

Section 15XXX : CORROSIVE EXHAUST DUCT WORK

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. Duct work sizes on drawings state inside clear dimensions.

1.3 GENERAL REQUIREMENTS

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

B. Duct work shall be listed for use as a fume and smoke exhaust duct without the need for an internal sprinkler protection system in accord 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 duct work and related components and accessories for a minimum of three years.

B. Installer shall have a minimum of three years experience installing metal duct work 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.

A. Submit written report confirming duct work has been fabricated and installed in accord with the latest SMACNA Standards and provisions of this specification.

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- B. Submit shop drawings only when it is necessary to deviate from the intent of the design drawings.
- C. Submit product information as provided by the manufacturer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. HALAR-ECTFE® Fluoropolymer coated stainless steel duct work:
Kem-Tuff™ as manufactured by GDS Manufacturing
2 Chad Lane
Williston, VT 05495

A. PTFE Envelope Gasket Kem-Seel GDS Manufacturing Williston, Vermont

B. PTFE Expandable Gasket W. L. Gore
Gore-Tex Elkton, Maryland

A. Heat Shrink Tape Wrap Raychem Corporation TWDB Type Menlo Park, California

2.2 MATERIALS

A. ECTFE Fluoropolymer Coated Stainless Steel Duct work:

1. Base metal shall be 316L stainless steel, with a 2-B exterior finish fabricated in accord with "SMACNA Round Industrial Duct Construction Standards" for the designated pressure classification. Unless otherwise specified duct work gauge and reinforcement will be based on Class 1, -6" WG schedule.

The coating shall be HALAR-ECTFE fluoropolymer, electrostatically applied powder coating system consisting of a primer and top coat. The coating shall be applied to provide complete and spark free coverage on the interior surface of duct work and all components. An exterior coating may be applied for added protection in environments susceptible to corrosive attack.

- B. Companion Flange angle ring type Van Stone flanges shall be used for all component joints. Except between 4 inch and 12 inch use pressed flanges. Material of construction shall be 304 stainless steel. Flange dimensions and bolt pattern shall meet or exceed minimums prescribed in the SMACNA Round Industrial Duct construction Standards.

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- 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 owners discretion. Selection of appropriate type and sizing 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 classifications schedule:
 - 1. Class 1 up to -6 inch WG; scrubbed exhaust.
- B. Materials: Use ECTFE fluoropolymer coated stainless steel pipe in construction duct work for the scrubbed clean room exhaust systems.

PART 3 EXECUTION

3.1 FABRICATION

- A. No variation of duct configuration or sizes permitted except by written permission of the architect or design engineer.
- B. Use smooth non-gored elbows 4 inch thru 8 inch, where possible.
- C. Fabricate Tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where rectangular elbows are used provide turning vanes. All mitered elbows shall have single thickness turning vanes; dual wall airfoil type blades are not acceptable.
- D. Drain and test port locations shall be determined prior to duct fabrication, and noted on detail drawings. Drain and test port configuration will be per Kem-Tuff™ standard unless otherwise noted.
- 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.
- F. Duct Fabrication:
 - 1. Longitudinal seams shall be fusion welded, no filler rod used.

2. Transverse seams shall be 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 over spray.
 6. Straight pipe fittings are fabricated in lengths per detail drawings. Maximum length on individual piece of straight pipe is 47 inches.
- G. Manufacturer shall be certified by the coating manufacturer in the application of fluoropolymer coatings.
- H. Testing: Each piece of duct work shall be spark tested over the entire coated surface area prior to shipment from the factory to insure 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 duct work is shipped with protective packaging, including end covers. Store duct work with protective packaging in place. Storage area should be free of traffic and debris. Maintain protective packaging while handling duct work at the work site. Remove protection just prior to installation.
- D. Clean duct work 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 duct work for any reason. All openings for drains, and testing or monitoring devices must be predetermined and factory installed.

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- 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 outlined above.
- I. Align ductwork accurately at all connections to insure proper seal. Bolts for flanges shall be made from a material compatible with the base metal of the angle flange. Unless otherwise specified, all bolts shall be 1/2" X 1-1/4". Torque bolts to 30 Ft-Lbs, then 25 Ft-Lbs in cross pattern.
- J. Install slip joints only where absolutely necessary. All horizontal slip joints shall be pitched 1/8 inch per foot back to tool or nearest drain unless otherwise specified with outside end up.
- K. All slip joints shall be heat shrink wrapped with Raychem Type TWDB heat shrink tape. Use an electric heat gun not propane torches when applying the shrink wrap. Excessive heat from torches may damage the coating. Using emery cloth slightly roughen the coating directly underneath the heat shrink wrap to promote better adhesion. Do not scratch through coating, or roughen coating within one quarter of an inch from the end of the duct.

END OF SECTION 15XXX