



Installation Guide

QuietR® Spiral Duct Liner





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Section 1: General Information

1.1 Introduction

Owens Corning Insulating Systems, LLC developed the following procedures for grooving and installing QuietR® Spiral Duct Liner into a 20-sided spiral duct. This is a duct board product that is grooved in a duct board grooving machine. This procedure gives the HVAC contractor the versatility to easily adjust to the size of spiral ducts being insulated without the need to special order materials.

1.2 Installation Procedures

Installation procedures contained within this Guide apply only to Owens Corning® QuietR® Spiral Duct Liner product.

Not all potential configurations are covered within this Guide. But the guideline contained within this guide gives the contractor the ability to adjust as needed for the job.

The procedures outlined in this Guide describe grooving and assembling QuietR® Spiral Duct Liner into a 20- side duct liner board for use inside round ducts. Each section 14" in diameter and larger is assembled using two grooved 10-sided pieces to form the 20-side liner section. 10"-13" diameter ducts may be insulated with 1" liner (1½" and 2" are not recommended). These ducts will have less than 20 sides.

1.3 Installation Questions

Fabrication and installation instructions for straight duct and common fittings are addressed within this Guide. It is the fabricator or contractor's responsibility to ensure that Owens Corning® QuietR® Spiral Duct Liner is installed securely in the ductwork.

If you have any questions regarding installation estimating or application please call your Owens Corning Representative.

1.4 Ordering Information

Information on estimating QuietR® Spiral Duct Liner for the HVAC job is included in this Guide.

For additional information or to order QuietR® Spiral Duct Liner please contact your local Owens Corning HVAC sales person.



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Section 2: Recommendations and Limitations

Recommendations

2.1 All portions of duct designated to receive duct liner should be completely covered with QuietR® Spiral Duct Liner.

2.2 Where adhesives are used only use a product that complies with ASTM C916.

2.3 Transverse joints should be neatly butted with no interruptions or gaps. All transverse joints should be edge coated. Metal nosing on leading edges must be used where duct liner is preceded by unlined metal and on all upstream edges when velocity exceeds 4,000 fpm (20.3 m/s).

2.4 Liner may also be secured with mechanical fasteners where needed either impact-driven or weld-secured which should compress the liner sufficiently to hold it firmly in place but not over compressed.

Note: When weld pins are used attention needs to be given to the pins so as to penetrate the foil and secure to the metal.

2.5 Minor damage and small tears can be repaired by applying duct liner coating.

2.6 After installation and prior to occupancy blow out duct system to remove all cutting scraps or foreign material remaining in the duct.

2.7 When ducts are used in systems supplying hospital or clean rooms, terminal filtration of the required efficiency for those rooms must be installed.

2.8 To avoid damage to the duct liner due to physical abuse caused by maintenance personnel working in accessible plenums some means of duct liner protection must be employed.

Limitations

Do not use QuietR® Spiral Duct Liner for:

- Ducts that will be subjected to operating temperatures exceeding 250°F (inside surface).
- Ducts that will be subjected to temperatures exceeding 150°F on the outside surface.
- Kitchen or fume exhaust ducts or to convey solids or corrosive gases.
- Burying in concrete or buried below grade.
- Installation immediately adjacent to high-temperature electric heating coils without radiation protection.
- With coal or wood-fueled equipment or with equipment of any type which does not include automatic maximum temperature controls.
- Duct which will be subject to liquid water liner should be protected with a sheet metal sleeve and drip pan adjacent to equipment such as evaporative coolers humidifiers cooling coils and outside intakes.
- Inside fire damper sleeves.
- When duct systems run through unconditioned space and are used for cooling only (when heating is from another source) register openings must be tightly sealed to prevent accumulation of water vapor in the duct system during the heating season.



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Section 3: Project Estimating

3.1 The following will aid the contractor in determining the amount of QuietR® Spiral Duct Liner to order. The following does not address labor requirements or project other related functions as these are the responsibility of the contractor.

3.2 The following guidelines should be followed for best results:

- Calculate fittings requirements by measuring length through the centerline.
- Reducers or other fittings that change diameter should be calculated using the largest diameter.
- It is better to order more product than not enough.

3.3 Calculate amount of QuietR® Spiral Duct Liner to order

- Determine the lengths of straight runs and centerline lengths of all fittings for each diameter duct. Add the total lineal feet for each diameter.
- Determine number of liner boards needed – See Table 1 for number of lineal feet of coverage per liner board based on board thickness and duct diameter. Divide your total length duct (ft) by the "Feet per Board" number. Round up to the nearest even number of boards.
- Determine the number of cartons of liner to order – See Table 1 for number of boards per carton for each liner thickness. Divide the estimated boards needed by the number of boards per carton and round up to the nearest full carton.
- See Table 2 for board usage.

Table 1 – Lineal feet/board

| 1" Board (6 bds/ctn) | | 1½" Board (4 bds/ctn) | | 2" Board (3 bds/ctn) | |
|-------------------------|-----------------------|------------------------------|-----------------------|------------------------------|-----------------------|
| Duct Dia. (in) | Feet per Board (A) | Duct Dia. (in) | Feet per Board (B) | Duct Dia. (in) | Feet per Board (C) |
| 10 | 13.20 | Below 14" Not recommended | | Below 14" Not recommended | |
| 11 | 11.31 | | | | |
| 12-14 | 9.43 | | | | |
| 15-18 | 7.54 | 14-17 | 7.54 | 14-17 | 7.38 |
| 19-24 | 5.66 | 18-24 | 5.66 | 18-23 | 5.53 |
| 25-37 | 3.77 | 25-36 | 3.77 | 24-36 | 3.69 |
| 38-48 | 1.89 | 37-48 | 1.89 | 37-48 | 1.84 |

Example using 1½" liner: You calculate a total of 75 lineal feet of 24" diameter duct is needed. Determine boards needed using Table 1: (75/5.66) = 13.25, round up to 14 boards. Determine cartons required (14/4) = 3.5, round up to 4 cartons required.



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Table 2 – Board Usage

| Duct Dia. (in) | 1" Board (each piece) | pcs/full bd | drop off (in) | % scrap | 1-1/2" Board (each piece) | pcs/full bd | drop off (in) | % scrap | 2" Board (each piece) | pcs/full bd | drop off (in) | % scrap |
|----------------|-----------------------|-------------|---------------|---------|---------------------------|-------------|---------------|---------|-----------------------|-------------|---------------|---------|
| 10 | 17.1 | 7 | 0.4 | 0.3 | Not Recommended | | | | Not Recommended | | | |
| 11 | 18.7 | 6 | 8.0 | 6.7 | Not Recommended | | | | Not Recommended | | | |
| 12 | 20.2 | 5 | 18.9 | 15.7 | Not Recommended | | | | Not Recommended | | | |
| 13 | 21.8 | 5 | 11.0 | 9.2 | Not Recommended | | | | Not Recommended | | | |
| 14 | 23.4 | 5 | 3.1 | 2.6 | 24.1 | 4 | 23.6 | 19.7 | 24.5 | 4 | 22.0 | 18.3 |
| 15 | 24.9 | 4 | 20.2 | 16.9 | 25.7 | 4 | 17.4 | 14.5 | 26.1 | 4 | 15.7 | 13.1 |
| 16 | 26.5 | 4 | 13.9 | 11.6 | 27.2 | 4 | 11.1 | 9.2 | 27.7 | 4 | 9.4 | 7.8 |
| 17 | 28.1 | 4 | 7.7 | 6.4 | 28.8 | 4 | 4.8 | 4.0 | 29.2 | 4 | 3.1 | 2.6 |
| 18 | 29.7 | 4 | 1.4 | 1.2 | 30.4 | 3 | 28.9 | 24.1 | 30.8 | 3 | 27.6 | 23.0 |
| 19 | 31.2 | 3 | 26.3 | 21.9 | 31.9 | 3 | 24.2 | 20.1 | 32.4 | 3 | 22.9 | 19.1 |
| 20 | 32.8 | 3 | 21.6 | 18.0 | 33.5 | 3 | 19.5 | 16.2 | 33.9 | 3 | 18.2 | 15.2 |
| 21 | 34.4 | 3 | 16.9 | 14.1 | 35.1 | 3 | 14.7 | 12.3 | 35.5 | 3 | 13.5 | 11.2 |
| 22 | 35.9 | 3 | 12.2 | 10.2 | 36.7 | 3 | 10.0 | 8.4 | 37.1 | 3 | 8.8 | 7.3 |
| 23 | 37.5 | 3 | 7.5 | 6.2 | 38.2 | 3 | 5.3 | 4.4 | 38.6 | 3 | 4.1 | 3.4 |
| 24 | 39.1 | 3 | 2.8 | 2.3 | 39.8 | 3 | 0.6 | 0.5 | 40.2 | 2 | 39.6 | 33.0 |
| 25 | 40.6 | 2 | 38.7 | 32.3 | 41.4 | 2 | 37.3 | 31.1 | 41.8 | 2 | 36.4 | 30.4 |
| 26 | 42.2 | 2 | 35.6 | 29.6 | 42.9 | 2 | 34.1 | 28.4 | 43.4 | 2 | 33.3 | 27.7 |
| 27 | 43.8 | 2 | 32.4 | 27.0 | 44.5 | 2 | 31.0 | 25.8 | 44.9 | 2 | 30.1 | 25.1 |
| 28 | 45.4 | 2 | 29.3 | 24.4 | 46.1 | 2 | 27.8 | 23.2 | 46.5 | 2 | 27.0 | 22.5 |
| 29 | 46.9 | 2 | 26.1 | 21.8 | 47.7 | 2 | 24.7 | 20.6 | 48.1 | 2 | 23.9 | 19.9 |
| 30 | 48.5 | 2 | 23.0 | 19.2 | 49.2 | 2 | 21.6 | 18.0 | 49.6 | 2 | 20.7 | 17.3 |
| 31 | 50.1 | 2 | 19.9 | 16.5 | 50.8 | 2 | 18.4 | 15.3 | 51.2 | 2 | 17.6 | 14.6 |
| 32 | 51.6 | 2 | 16.7 | 13.9 | 52.4 | 2 | 15.3 | 12.7 | 52.8 | 2 | 14.4 | 12.0 |
| 33 | 53.2 | 2 | 13.6 | 11.3 | 53.9 | 2 | 12.1 | 10.1 | 54.4 | 2 | 11.3 | 9.4 |
| 34 | 54.8 | 2 | 10.4 | 8.7 | 55.5 | 2 | 9.0 | 7.5 | 55.9 | 2 | 8.1 | 6.8 |
| 35 | 56.4 | 2 | 7.3 | 6.1 | 57.1 | 2 | 5.8 | 4.9 | 57.5 | 2 | 5.0 | 4.2 |
| 36 | 57.9 | 2 | 4.1 | 3.5 | 58.6 | 2 | 2.7 | 2.3 | 59.1 | 2 | 1.9 | 1.6 |
| 37 | 59.5 | 2 | 1.0 | 0.8 | 60.2 | 1 | 59.8 | 49.8 | 60.6 | 1 | 59.4 | 49.5 |
| 38 | 61.1 | 1 | 58.9 | 49.1 | 61.8 | 1 | 58.2 | 48.5 | 62.2 | 1 | 57.8 | 48.2 |
| 39 | 62.6 | 1 | 57.4 | 47.8 | 63.4 | 1 | 56.6 | 47.2 | 63.8 | 1 | 56.2 | 46.8 |
| 40 | 64.2 | 1 | 55.8 | 46.5 | 64.9 | 1 | 55.1 | 45.9 | 65.4 | 1 | 54.6 | 45.5 |
| 41 | 65.8 | 1 | 54.2 | 45.2 | 66.5 | 1 | 53.5 | 44.6 | 66.9 | 1 | 53.1 | 44.2 |
| 42 | 67.4 | 1 | 52.6 | 43.9 | 68.1 | 1 | 51.9 | 43.3 | 68.5 | 1 | 51.5 | 42.9 |
| 43 | 68.9 | 1 | 51.1 | 42.6 | 69.6 | 1 | 50.4 | 42.0 | 70.1 | 1 | 49.9 | 41.6 |
| 44 | 70.5 | 1 | 49.5 | 41.3 | 71.2 | 1 | 48.8 | 40.7 | 71.6 | 1 | 48.4 | 40.3 |
| 45 | 72.1 | 1 | 47.9 | 39.9 | 72.8 | 1 | 47.2 | 39.3 | 73.2 | 1 | 46.8 | 39.0 |
| 46 | 73.6 | 1 | 46.4 | 38.6 | 74.4 | 1 | 45.6 | 38.0 | 74.8 | 1 | 45.2 | 37.7 |
| 47 | 75.2 | 1 | 44.8 | 37.3 | 75.9 | 1 | 44.1 | 36.7 | 76.3 | 1 | 43.7 | 36.4 |
| 48 | 76.8 | 1 | 43.2 | 36.0 | 77.5 | 1 | 42.5 | 35.4 | 77.9 | 1 | 42.1 | 35.1 |



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Section 4: Grooving Spiral Duct Liner

4.1 Must have Glass Master® 220 grooving machine. For more information about Glass Master see page R-1.

4.2 Be sure to understand and follow all safety instructions that come with the machine. Abide by the safety standards set in the shop or job site.

4.3 Set the machine up for the correct thickness of duct liner board – make sure the rollers are flat and parallel.

4.4 Cut the factory shiplaps off the boards (see Table 3). Preferred method is using the machine with two (2) cutoff tools. Can be hand cut.

Table 3 – Shiplap Cutoff Dimensions

| | | | |
|----------------------|--------|--------|--------|
| Liner Thickness | 1" | 1 1/2" | 2" |
| Male shiplap (in.) | 1 | 1 3/8 | 1 7/8 |
| Female shiplap (in.) | 1 3/4 | 1 3/8 | 1 7/8 |
| Total cutoff (in.) | 2 3/4 | 2 3/4 | 3 3/4 |
| Liner width (in.) | 45 1/4 | 45 1/4 | 44 1/4 |

4.4 Set grooving tools into the machine – see figure 1

- Position #1 – flange tool (far left) is for cutting the stapling/tape flap
- Positions #2 thru #10 – V grooving tools (fewer for ducts less than 14" diameter)
- Position #11 – straight cut-off tool (note: if using the standard straight cut-off tool from the shiplap set, add 3/4" to Table 4 measurement)

4.5 Position grooving tools on machine – see figure 2 (gage made from 1/4" thick aluminum works well)

- Place the flange tool snug to the far left and lock into place by pushing down on the clamp lever
- Position V groove tools by using a gage block to space the tools per Table 4
- Position the cut-off tool using the same gage block as rest of the tools



Figure 2 – Spacing with a gage block

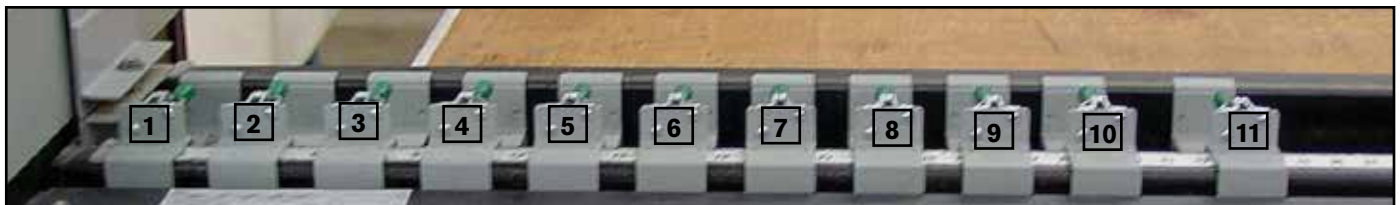


Figure 1 - Tool Positioning



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Table 4 – Distance Between Tools

| Spiral Duct Diameter (in.) | Number of sides (complete duct) | Distance between tools (in.) |
|----------------------------|---------------------------------|------------------------------|
| 10 | 14* | 7/32 (0.21) |
| 11 | 16* | 1/8 (0.13) |
| 12 | 16* | 5/16 (0.33) |
| 13 | 18* | 1/4 (0.24) |
| 14 | 20 | 3/16 (0.18) |
| 15 | 20 | 5/16 (0.33) |
| 16 | 20 | 1/2 (0.49) |
| 17 | 20 | 21/32 (0.65) |
| 18 | 20 | 13/16 (0.80) |
| 19 | 20 | 31/32 (0.96) |
| 20 | 20 | 1 1/8 (1.12) |
| 21 | 20 | 1 9/32 (1.28) |
| 22 | 20 | 1 7/16 (1.43) |
| 23 | 20 | 1 19/32 (1.59) |
| 24 | 20 | 1 3/4 (1.75) |
| 25 | 20 | 1 29/32 (1.90) |
| 26 | 20 | 2 1/16 (2.06) |
| 27 | 20 | 2 7/32 (2.22) |
| 28 | 20 | 2 3/8 (2.37) |
| 29 | 20 | 2 17/32 (2.53) |
| 30 | 20 | 2 11/16 (2.69) |
| 31 | 20 | 2 27/32 (2.85) |
| 32 | 20 | 3 (3.00) |
| 33 | 20 | 3 5/32 (3.16) |
| 34 | 20 | 3 5/16 (3.32) |
| 35 | 20 | 3 15/32 (3.47) |
| 36 | 20 | 3 5/8 (3.63) |
| 37 | 20 | 3 25/32 (3.79) |
| 38 | 20 | 3 15/16 (3.95) |
| 39 | 20 | 4 3/32 (4.10) |
| 40 | 20 | 4 1/4 (4.26) |
| 41 | 20 | 4 7/16 (4.42) |
| 42 | 20 | 4 9/16 (4.57) |
| 43 | 20 | 4 3/4 (4.73) |
| 44 | 20 | 4 7/8 (4.89) |
| 45 | 20 | 5 1/16 (5.05) |
| 46 | 20 | 5 3/16 (5.20) |
| 47 | 20 | 5 3/8 (5.36) |
| 48 | 20 | 5 1/2 (5.52) |

*Recommended for only 1" thick liner

Note: Spacing between tools = ((ID x 3.14159)/# of sides) – 2" where ID is Inside Diameter

4.6 Grooving the Liner Board

- Run a board through the machine – check to see if the flange tool is cleaning the fiberglass from the stapling/tape flap, if not, remove tool from machine and adjust knife up or down and check again on second board. See figure 3.
- After grooving the second board, stop and assemble per section 5. Dry fit into the duct per section 7. The goal is to have the liner slide into place to fit snug and not loose.

4.7 Adjusting the size of the Liner Duct

- If it is too large diameter, reduce the gap between the last grooving tool and the cut-off tool by approximately 1/8". If too small, increase the gap by approximately 1/8". Run 2 more boards through the machine, assemble, and dry fit. Again, the goal is to have the liner slide into place to fit snug and not loose. Increase or reduce this gap until the liner fits correctly. ***This will save you from having to use adhesive on all the straight run ducts! It's worth the time to get this right!***



Figure 3 - Grooved 1-sided section



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Section 5: Spiral Duct Liner Section Assembly

5.1 To assemble duct section select two grooved pieces. Lay the two pieces flat side-by-side foil side up (Figure 4). Butt the two liner board edges together with one taping flange of one piece overlaying the non-flange side of the other piece. Staple every 8" using outward clinching 1/2" galvanized staples to secure together. Apply foil tape and squeegee tight to the facing. Bring into a circle by butting the other edges together foil sides out. Staple tape and squeegee down (Figures 5 and 6).



Figure 4 - Two pieces laid flat side-by-side



Figure 5 - Stapling and taping



Figure 6 - Squeegee tape down



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Section 6: Adhesives, Coating, and Pins

6.1 Adhesives – shall comply with ASTM C916.

6.1.1 When inserting sections into the spiral duct:

- For all sections being used in fittings adhesive shall be applied over the full outside surface going against the sheet metal duct before installing.
- If needed for straight sections apply a band of adhesive at least 3" wide at both ends of the section over the outside surface of the liner that will go against the sheet metal duct.

6.2 Coatings – use a duct liner coating designed for use in HVAC interior ductwork that contains an EPA-registered antimicrobial (biocide).

6.2.1 Coating shall be applied to all transverse connecting edges. This coating shall extend onto the air stream surface at least 1" both ways from the joint (Figure 7).

6.2.2 Coating shall be applied to all transverse connecting edges contained within all fitting. This coating shall extend onto the air stream surface at least 1" both ways from the joint (Figure 8).

6.2.3 If mat surface of liner is loose or torn apply coating for repair.

6.3 Pins If needed mechanical fasteners either impact-driven or weld-secured which should compress the liner sufficiently to hold it firmly in place but not over compressed.

Note: When weld pins are used attention needs to be given to the pins so as to penetrate the foil and secure to the metal.

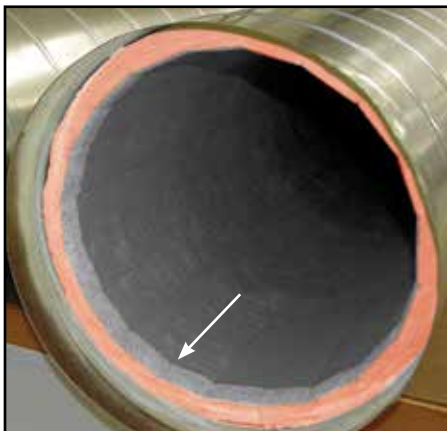


Figure 7 - Coated transverse edge



Figure 8 - Fittings coated transverse edges



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Section 7: Straight Duct

7.1 Most efficient spiral duct lengths for the duct liner will be based on the liner thickness used and the coupling width used. The maximum length of each section of liner is 45¼" for the 1" and 1½" and 44¼" for the 2" liner. If using the typical inside coupling, the recommended length of the spiral duct is a multiple of the maximum length of the liner to be used plus the width of a coupling (½ width at each end of the duct).

Example: If you were using 1" liner with 4" wide coupling, you could consider—

Single length: $45\frac{1}{4}" + 4" = 49\frac{1}{4}"$

Double length: $(45\frac{1}{4}" \times 2) + 4 = 94\frac{1}{2}"$

Triple length: $(45\frac{1}{4}" \times 3) + 4 = 139\frac{3}{4}"$

7.2 Place a mark ½ of the coupling width in from each end of the spiral duct. See figure 9.

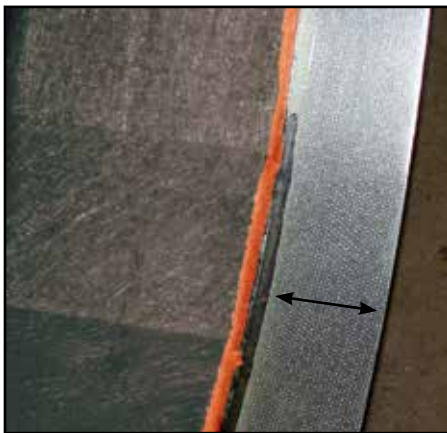


Figure 9 - Square edge with scribe mark

7.3 Groove the liner per section 4

7.4 Assemble section per section 5

7.5 Coat the traverse edges per section 6

7.6 Bend the liner section into a heart shape and insert into the spiral duct to the proper location. This is done by placing the taped joints at the sides and pushing down at the top joint and bending into the heart shape as shown in figure 10. Insert into the duct and push the heart point upwards to bring it back to its original round shape. Tap any section of the liner into place tight to the metal if needed. If installing more than one section of liner into the spiral duct, make sure the sections of liner are tight to one another.



Figure 10 - Heart shape for insertion into duct



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Section 8: Couplings

8.1 Insulate the joint coupling as width plus $\frac{1}{8}$ " each side for a total of $\frac{1}{4}$ " extra (Figure 14).

Note: The $\frac{1}{8}$ " additional liner on each side is to assure good insulation contact between sections.

8.2 If in the adjoining straight sections the liner is 1 to 3 inches short this length may be added to that side of the coupling to make-up the lining difference. But at no time shall that length exceed 3" on either side.

8.3 Adhere liner to coupling per Section 6.1.

8.4 Coat both exposed edges per Section 6.2.

8.5 If mat surface of liner is loose or torn apply coating per Section 6.2.



Figure 14 - $\frac{1}{8}$ " additional liner on couplings and fittings



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Section 9: Elbows

9.1 Elbow gores can be cutout in one of two manners:

9.1.1 Assemble the duct liner section(s) as described in Section 5. Using a band saw cut proper angles to match gore sizes (Figure 15). Typical angles are $11\frac{1}{4}$ deg for 5 gore and $22\frac{1}{2}$ deg for 3 gore elbows

9.1.2 With the duct liner section still in the flat before making the second tape joint lay the sheet metal pattern over the foil side of insulation section. Using a hand knife hold the blade so that the cut edge is at the proper angle to fit the elbow. Join and tape the section together as describe in Section 5.

9.2 Apply adhesive and edge coating per section 6.

9.3 Bend the liner section into a heart shape and insert into the elbow. This is done by placing the taped joints at the sides and pushing down at the top joint and bending into the heart shape as shown in figure 16. Insert into the correct location and push the heart point upwards to bring it back to its original round shape. Tap any section of the liner into place tight to the metal if needed. Make sure the gores are snug to one another and the liner protrudes out $\frac{1}{8}$ " from the ends of the fitting as shown in figure 17.

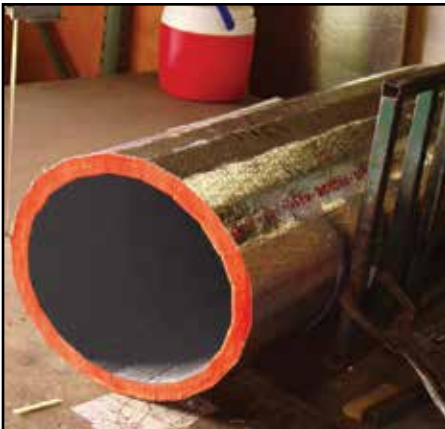


Figure 15 - Band Saw



Figure 16 - Inserting gore into elbows

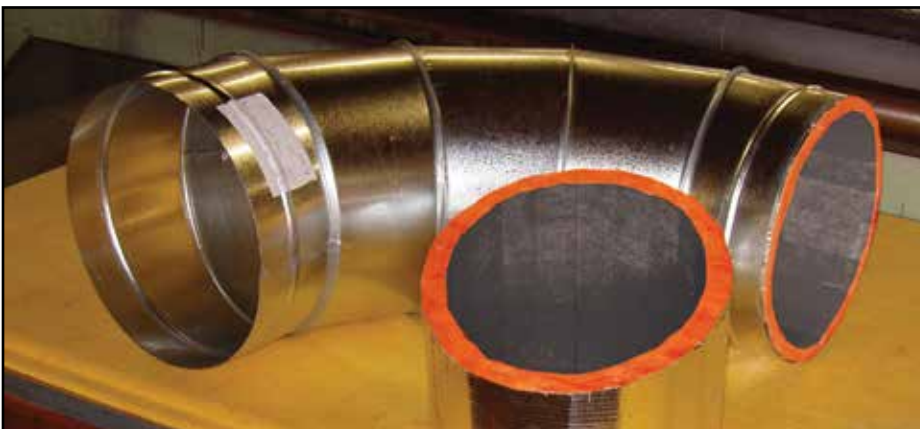


Figure 17 - Prepared end gore for elbow



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Section 10: Tee's

10.1 Assemble the duct liner section(s) as described in Section 5.

10.2 The following is one recommendation of insulating Tee Fittings.

10.3 Measure and cut from a duct liner section the branch leg to the longest length needed and add at least 1". Leave $\frac{1}{8}$ " of liner extending past the joint flange with excess liner extending above the branch fitting. Using the fitting as a guide cut the excess liner. Align the knife blade so that the correct angle of the fitting is maintained (Figures 18 and 19).

10.4 Remove insulation and weld branch leg onto straight section of Tee.

10.5 Apply adhesive per Section 6 and insert branch insulation into section.

10.6 Using another liner section cut to the appropriate length with an additional $\frac{1}{4}$ " added. Apply adhesive per Section 6 and insert in to straight through leg leaving $\frac{1}{8}$ " of liner extending past both ends. Using the tap fitting as a guide cut the opening into the straight section. Align the knife blade so that the correct angle of the fitting is maintained. Care shall be taken so not to damage the tap leg insulation (figures 20 and 21).

10.7 Coat per Section 6 where the tap and straight liner knife-edge meet (Figure 22).

10.8 Coat per Section 6 to all transverse connecting edges.

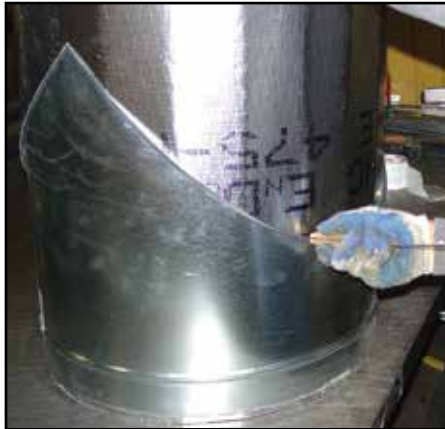


Figure 18 - Trimming branch leg of Tee



Figure 19 - Trimmed branch leg of Tee



Figure 20 - Trimming straight leg of Tee

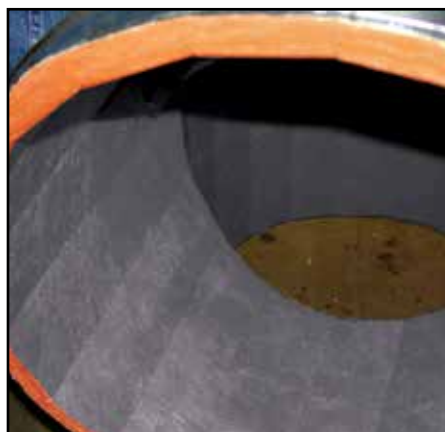


Figure 21 - Finished edge of Tee



Figure 22 - Coating on the inside edge of Tee



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Section 11: Reducers

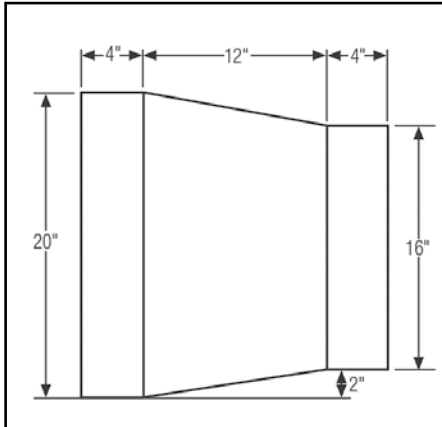
11.1 It is recommended that the sheet metal reducer be manufactured as follows (Drawing 6):

- 4/12 reduction (go 12" in length for every 4" reduction in diameter) maximum.
- Minimum 4" flange at both ends.

Note: The above requirements will produce larger pieces making them easier to install.

11.2 On an un-grooved air stream side of the duct liner place the sheet metal pattern for the 4/12 reducer (Figure 23). At one end of the pattern leave a 1" to

1½" from the edge of the board for adding the tape flange. Using a hand knife and holding the blade at approximately a 10° angle cut around the pattern cutting the ends and outside arch angled under the pattern and the inside arch angled away from the pattern (Figure 24). These angles will align the reducer insulation section to the adjoining pieces. At the end for the tape flange cut the edge of the pattern down to the facing but not through. Finish the two sides with the arc to the end of the board. Remove insulation for the tape flange area.



Drawing 6 - Reducer example



Figure 23 - Metal pattern



Figure 24 - Cutting sides at an angle



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11.3 On the outside edge of the arc divide the insulation into 20 equal sections (Figure 25). With a straight edge draw lines for the 20 sections from the outside mark to the center of the arc (Figure 26).

11.4 With the hand-grooving tool groove each line (Figure 27). Remove insulation from the grooves.

11.5 Assemble reducer per section 5 as shown in Figure 28. Apply adhesive and edge coating per section 6. Inset into reducer as shown in Figure 29.

11.6 To finish insert the two straight end pieces. Leave an additional $\frac{1}{8}$ " in length past the sheet metal as done with the couplings in Section 8. Join and tape the section together as described in Section 5. Insert both flange sections by adhering per Sections 6 (Figure 30).

11.7 Coat per Section 6 where the taper and straight liner knife edge meet.

11.8 Coat per Section 6 to all transverse connecting edges.



Figure 25 - Locating the 20 sections



Figure 26 - Marking out groove lines



Figure 27 - Hand grooving reducer lines

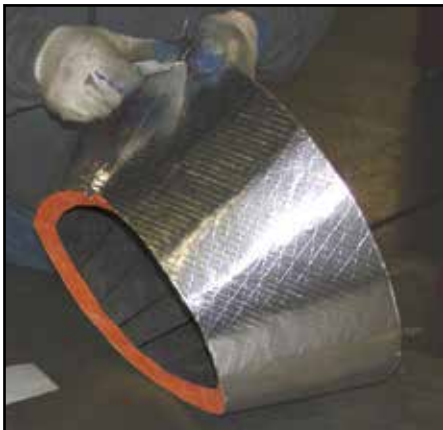


Figure 28 - Assembling reducer



Figure 29 - View of insulation inside reducer



Figure 30 - View of reducer insulation to flange insulation



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Section 12: End Caps

12.1 Cut at the same diameter of the cap a piece of un-grooved duct liner.

12.2 Install with adhesive (Figure 31).

12.3 Where installing the end cap, the liner shall end 1", 1½", or 2" from the end of the spiral duct depending on the thickness of the liner used.



Figure 31 - View of insulated end cap



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Section 13: Diffusers

13.1 Rectangular taps for mounting of diffusers are to be lined with QuietR® Spiral Duct Liner adhered and pinned as typical duct liner (Figure 32).

13.2 For a curved diffuser that mounts onto the spiral duct insulate spiral duct as described in Section 7. Cut liner insulation to accommodate diffuser opening.

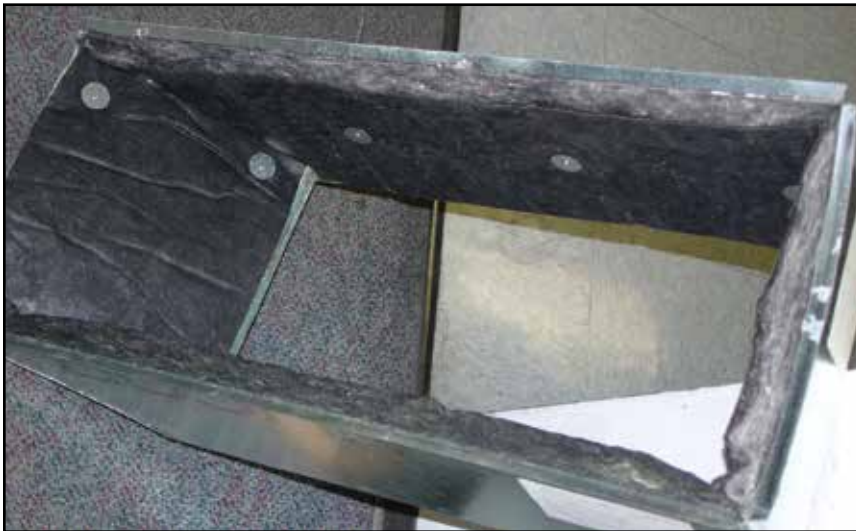


Figure 32 - Insulated diffuser box



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Equipment and Material Reference

GlassMaster Grooving Machine:

CertainTeed Machine Works

101 Hatfield Road

Winter Haven, FL 33880

Phone: 863-294-3206

Fax: 863-294-6771

Toll Free: 800-874-9135

Toll Free: 800-237-7841

Email: cmw@saint-gobain.com

Coating:

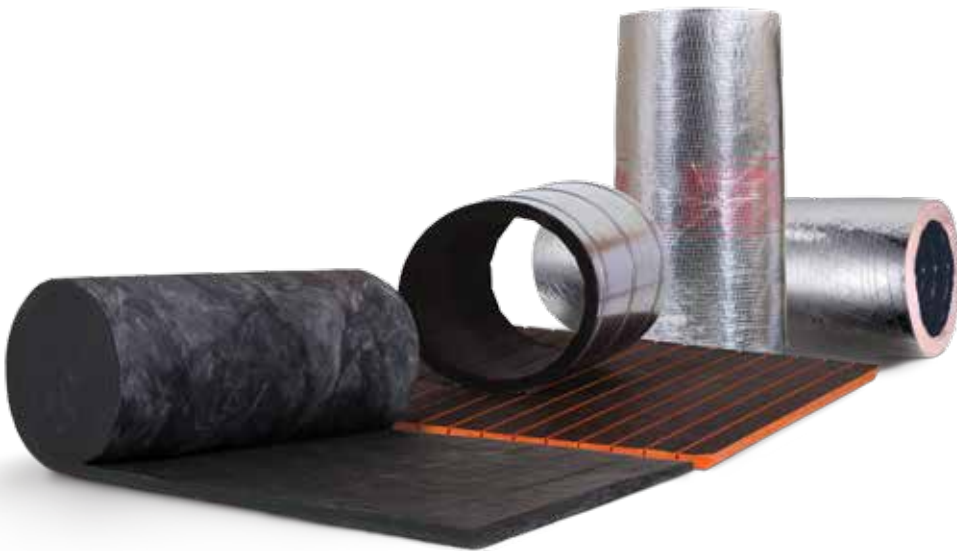
Use a duct liner coating designed for use in HVAC interior ductwork that contains an EPS-registered antimicrobial (biocide).

Additional material needed, obtained locally:

UL 181A Foil Tape

Outward Clinching Staple Gun

Galvanized Staples 1/2" or 9/16" length



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