

* + - * 1. Connect base section to foundation using anchor lugs of size and number recommended by manufacturer.
				2. Join sections with acid-resistant joint cement to provide continuous joint and smooth interior finish.
				3. Erect stacks plumb to finished tolerance of no more than 1 inch out of plumb from top to bottom.
			1. INSTALLATION OF UNLISTED, FIELD-FABRICATED CHIMNEYS
				1. Suspend chimneys independent of their appliance connections.

Retain first paragraph below for Projects in seismic areas.

* + - * 1. Install seismic restrains according to manufacturer's written instructions. Comply with requirements in Section 230548 "Vibration and Seismic Controls for HVAC."
				2. Lap joints in direction of flow.
				3. Support chimneys from building structure with bolts, concrete inserts, steel expansion anchors, welded studs, C clamps, or beam clamps according to manufacturer's written instructions.
			1. CLEANING
				1. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes.
				2. Provide temporary closures at ends of chimneys and stacks that are not completed or connected to equipment.

END OF SECTION 235133