

Nordfab Ducting General Specifications



Structural Integrity and General Engineering Specification for Quick-Fit Ducting

Applications

Nordfab's laser welded seam Quick-Fit™ Piping System has been used in many different industrial applications, and under various negative static pressures. The typical design range we see in our applications range from -2" wg to -28" wg; however, we have some systems operating at vacuums of -32" wg to -42" wg under normal operating parameters. Please take into account that our pipe comes in 5' lengths with a rolled lip on each end, thus providing reinforcement every 5', which presents a sound structural design that should be stronger than any pipe in its class according to SMACNA guidelines and regulations.

Structural Integrity

All fit-together ducting systems allow for some degree of leakage where they are joined. QF ducting is no exception and is not sold as an airtight system. In comparison to other ducting typically used in fit-together systems, Nordfab's QF ducting has fully welded, leak-tight laser welded seams. Spiral and other ducting with lockform seams are *not* fully welded at the seams and can be expected to have higher leakage rates than QF. In addition to our standard Nitrile gasket, Nordfab offers special clamp gasket material for high heat applications. Application of sealants to the individual rolled ends can also enhance the tightness of the system. However, the QF system is sold as a quick way of installing and modifying ductwork while at the same time retaining the usability of each component. In short, QF is designed with the capability to be taken apart, re-assembled, stored or moved. Completely eliminating the

possibility for leakage jeopardizes the inherent benefits of the duct. While Nordfab is currently unaware of any method of evaluating dust collection piping alone, the following data is presented using the criteria for all duct, including HVAC. This data is presented only for the purpose of indicating acceptability of the QF in dust/fume removal in a negative pressure situation and should not be confused with the ducting that uses tape or gaskets as sealant in the positive conveyance of air.

Leakage Rate:

Standard QF is designed to provide tight sealing and efficient airflow under negative pressures. To that end, we are providing the following information for piping situations where fan sizing is of extreme importance. The following

Leakage Class Determined In Accordance With SMACNA Class 3

Duct Size	Avg. leakage per 100'	
	5" SP	10" SP
4" - 6"	5 CFM	6 CFM
7" - 10"	2.5 CFM	3.5 CFM
11" - 24"	2 CFM	4 CFM

data was obtained using standard components and was performed in accordance with the SMACNA, "HVAC AIR DUCT LEAKAGE TEST MANUAL". The information gives the leakage rate per joint of duct at various pressures. To utilize the chart, count the number of clamps (this equals the number of pieces) per size and multiply by the number given beside the corresponding diameter and under the applicable pressure. These numbers

Leakage Rate In CFM Per QF Joint

Dia In.	3 WG	5 WG	7.5 WG	10 WG	15 WG	20 WG	25 WG	30 WG
4	0.20	0.25	0.30	0.30	0.35	0.50	0.60	0.80
5	0.20	0.25	0.30	0.30	0.35	0.50	0.60	0.80
6	0.20	0.25	0.30	0.30	0.35	0.50	0.60	0.80
7	0.20	0.25	0.30	0.30	0.35	0.50	0.60	0.80
8	0.20	0.25	0.30	0.30	0.35	0.50	0.60	0.80
9	0.20	0.25	0.30	0.30	0.35	0.50	0.60	0.80
10	0.20	0.25	0.30	0.30	0.35	0.50	0.60	0.80
12	0.30	0.30	0.40	0.40	0.40	0.60	0.70	0.90
14	0.30	0.30	0.50	0.70	0.80	0.80	0.90	1.10
16	0.30	0.40	0.60	0.70	1.00	1.10	1.20	1.40
18	0.40	0.40	0.70	0.80	1.10	1.30	1.50	1.70
20	0.40	0.60	0.80	0.90	1.20	1.50	1.70	2.00
22	0.40	0.60	0.80	1.10	1.40	1.50	2.00	2.20

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assume that the product is correctly installed, free of dents in the joining ends, and that the gasket is in place. Special gasket material and sealants will increase the sealing capabilities.

Manufacturing Profile

Nordfab Quick-Fit Ducting is manufactured in Thomasville, NC. Nordfab duct is a clamp-together design using a rolled edge design with a single lever clamp. The ducting and clamps are made of similar materials. During manufacturing, the duct material sheet blanks, which are five feet long, are rolled and fused together with a laser weld process along the longitudinal seam. Each pipe is checked with a light apparatus for any welding flaws or gaps. The rolled edge is then die-formed after inspection by rolling each end of the pipe simultaneously. The laser weld prevents any gaps in the rolled edge from forming. This rolled end is used for clamping components together as well as offering reinforcement every five feet. All clamps contain a standard gasket made of Nitrile which is suitable for most applications, including oil mist, as long as high temperatures are not an issue. An ePTFE gasket option is available for high temp applications. Nordfab Quick-Fit Ducting is available in 1" increments sized 3" to 24" diameter.

Engineering Specification

Ducting shall consist of the following:

- a. Galvanized: ASTM A527 with a G90 rating
 - i. Recommended max. service temperature is 390° F. At temperatures ranging between 390° F and

- 480° F, the zinc-iron alloy layers in galvanized steel will continue to provide a high level of protection from corrosion. However, there may be some peeling, changes in mechanical properties, and reduction in the corrosion protection.
- b. 304SS: Finish meets ASTM A240
 - i. Temp rating is 1100° F
- c. 316SS: Finish meets ASTM A240
 - i. Temp rating is 1100° F

Ducting manufacturing techniques:

- a. Diameters 3" - 24" pipe, adjustable nipples, and collars attached to other components will have one or both ends die formed-rolled to provide a uniform edge around the circumference of the rolled end. The pipe and adjustable nipples shall have the longitudinal seam laser welded to allow for a tighter slip joint and reduce system pressure losses. All laser welded seams will undergo a light test to ensure there are no voids or imperfections in the system. Pipe lengths using laser welded seams will not exceed a nominal 60" length. The rolled edges provide structural support at 5' intervals or less and can be interpreted as a stiffener where SMACNA specifications are required. An adjustable nipple is used for adjustment during the install process. Pipe is cut to appropriate length and the adjustable nipple secures the pipe for install.
- b. Pipe and other components larger than 24" shall utilize either an angle flange or flat flange attached loosely and retained

- in place using a 3/8" vanstone lip. The flanged pipe shall have a compressed interlocking lap form seam and not exceed 78" in length. The angle or flat flanges provide structural support at 6'-6" intervals or less and are considered as stiffeners where SMACNA specifications are required.
- c. There will be times when certain components will be air direction sensitive. These components will have an arrow sticker attached showing the proper flow direction.
- d. Ducting and its components shall have been tested to +/- 80" WG on pipe diameters 3" to 20" and +80" / -50" WG on sizes 22" to 24", using the following gauged reference:
 - i. 3" will use 18ga material thickness
 - ii. 4" through 12" will use 22ga material thickness
 - iii. 13" through 29" will use 20ga material thickness
 - iv. 30" and above will use 18ga material thickness

Clamping rolled edged duct:

- a. Clamps shall be constructed with an over-center, spring-lever action for quick connecting of two pieces of ducting. A retaining pin shall be inserted in the handle and an eyelet on the clamp as a safety feature to ensure the handle does not prematurely come undone.
- b. When closing the clamp, the internal seal shall be compressed in such a manner as to cover both rolled beads for optimum sealing

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capacity in a full 360° pattern.
Optional caulking and other materials governing system temperature ratings if applicable:

- a. Approved caulk is 3M Scotch Seal Metal Sealant 2084 or equivalent for system temperatures of 250°F or lower
- b. Optional approved caulk is 3M Polyurethane Adhesive Sealant 540 or equivalent for system temperatures of 250°F or lower
- c. Optional approved caulk is Rock River Silicone Sealant or equivalent for system temperatures of 400°F or lower
- d. Optional approved caulk is Red Devil HVAC/R High Temperature-Silicone Sealant (red in color) or equivalent for system temperatures of 500°F or lower
- e. Sealing o-rings
 - i. Buna-N, 70 Duro-Meter hardness with a temperature rating of 250°F maximum and is black in color, used with the adjustable nipple
 - ii. Silicone rubber, ZZ-R-765 Class 2A and 2B grade 770 AMS-3304E and 3304F and 3303G, FDA approved and is red in color, used with the adjustable nipple
- f. Sealing gaskets
 - iii. Molded gaskets shall meet the material classification of ASTM D-2000 M2BG510 A24 B34 E014

- E034 EF11 EF21 and used in systems where the temperature rating is 225°F or less and are black in color. This component shall be made using conductive materials for conductivity.
- iv. Sponge o-ring shall meet the material classification of either ASTM D-1056-68 – SBE43 or ASTM D1056-85, 91, 98 – 2B3
 - g. Clamp seals shall be made of one of the following:
 1. Nitrile to meet or exceed ASTM D 1056 standards with a temperature rating not to exceed 158°F constant temperature (or intermittent temperature of 194°F).
 2. Silicone to meet or exceed ASTM-D-2000 M1GE605 – ZZ-R-765 Class 2 Grade 50 – AMS-3302 standards with a temperature rating not to exceed 400°
 3. ePTFE not degraded by any common chemicals in the 0-14 PH range. Temperature rating shall not exceed 600°F.

Conductivity:

Metal-to-metal contact shall be obtained at all joint connections. Die-formed rolled edges are uniform in shape which provides the most consistent contact. The ears of the clamp contact with the rolled edges and provide maximum conductivity. Conductivity shall be adhered to per

NFPA 77 paragraph 8.4.1.1; states all parts of the continuous metal piping system should have a resistance level that does not exceed 10 ohms. Testing is the responsibility of the owner.

Collapsibility Strength of QF Piping

Each size of piping has been tested for strength against collapsing. The piping was exposed to constant Positive pressure and constant vacuum. Each pipe was exposed to a maximum pressure capacity of the test equipment of +/- 80" WG on pipe diameters 3" to 20" and +80" / -50" WG on sizes 22" to 24". None of the pipe showed any form of deformation during the test. Please take into account that our pipe comes in 5' lengths with a rolled lip on each end, thus providing reinforcement every 5', which presents a sound structural design that should be stronger than any pipe in its class. Pipe and fittings must be installed in accordance with Nordfab's standard specifications and standard accepted practices.

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