

# Installation Instructions and Operation & Maintenance Manual

**DuraDuct™ LXD**

Single Wall Laboratory Exhaust System

**Do not install this system without completely reading the installation instructions. All details as noted in this document must be followed. For further information please contact VaughanAir.**

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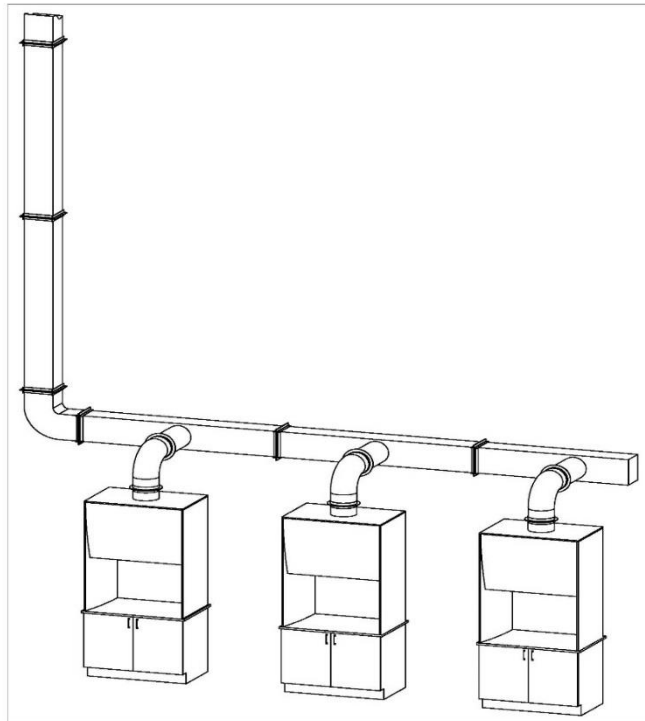


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## GENERAL INFORMATION

DuraDuct™ LXD is a pre-manufactured, single wall laboratory exhaust duct system. Featuring installer friendly companion flange connections that include a chemically inert and liquid tight gasketed sealing system. The LXD system eliminates the field welding required for contractor fabricated laboratory duct systems. Extensive structural, fire and leakage testing has been performed on the DuraDuct™ LXD system ensuring a safe and cost-effective solution for new construction or retrofitting of laboratory exhaust duct systems.



### PRODUCT FEATURES:

- Rectangular or round footprint
- No weld system; flange to flange connections
- Available in 304SS or 316SS
- Specialized fittings available
- +10" & -10" Leakage and deflection tested in accordance with ANSI/ASHRAE/SMACNA Standard 126-2000
- +8" & -8" Pressure Decay tested in accordance with ASME Standard N510 Testing of Nuclear Air Treatment Systems
- Factory tested seam welds
- 2 Hour fire resistance rating option available in DuraDuct™ HXD

## TESTS PERFORMED:

ASTM F36	Compressibility and Recovery of Gasket Materials
ASTM F152	Tension Testing of Non-metallic Gasket Materials
ANSI/ASHRAE/SMACNA 126	Air Leakage and Deflection Testing
ASTM E119	Standard Test Methods of Fire Tests of Building Construction and Materials
ASTM E-84	Surface Burning Characteristic
ASTM F36	Compressibility and Recovery of Gasket Materials
ASTM F152	Tension Testing of Non-metallic Gasket Materials

## CONSTRUCTION DETAILS

DuraDuct™ LXD is constructed with fully welded duct materials. It is supplied with tested flange to flange connections and a specialized chemical resistant gasket. Standard lengths are 59" or 118" long and specialized fittings are available to suit the system design. Refer to lay-out drawing for complete details.

### DUCT MATERIALS:

**Liner:** Minimum 18 gauge for rectangular duct, and minimum 20 gauge for round.  
 304 Stainless Steel - Standard  
 316 Stainless Steel - Premium

**Angle Flanges (Square):** 1-1/2" x 1/8" painted mild steel structural angle - Standard  
 1-1/2" x 1/8" 304 Stainless steel structural angle - Premium  
 1-1/2" x 1/8" 316 Stainless steel structural angle - Premium

**Angle Flanges (Round):** Powder coated mild steel structural angle - Standard  
 304 Stainless steel structural angle - Premium  
 316 Stainless steel structural angle - Premium

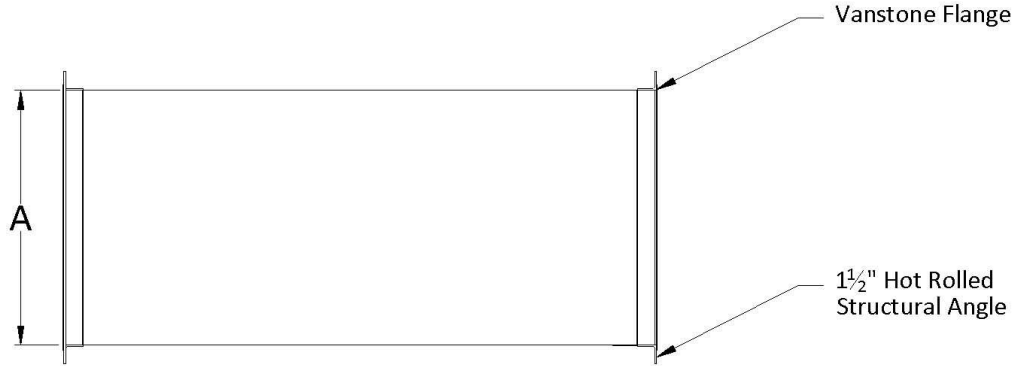
6" to 11" Diameter	1-1/4" x 1-1/4" x 1/8" angle
12" to 24" Diameter	1-1/2" x 1-1/2" x 1/8" angle
25" to 40" Diameter	2" x 2" x 3/16" angle

**Duct Weight:** 2.6 lbs./sq. ft.

**Standard Fittings:** See the attached pages for DuraDuct™ LXD standard fittings and dimensions.

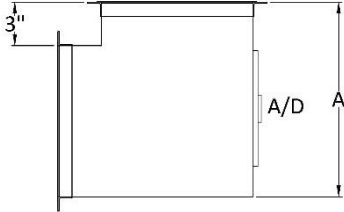
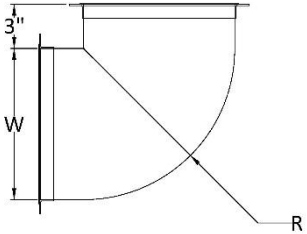
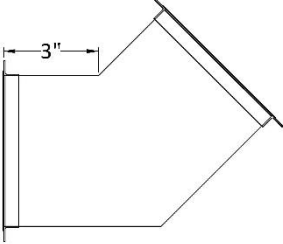
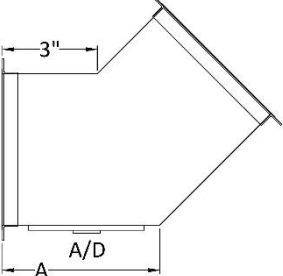
Non-Standard fittings, fittings sizes, and fitting configurations are available for a premium. Contact VaughanAir for details.

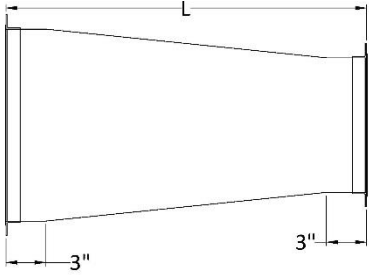
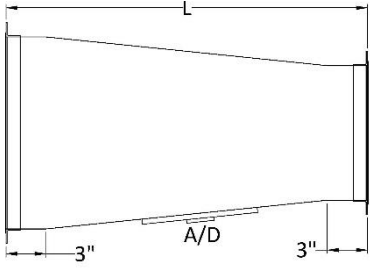
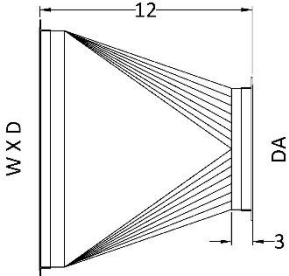
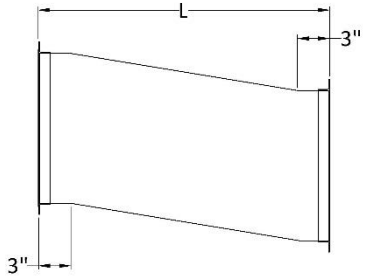
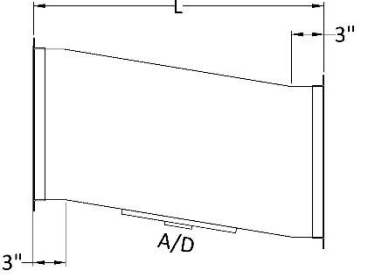
**Construction:** Inner Duct: (A)

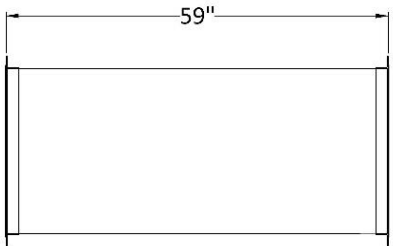
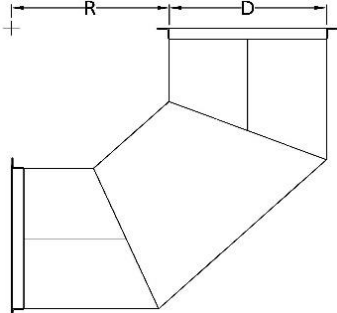
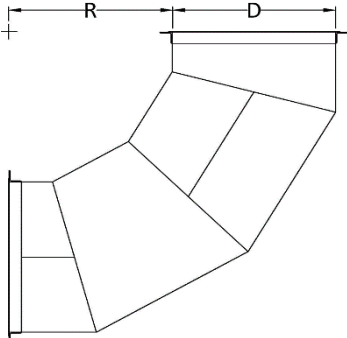
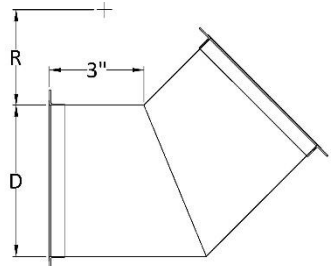
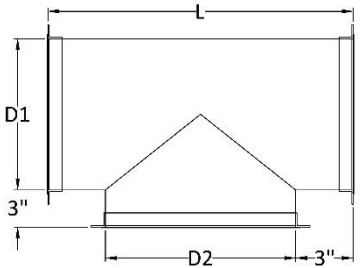


**DuraDuct™ LXD Construction Detail**

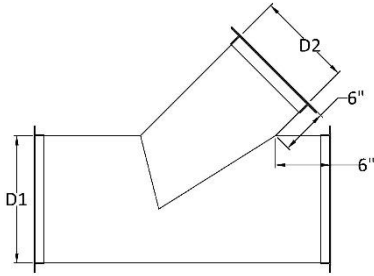
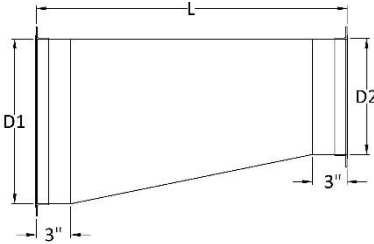
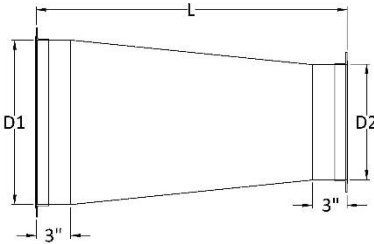
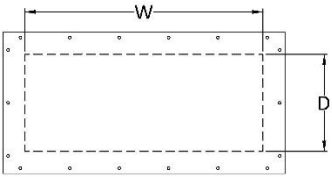
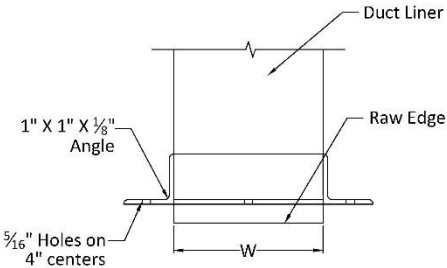
	<p><b>Straight Duct</b></p> <p>Standard Length = 59"</p>
	<p><b>Straight with Access Door</b></p> <p>Minimum Length with access door (L) = 18" Minimum Length without access door (L) = 12" ** Duct lengths shorter than 12" should be added to adjacent fitting.</p>
	<p><b>90 Degree Square Elbow</b></p> <p>Standard Throat = 3"</p>

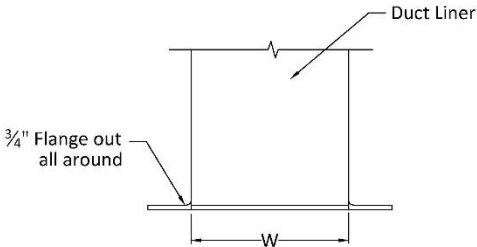
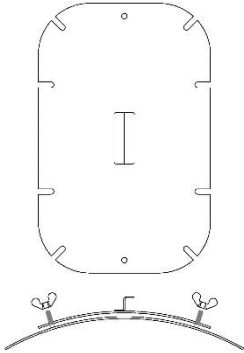
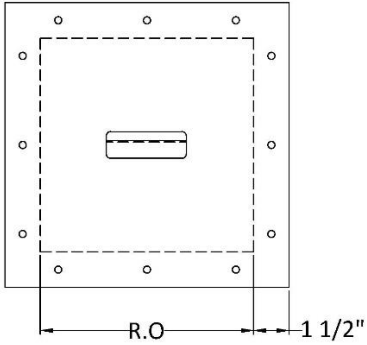
	<p><b>90 Degree Square Elbow with Access Door</b></p> <p>Standard Throat = 3" Minimum Heel Length (A) = 18"</p>
	<p><b>90 Degree Radius Elbow</b></p> <p>Standard Throat = 3" Standard Radius = W</p>
	<p><b>45 Degree Elbow</b></p> <p>Standard Throat = 3"</p>
	<p><b>45 Degree Elbow with Access Door</b></p> <p>Standard Throat = 3" Minimum heel length for access door (A) = 18"</p>

	<p><b>Transition</b></p> <p>Standard length (L) = 24"</p>
	<p><b>Transition with Access Door</b></p> <p>Standard length with access door (L) = 24"</p>
	<p><b>Square to Round</b></p> <p>Standard Length = 12"  W X D = Inner Duct  DA = Diameter of Inner Duct</p> <p>Access door not available</p>
	<p><b>Offset</b></p> <p>Standard Length (L) = 24"</p>
	<p><b>Offset with Access Door</b></p> <p>Standard Length with access door (L) = 24"</p>

	<p><b>Straight Duct (Round)</b></p> <p>Standard Lengths = 59", 29", 19", 14"</p>
	<p><b>90 Degree 3 Gore Elbow (Round)</b></p> <p>Diameter (D): 6" to 9" Radius (R) = D</p>
	<p><b>90 Degree 4 Gore Elbow (Round)</b></p> <p>Diameter (D): <math>\geq 10</math>" Radius (R) = D</p>
	<p><b>45 or 30 or 22.5 Degree 2 Gore Elbow (Round)</b></p> <p>Radius (R) = D Minimum Throat = 3"</p>
	<p><b>90 Degree Tee (Round)</b></p> <p>D1 = Diameter of Duct 1 D2 = Diameter of Duct 2 (D2 must be <math>\leq</math> D1)</p> <p>Standard Throat (T) = 3 Standard Length (L) = D2 + 6</p>



	<p><b>45 Degree Lateral Tee (Round)</b></p> <p>D1 = Diameter of Duct 1  D2 = Diameter of Duct 2  (D2 must be <math>\leq</math> D1)</p> <p>Standard Throat = 6</p>
	<p><b>Flat Transition (Round)</b></p> <p>D1 = Diameter of Duct 1  D2 = Diameter of Duct 2  (D2 must be <math>&lt;</math> D1)</p> <p>Standard length  (L) = 12" if <math>(D1-D2) \leq 4"</math>  (L) = 18" if <math>(D1-D2) &gt; 4"</math></p>
	<p><b>Centerline Transition (Round)</b></p> <p>D1 = Diameter of Duct 1  D2 = Diameter of Duct 2  (D2 must be <math>&lt;</math> D1)</p> <p>Standard length  (L) = 12" if <math>(D1-D2) \leq 4"</math>  (L) = 18" if <math>(D1-D2) &gt; 4"</math></p>
	<p><b>Block End</b></p> <p><math>W \times D =</math> Inner Duct</p>
	<p><b>Bolted Hood Connection</b></p> <p><math>W = (\text{I.D of hood flange}) - (1/16")</math></p>

 <p>Diagram illustrating a welded hood connection. A vertical duct liner is shown with a horizontal flange extending 3/4" out all around. The width of the flange is labeled as W.</p>	<p><b>Welded Hood Connection</b></p> <p>W = I.D of hood flange          SED flange to be field welded of hood flange</p>
 <p>Diagram illustrating a round access door. The door is shown with a handle and mounting hardware. Below the door is a curved duct section with two mounting points.</p>	<p><b>Access Doors (Round)</b></p> <p>Factory installed round access doors are installed on straight sections and sealed with the same inert gasket used in the field connections.</p> <p>Standard Access Door Sizes:</p> <p>15" x 6" Door for 6"Ø to 10" Ø Duct          15" x 8" Door for 12"Ø to 18" Ø Duct          15" x 10" for Duct &gt; 18"Ø</p>
 <p>Diagram illustrating a rectangular access door. The door is shown with a handle and mounting hardware. The door is offset by 1 1/2" from the duct wall. The offset is labeled as R.O.</p>	<p><b>Access Doors (Rectangular)</b></p> <p>Factory installed rectangular access doors are installed on straight sections and sealed with the same inert gasket used in the field connections.</p> <p>Standard Door Sizes (R.O)</p> <p>12" x 12"          12" x 10"          12" x 8"          12" x 6"          12" x 4 "          12" x 2"</p>

## CODE COMPLIANCE:

The DuraDuct™ LXD system, installed as instructed meets the requirements of the following standards: ANSI/ASHRAE/SMACNA Standard 126-2000 for up to 10" negative or positive pressure and ASME Standard N510 Testing of Nuclear Air Treatment Systems pressure decay testing for up to 8" pressure. 2-hour fire rated zero clearance option tested to ASTM E 119 and in accordance with NBCC, IMC and IBC codes, is available.

## HANDLING INSTRUCTIONS:

DuraDuct™ LXD is a robust system, however, care should be taken in handling the ductwork. All fittings are shipped skidded and shrink wrapped. Each component should be inspected for damage, if damage has occurred notify the freight company upon receipt of the goods to file a claim.

## CONNECTION DETAILS:

All components are supplied with bolt-up type flanged connections. All flanged connections are designed alike providing a quick and trouble-free installation. All flange gasket, nuts, bolts, washers and screws are provided to complete the single-source design. Assembly details follow:

## FLANGE ASSEMBLY INSTRUCTIONS:



ANSI

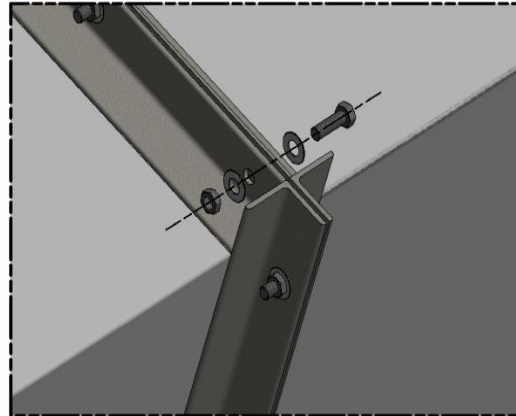
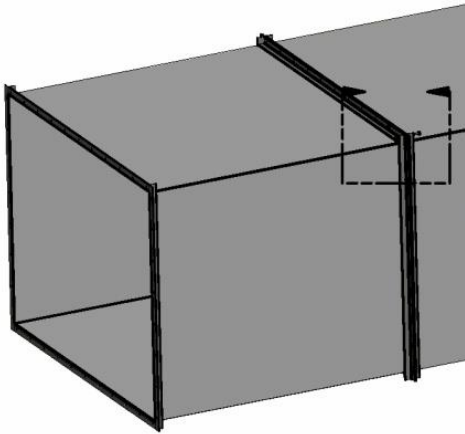
Round LXD



Square LXD

### Step 1:

- a) Thoroughly clean the connection flange of any oil or debris (a solvent based degreaser may be used) to ensure a positive bond between the gasket and steel flange.
- b) Install the CRG join gasket by removing the paper backing and applying the gasket flush to the outer edge of the inner liner. Overlap of the gasket ends should be made at the top portion of the duct and centered between bolt holes. Be sure not to stretch the gasket while you apply it to the steel flange. See images on page 10 for round vs. square duct gasket installations.
- c) Gasket does not require any specific cure time prior to operation.



## Step 2:

Connect each section using the supplied bolt assembly. A nut, bolt and two flat washers are provided for each bolt hole. Be sure to not disturb the sealant when assembling. Tighten each bolt assembly making sure to check each fastener prior to moving on to step 3. Bolt assembly to be torqued to 190 lbf-in.

**Tip:** A drift pin is helpful to locate the bolt holes.

## COMMON DUCT (MANIFOLD) SYSTEMS:

DuraDuct™ LXD is capable of tying together multiple fume hoods in a single common duct. Make sure to follow the installation drawings closely for specific details regarding these systems.

## SUPPORT METHODS AND DETAILS

### HORIZONTAL SUPPORTS:

The horizontal supports will provide for joint alignment and support for laboratory exhaust duct horizontal applications. The horizontal supports shall be secured to structural members of the building, which can adequately support the weight of the duct system. Consult with VaughanAir for technical support.

### VERTICAL SUPPORTS:

**Knee Brackets** - The knee brackets should maintain a 45° angle, if this is impractical consult with VaughanAir Barriers Inc. prior to installation. The vertical supports shall be secured to structural members of the building, which can adequately support the weight of the laboratory exhaust duct system. Consult with VaughanAir for technical support.

**Note:** All duct supports are contractor supplied. Floor supports are also acceptable, consult with VaughanAir for details.

### LATERAL GUIDES:

**Lateral Guides** - The vertical supports will adequately support the weight of the laboratory exhaust duct system; however, lateral guides should be used to maintain alignment during installation. Lateral guides should be placed every 20ft maximum span using an 11ga x 2" strap unless a vertical knee bracket support is already installed. Two anchors per guide should be used, refer to wall anchor sizing from the vertical support chart above. If lateral guides as shown cannot be used consult with VaughanAir for technical support.

**Note:** All duct supports and lateral guides are contractor supplied.

### HOOD CONNECTIONS:

Ducts connecting to the fume hood canopy shall be coordinated with project management and installed in accordance with lay-out drawing.

### TEST PORT DETAIL:

When requested, optional test ports can be supplied. Test ports can be installed on the duct as intended for use for balancing when required. The test port diameter can be built to suit site requirements. Please inquire with project management for coordination.



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