Design No. CFD 502 F

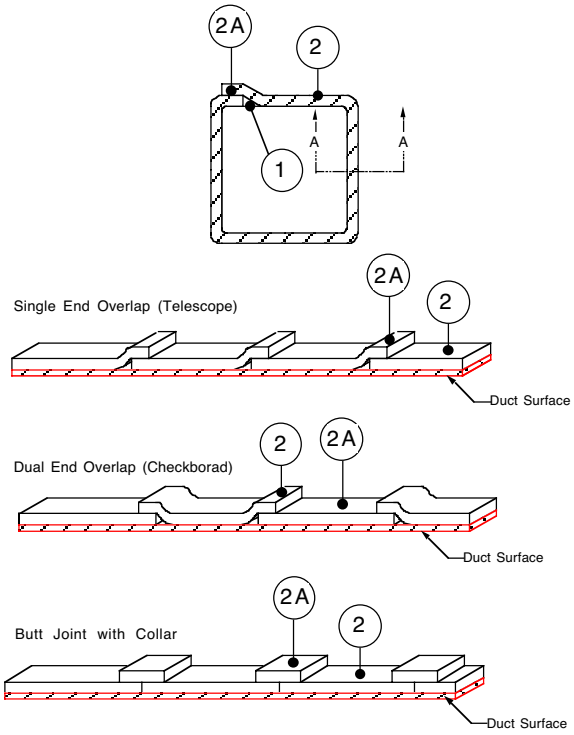
CHEMICAL FUME EXHAUST DUCTS

UL 1978 (March 29, 1995)

Sections 12 Pass

Sections 13 Pass

ASTM E 119 2hr. Engulfment Test - Pass



1. CHEMICAL FUME EXHAUST DUCT**: A continuously welded, liquidtight L-shaped duct system with horizontal and vertical shafts constructed of 16 GA sheet carbon steel or 18 GA. stainless steel with a max. outside dimensions of 52 in. high x 52 in. wide. When required, equip the duct with a field fabricated access door. Construct the duct using sections affixed to each other with seams. Reinforce the duct to IMC or NFPA 96 requirements designed to carry the weight of the duct assembly covered with insulation under a fire load equivalent to UL 1978 exposure and the ASTM E 119 time-temperature curve. Duct to be rigidly supported in accordance with IMC or NFPA 96 requirements and as specified in Item 5.

2. INSULATION: FireMaster® FastWrap+® is a nominal 1-1/2" thick, 6.0-pcf insulative blanket made of either refractory ceramic fibers or calcium magnesium silicate fibers. This product is totally encapsulated with a polypropylene/foil scrim. The blanket is available in various widths. FireMaster® FastWrap+® system may be installed with a zero clearance at the overlaps. The overlap thickness being a nominal 3 inches. The

insulation used was a single layer system. FireMaster® FastWrap+® shall be cut to a length sufficient to wrap completely around the perimeter of the duct, plus provide a min. overlap of 3 in. onto its starting end. The longitudinal overlaps of adjacent blankets (2A) can be accomplished by one of the following three methods as depicted in the drawings:

* A 3-inch overlap telescoping method where each adjacent blanket has one edge exposed and one edge covered by the next blanket,
* A 3-inch overlap checkerboard pattern where both edges of each alternating blanket are covered by each adjacent blanket whose edges are exposed, or
* A butt splice with collar method where the blankets are butted together and a 6-inch wide collar of blanket is centered over the butt splice overlapping each adjacent blanket 3-inches.

Reference Product Section of this Directory for more details.

Listed Manufacturer:

Thermal Ceramics Inc. --

Applied Fireproofing

Mineral Fiber Fireproofing

FireMaster® FastWrap+®

3. PINS: Not shown. For duct sizes greater than, 24-inches by 48-inches, the insulation is attached using steel pins. Weld min. 12 GA, min. 5 in. long, mild steel insulation pins to the duct. Pins shall be located at all blanket overlaps and meet the following requirements. Space pins in rows max. 12-in. apart and the pins in the rows are max. 10-1/2-inch o.c. Pins are max. 1 in. from the end of a duct and max. 1 in. from any corner (edge of a 90° bend). All overlaps are a minimum of 3-inches for circumferential overlaps going around the duct and for longitudinal overlaps following the length of the duct. Insulation pins are to be located in the middle of the overlap and spaced a maximum of 6-inches apart along the overlap. The blanket is locked into place over the pins with minimum 1.5 in. x 1.5-in. square, or 1.5-in. diameter round, galvanized steel, speed clips or cup head pins. Insulation pins that extend beyond the outer blanket wrap layer shall be turned down to eliminate sharp edges or the excess length cut off. For duct sizes less than or equal to, 24-inches by 48-inches, the insulation can be attached using pins or min. 1/2-inch wide stainless steel bands, which are nominally 0.015-inches thick or 1/2-inch wide carbon steel banding equivalent. Insulation pins are to be located in the middle of the overlap and spaced a maximum of 6-inches apart along the overlap. The use of filament tape as a temporary hold for the insulation prior to banding to ease installation is permitted. Place the bands a max. 1.5 in. from each blanket edge and midway between edges. Tension the banding material to hold the FireMaster® FastWrap+® in place without causing any cutting or damage to the blanket or duct.
4. STRAPPING: Not shown. For duct sizes less than or equal to, 24-inches by 48-inches, the insulation can be attached using min. 1/2-inch wide stainless or carbon steel bands, which are nominally 0.015-inches thick. The use of filament tape as a temporary holding method for the insulation prior to banding to ease installation is permitted. Place the bands a max. 1.5 in. from each blanket edge and midway between blanket edges. Tension the banding material to hold the FireMaster® FastWrap+® in place without causing any cutting or damage to the blanket or duct.
5. ACCESS DOOR: (Not shown) A 10 in. x 10 in. cleanout access opening may be cut into the duct at midheight along the horizontal section of the duct. Place a min. 1/2-inch thick ceramic fiber gasketing between the door and the opening. Cover the opening with a min. 12-in. x 12-in. door constructed of min. 16-GA sheet steel. Center the door over the opening and secure it to the duct with eight No. 10 nominal 3/4-in. self-drilling sheet metal screws spaced 1/4 inch from the outside edges of the door and at each corner and midpoint of the perimeter. Equip each door with four, 1/4-in. diameter all-thread rods measuring 4 in. in length, welded to the face

of the door. For the field-fabricated doors, the all-thread was applied at the corners of a square pattern with 8-in. long horizontal and vertical sides, centered on the access door. For the field-fabricated doors, place 12 GA mild steel impaling pins at the corners of a square pattern, centered over the door, with 6-in. long horizontal and vertical sides. Once the doors are placed, and the duct wrapped, cut the ceramic fiber blanket over each door away to the outer perimeter of the access door. The removed blanket was replaced with a primary layer of similar blanket, filling the cut away opening, and a second layer of similar blanket having an overlap. For the field-fabricated doors, cut the first layer 13 in. x 13 in. and place it over the door.

6. SUPPORTS: (Not shown) After the insulation of the FireMaster® FastWrap+® system is complete, add a typical trapeze support system with horizontal supports a max. 48-in. o.c., starting at the center of the vertical rise portion. The trapeze supports consist of 3/8" all-thread rod bolted to 2" x 2" x 1/4" steel angle. Space the all-thread rods a max. 6" away from the edge of the insulated ducts on each side and cut the steel angle sections to 70" long each, with nom. 3/8" clearance holes drilled 2-1/2" in from each end. Support hanger systems do not need to be wrapped.

**The UL 1978 test, which is an internal fire test, evaluates the capability of the duct enclosure system to prevent the ignition of combustible construction adjacent to the duct enclosure in the event of an internal grease fire. The ASTM E-119 engulfment test, which is an external fire test, evaluates the capability of the duct enclosure system to remain intact, protecting the duct system in the event of a fire outside the duct. These tests do not, nor are they intended to, replicate a real world fire. Rather, the purpose of these tests is to create a severe fire exposure situation, and to subject all similar devices to a standardized test in order to gage their performance. The performance criteria for the UL 1978 test is a maximum allowable temperature rise measured on the interior surface of a combustible construction placed on the duct in the manner specified in the test method. The performance criteria for the ASTM E-119 engulfment test is that there shall be no structural collapse, failure, or opening of the duct cavity during the fire exposure or hose stream tests. The performance of the engulfment test is based on an hourly rating.

With this application for a fume exhaust system, there is a potential presence of various types of chemicals. The presence of these various chemicals are not within the scope of the test protocols. Hence, this Design Listing will provide the ratings specified when installed in accordance with the Design Listing and tested in accordance with UL 1978 and ASTM E-119. The various chemicals, to which the chemical fume exhaust system may be subjected to, should be considered by a chemical engineer to determine if the presence of various combinations may be a source of combustion, or if they may be a source for a fire exposure exceeding that of the UL 1978 and ASTM E-119 tests, or if they will react with the insulation, deteriorating the insulative characteristic.