



SECTION 15XXX: CORROSIVE EXHAUST DUCTWORK

PART 1 – GENERAL

1.1 REFERENCES

- SMACNA-01 Accepted Industry Practice for Industrial Duct Construction
- SMACNA-06 HVAC Duct Construction Standards
- SMACNA Round Industrial Duct Construction Standards
- Factory Mutual Research Standard 4922

1.2 DEFINITIONS

A. Ductwork sizes on drawings state inside clear dimensions.

1.3 GENERAL REQUIREMENTS

A. Fabricate ductwork in accordance with the latest edition of SMACNA Industrial Duct Construction Standards for both round and rectangular duct, unless more stringently detailed.

B. Ductwork shall be listed for use as a fume and smoke exhaust duct without the need for an internal sprinkler protection system in accordance with Factory Mutual Research Standard 4922.

1.4 QUALITY ASSURANCE

A. Manufacturer shall be engaged in the regular and ongoing production of coated stainless-steel ductwork and related components and accessories for a minimum of three years.

B. Duct Manufacturer shall have current Factory Mutual (FM) listing verifying material meets FM 4922 requirements.

C. Installer shall have a minimum of three years' experience installing metal ductwork in industrial exhaust applications or systems.



1.5 SUBMITTALS

- A. Submit typical shop standards and/or SMACNA details for each class of duct specified, including particulars such as gauge sizes, welds, joint details and fitting configurations prior to start of work.
- B. Submit written report confirming ductwork has been fabricated and installed in accord with the latest SMACNA Standards and provisions of this specification.
- C. Submit shop drawings only when it is necessary to deviate from the intent of the design drawings.
- D. Submit product information as provided by the manufacturer.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. HALAR-ECTFE® Fluoropolymer coated stainless steel ductwork:

Kem-Tuff™ as manufactured by GDS Manufacturing

32 Boyer Circle

Williston, VT 05495

- B. PTFE Joint Gasket:

Kem-Seel™

Kem-Flex Seel™

- C. PTFE Expandable Gasket:

W. L. Gore

Garlock

Intertec



2.2 MATERIALS

A. ECTFE Fluoropolymer Coated Stainless Steel Ductwork

1. Base metal shall be 300 Series stainless steel, with a 2-B exterior finish fabricated in accordance with “SMACNA Round Industrial Duct Construction Standards” for the designated pressure classification. Unless otherwise specified ductwork gage and reinforcement will be based on Class 1, -6” WG schedule.
2. The coating shall be HALAR-ECTFE fluoropolymer, electrostatically applied powder coating system consisting of a primer and topcoat. The coating shall be applied to provide complete and spark free coverage on the interior surface of ductwork and all components per FM guidelines. Exterior coating may be applied for added protection in environments susceptible to corrosive attack.

B. Companion Flange angle ring / Van Stone flanges shall be used for all component joints. Material of construction shall be 304 stainless steel or black iron. Flange dimensions and bolt pattern shall meet or exceed minimums prescribed in the SMACNA Round Industrial Duct Construction Standards.

C. Gaskets shall be used on all flanged joints. PTFE envelope type gaskets, .020” U-cut with a 1/8” neoprene filler, as supplied by GDS Manufacturing, are recommended for round duct connections. Expanded PTFE gasket material may also be used at the owner’s discretion. Selection of appropriate type and size shall be per the manufacturer’s recommendation.

D. Support material shall be compatible with base material of duct construction unless a liner is used to separate incompatible materials of construction.

2.3 DUCT CONSTRUCTION CLASSIFICATION

A. Applications: Construct project duct systems in accordance with the following classification schedule:

1. Class 1 up to -6-inch WG; scrubbed exhaust

B. Materials: Use ECTFE fluoropolymer coated stainless steel pipe in construction ductwork for the scrubbed clean room exhaust systems.

PART 3 – EXECUTION

3.1 FABRICATION

A. No variation in duct configuration or sizes permitted except by written permission of the architect or design engineer.

B. Multi gored elbows are recommended where possible. Refer to Kemtuff cutsheets for additional data.

C. Fabricate Tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Elbows less than 1-1/2 times are optional with engineer approval.

D. Drain and test port locations shall be determined prior to duct fabrication and noted on detailed drawings. Drain and test port configuration will be per Kem-Tuff standard unless otherwise noted. Refer to Kemtuff cutsheets for additional information.

E. Increase duct sizes gradually, not exceeding a 15-degree divergence wherever possible. Maximum divergence upstream of equipment to be 30 degrees, and 45 degrees convergence downstream.

G. Duct Fabrication:

1. Longitudinal seams shall be fusion welded, no filler rod used.
2. Transverse seams shall be a continuous weld.
3. All seams shall be ground clean and smooth.
4. If additional reinforcement is required, submit proposal prior to bid for HVAC system engineer's approval.
5. Exterior of duct and fittings shall be free of any overspray.
6. Straight pipe fittings are fabricated in lengths per detail drawings.

F. Manufacturer shall be certified by the coating manufacturer in the application of fluoropolymer coatings.



G. Testing: Each piece of ductwork shall be spark tested over the entire coated surface area prior to shipment from the factory to ensure a void free surface. A DC spark tester shall be used at 250 volts/mil setting.

3.2 INSTALLATION

A. All Kem-Tuff Duct Products are to be installed per SMACNA specifications where applicable regarding but not limited to location, support spacing, routing, and penetrations.

B. Inspect each part on arrival for damage and notify GDS Manufacturing within 24 hours of same.

C. All Kem-Tuff ductwork is shipped with protective packaging, including end covers. Store ductwork with protective packaging in place. The storage area should be free of traffic and debris. Maintain protective packaging while managing ductwork at the work site. Remove protection just prior to installation.

D. Clean ductwork prior to installation to remove dirt and dust. During installation close duct openings and open ends with temporary covers to prevent damage and keep construction dust and debris from inside of duct.

E. Install all supports in accordance with SMACNA Industrial Duct Construction Standards.

F. Do not scratch, cut, drill, or penetrate the coating on the ductwork for any reason. All openings for drains, and testing or monitoring devices must be predetermined and factory installed.

G. If coating is scratched or damaged once it has been received, contact the manufacturer for repair instructions. Repair kits are readily available and may be purchased from the manufacturer. All repairs must be spark tested prior to installation.

H. Contractor shall conduct continuous random inspections during installation in accordance with the procedures and standards outlined above.

I. Align ductwork accurately at all connections to ensure proper seal. Bolts for flanges shall be SAE grade 5 zinc plated hardware. Use of stainless-steel hardware is not recommended unless specified to eliminate the risk of galling, for all duct 4 inches through 10 inches in diameter, all bolts shall be 5/16" x 1-1/4". Torque bolts to 22 Ft-Lbs. Duct diameters 12 inches through 48 inches shall be



3/8" x 1-1/4" bolts, torqued to 36 Ft-Lbs. Duct diameter 50 inches and above shall be 7/16" x 1-1/4".
Torqued bolts to 60 Ft-Lbs in a cross pattern with a minimum of three passes.