

Single Wall Marine Specification

4

Material

1. Ductwork shall be fabricated from (* not available in die-stamped fittings) from one or more of the following:
 - a. G60 galvanized steel conforming to ASTM A653 and A924;
 - b. G90 galvanized steel conforming to ASTM A653 and A924;
 - c. 304L-2B stainless steel* conforming to ASTM A240;
 - d. 316L-2B stainless steel* conforming to ASTM A240; or
 - e. Aluminum Type 3003-H14* conforming to ASTM B209.
 - f. Stainless steel fittings provided with a 2B mill finish.
2. ProCoat™ and ProCoat Plus™ epoxy coated ductwork are available options. Coating is an average thickness of 4 mils (0.004"). Coating shall meet or exceed 1,000 hour salt spray test per ASTM B117-97. (Standard color is white, however, consult the factory for additional color options). ProCoat products have a minimum surface hardness of 2H when tested per ASTM D33-63-92A. ProCoat Plus™ is coated both inside and outside of duct.
3. Antimicrobial agents are available options with double and single wall systems and shall be EPA listed. Antimicrobial coated spiral duct and fittings are treated with a factory applied antimicrobial agent.

Metal Thickness

1. The specified material thickness shall be no less than the latest Linx Industries published catalog.
2. Unless otherwise noted, all duct and fittings shall be suitable for +10" water gauge (2.5 Kpa).
3. Please consult the factory for all negative pressure applications.

Construction

1. Spiral Duct
 - a) All round spiral duct 8" (200 mm) and larger shall incorporate multiple corrugations between the spiral lock seams.
 - b) The duct inside diameters shall be calibrated to the latest Linx Industries published dimensional tolerance standards.
 - c) Spiral duct seam slippage shall be prevented by means of a flat spiral seam with mechanically formed indentation evenly spaced along the spiral lock seam.
2. Fittings shall be manufactured using one or more of the following construction methods:
 - a) Overlapped edges are stitched or spot welded along the entire length of the fitting;
 - b) Standing seam gore locked and internally sealed;
 - c) Button punched and internally sealed; or
 - d) Round elbows 3" through 12" (80 mm through 315 mm) diameter shall be die stamped and continuously stitched welded.
 - e) All end shall have a rolled over edge for added strength and rigidity.
3. Dampers – All volume and balancing dampers shall be Linx Industries type DSU or DTU as specified in the contract documents.
 - a) Dampers shall be fitting sized to slip into the spiral duct with a double-lipped, "U" profile, EPDM rubber gaskets.
 - b) Damper shall have all of the following features:
 - i. Locking quadrant with blade position indicator
 - ii. 2" (50 mm) sheet metal insulation stand-off
 - iii. Integral shaft/blade assembly
 - iv. Shaft mounted load bearing bushings
 - v. Gasketed shaft penetrations to minimize air leakage

Connections – Fitting ends shall be sized to slip-fit into the spiral duct of the same nominal size. Fitting to fitting connections shall be made by the use of duct size “MF” couplings; duct to duct connections require the fitting size “NPU” couplings.

Joint Sealing

1. The addition of any externally applied sealants shall not be required.
2. Fitting ends shall be equipped with factory installed, double-lipped, “U” profile EPDM rubber gaskets.
3. The gasket shall be located in a groove at the end of the fitting and use a spot welded stainless steel band located in a groove at the end of the fitting.
4. In order to achieve optimum sealing for diameters between 3" (80 mm) and 20" (508 mm), different size gaskets shall be used.
5. The gasket shall be classified by Underwriters Laboratories (UL) for a flame spread index and smoke developed index of 0/0 in accordance with ASTM E84-91a.
6. When installed in spiral duct per the Linx Industries’ currently published installation instructions, the gasket shall create a seal against the interior of the spiral duct.
7. The system tightness shall be factory warranted to meet a Leakage Class 3 performance.

Double Wall Marine Specification

Material

1. Ductwork shall be fabricated from (* not available in die-stamped fittings) from one or more of the following:
 - a. G60 galvanized steel conforming to ASTM A653 and A924;
 - b. G90 galvanized steel conforming to ASTM A653 and A924;
 - c. 304L-2B stainless steel* conforming to ASTM A240;
 - d. 316L-2B stainless steel* conforming to ASTM A240; or
 - e. Aluminum Type 3003-H14* conforming to ASTM B209.
 - f. Stainless steel fittings provided with a 2B mill finish.
2. ProCoat™ and ProCoat Plus™ epoxy coated ductwork are available options. Coating is an average thickness of 4 mils (0.004"). Coating shall meet or exceed 1,000 hour salt spray test per ASTM B117-97. (Standard color is white, however, consult the factory for additional color options). ProCoat products have a minimum surface hardness of 2H when tested per ASTM D33-63-92A. ProCoat Plus™ is coated both inside and outside of duct.
3. Antimicrobial agents are available options with double and single wall systems and shall be EPA listed. Antimicrobial coated spiral duct and fittings are treated with a factory applied antimicrobial agent.
4. Fiberglass insulation shall be 1" (2" optional) 1.0 lb/ft³ USCG/IMD approved (Certificate must be made available upon request) with a maximum conductivity factor (k) of 0.26 BTU-in/hr x ft² x °F at 75°F mean ambient temperature (R=3.8 for 1" insulation; R=7.7 for 2" insulation).

5. Retaining fabric (used on perforated duct) shall be 0.008" thick, 15.6 lb/ft³ density non-woven polyester fabric with an air permeability rate of 9.2 ft³/ft² x s.
6. The insulation stop shall be EnergyX as manufactured by Linx Industries with a maximum conductivity factor (k) of 0.28 BTU-in/hr x ft² x °F and operating temperature range of -70°F to +220°F.
7. The perforated inner liner (available in G60 only) shall consist of 0.125" diameter perforations on 0.250" staggered centers corresponding to an overall open area of 23%.

Metal Thickness

1. The specified material thickness shall be no less than the latest Linx Industries' published catalog.
2. Unless otherwise noted, all duct and fittings shall be suitable for +10" water gauge (2.5 Kpa).
3. Please consult the factory for all negative pressure applications.

Construction

1. Double Wall Construction

- a) Double wall duct and fittings shall consist of: an outer pressure shell; an inner perforated liner (available in G60 only) on duct and a solid liner on fittings; fiberglass insulation; retaining fabric (when a perforated inner liner is specified); and EnergyX™ insulation stops as a factory supplied integral assembly.
- b) The outer shell shall be the pressure shell.
- c) The outer pressure shell diameter shall be two times the insulation thickness larger than the inner liner.
- d) The duct size shall be reflected as the nominal clear inside (airside) diameter or the nominal diameter of the inner liner.
- e) The perforated liner on the spiral duct shall be integrally wrapped with a retaining fabric between the perforated inner liner and the fiberglass insulation. The retaining fabric shall be securely held by the spiral lockseam of the inner liner. This is to prevent the glass fibers tearing into the airstream and at the same time maintains the desired acoustical properties.
- f) Spiral duct shall have heavy duty spring clips evenly spaced around the duct circumference to maintain the inner liner concentric to the outer pressure shell.
- g) The ductwork assembly shall be classified by Underwriters Laboratories (UL) for a flame spread index and smoke developed index of 0/0 in accordance with ASTM E84-91a.
- h.) Perforated Metal Liner (duct only): Consists of 0.125" (3 mm) perforations on 0.250" (6 mm) staggered centers and 23% open area. Perforated liner is available in galvanized G60 only. All double wall fittings are manufactured with a solid inner liner; a perforated inner is available upon request.
- i.) Insulation (Linx Gasketed only): USCG/IMO certified glass fiber insulation will have a maximum conductivity factor (k) of 0.26 BTU-in/hr x ft² x °F at 75°F mean ambient temperature (R=3.8).
- j.) Insulation shall be 1" thick standard. 2" insulation thickness is an available option.
- k.) EnergyX™ Insulation stop (Linx Gasketed only): Constructed of a closed-cell elastomeric foam with a maximum conductivity factor (k) of 0.28 BTU-in/hr x ft² x °F and an operating temperature range of -70°F to +220°F.
- l.) Retaining Fabric: 0.008" thick, 15.6 lb/ft³ density non-woven polyester fabric with an air permeability rate of 9.2 ft³/ft² x s.

2. Spiral Duct

- a) All round spiral duct 8" (200 mm) and larger shall incorporate multiple corrugations between the spiral lock seams.
- b) The duct inside diameters shall be calibrated to the latest Linx Industries published dimensional tolerance standards.
- c) Spiral duct seam slippage shall be prevented by means of a flat spiral seam with mechanically formed indentation evenly spaced along the spiral lock seam.

3. Fittings shall be manufactured using one or more of the following construction methods:

- a) Overlapped edges are stitched or spot welded along the entire length of the fitting;
- b) Standing seam gore locked and internally sealed;
- c) Button punched and internally sealed; or
- d) Round elbows 3" through 10" (80 mm through 300 mm) diameter shall be die stamped and continuously stitched welded.
- e) All end shall have a rolled over edge for added strength and rigidity.

4. Dampers – All volume and balancing dampers shall be Linx Industries type DSUI or DTUI as specified in the contract documents.

- a) Dampers shall be fitting sized to slip into the spiral duct with a double-lipped, "U" profile, EPDM rubber gaskets.
- b) Damper shall have all of the following features:
 - i. Locking quadrant with blade position indicator
 - ii. 2" (50 mm) sheet metal insulation stand-off
 - iii. Integral shaft/blade assembly
 - iv. Shaft mounted load bearing bushings
 - v. Gasketed shaft penetrations to minimize air leakage

Connections – The duct and fittings shall in combination with each other shall go together as easily as single wall ductwork. Fitting ends shall be sized to slip-fit into the spiral duct of the same nominal size. Fitting to fitting connections shall be made by the use of duct size "MFI" couplings; duct-to-duct connections require the fitting size "NPUI" couplings.

Joint Sealing

1. The addition of any externally applied sealants shall not be required.
2. Fitting ends shall be equipped with factory installed, double-lipped, "U" profile EPDM rubber gaskets.
3. The gasket shall be located in a groove at the end of the fitting and use a spot welded stainless steel band located in a groove at the end of the fitting.
4. In order to achieve optimum sealing for diameters between 3" (80 mm) and 20" (508 mm), different size gaskets shall be used.
5. The gasket shall be classified by Underwriters Laboratories (UL) for a flame spread index and smoke developed index of 0/0 in accordance with ASTM E84-91a.
6. When installed per the Linx Industries' currently published installation instructions, the fitting gasket shall create an air seal against the interior of the spiral duct.
7. The system tightness shall be factory warranted to meet a Leakage Class 3 performance.