

HOW TO MAKE A DIFFUSER

For Your Air Conditioner

by ADRIAN HAIRRELL

Tools Needed:

- Tape measure • Felt marker
- String gauge 23 sheet metal
- 1-8'-2x4 • Sheet metal shears
- Spray paint • A file
- Hand drill • 5/16" Hex bit
- Phillips screw driver bit
- 4-2" corner braces
- 1- 1" wood screw
- 21- #10 1/2" self-tapping sheet
- Protractor • Metal screws
- Two small clamps

- Optional:**
- Rivet gun • Rivets
 - Drill bit • Plywood
 - Bench mounted vise

Figure 1- MEASURING THE DIAMETER OF THE CONDENSER



Installing a diffuser improves airflow through the condenser coil which increases the amount of heat rejected to outdoors. With some simple hand tools one can be made in a couple hours.

Step 1- Measure the diameter of the outlet of the condenser as seen in **Figure 1**. Measure a diameter that is just outside of the louvers so you don't restrict airflow.

Step 2- Now some calculations are needed to make the diffuser template. Download our **simple spreadsheet** from the link on the previous page to determine the dimensions needed based on the diameter measurement in Step 1. The template outline of the diffuser can be seen in **Figure 2**.

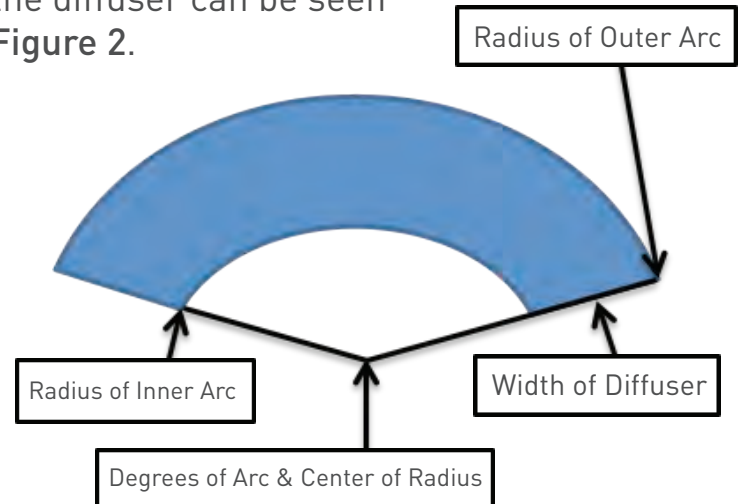


Figure 2- TEMPLATE OUTLINE OF THE DIFFUSER

Step 3- You will need either a scrap piece of plywood or flooring to screw into like a wooden shop floor. Lay the piece of sheet metal down and measure the radius of the outer arc back to the center of the radius as seen in **Figure 3**. You can measure from the top of the sheet metal in order to minimize scrap material. Please note that the wider the diffuser is the more sheet metal is needed. The one made for this tutorial used a 12" width and 25" outlet condenser opening and required a 4' x 8' sheet of sheet metal.

{HOW TO}

MAKE A DIFFUSER

Figure 3-
LAYOUT OF THE DIFFUSER

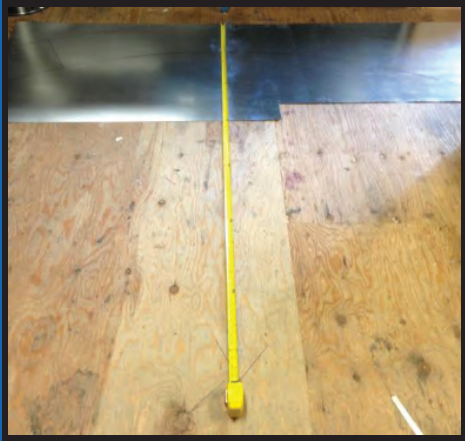


Figure 4-
SCRIBING THE OUTER RADIUS

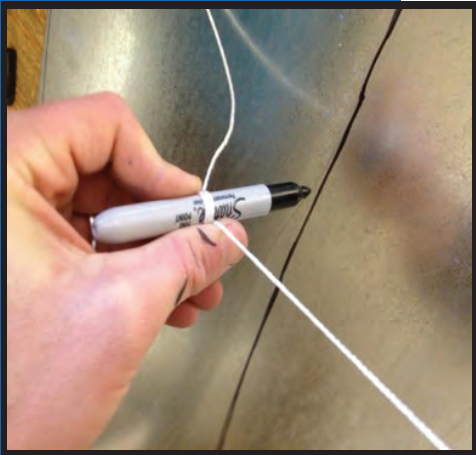
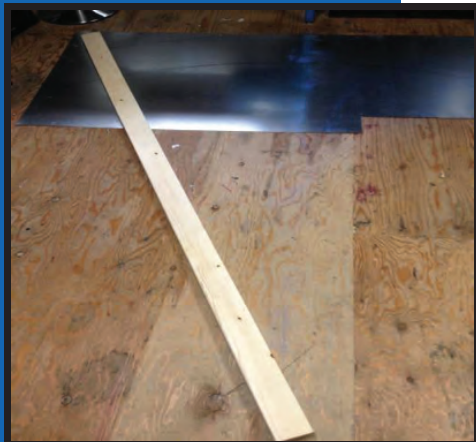


Figure 5-
MARKING THE END
OF THE DIFFUSER



Step 4- Drive a wood screw a half an inch or so into the wood at the center of the radius (where the tape measure is in **Figure 3**). Leave at least half of the screw protruding from the wood. Mark with a marker the radius of the outer arc at the top of the sheet metal. This needs to be in a straight line as seen in **Figure 3**.

Step 5- Using the same screw location measure and mark the radius of the inner arc on the sheet metal.

Step 6- Measure and mark the degrees of arc with a protractor from the spreadsheet at the screw location as seen in **Figure 3** (at the tape measure).

Step 7- Tie some string around the screw and then wrap the other end around the marker until the marker lines up with the mark for the outer radius and scribe an arc as seen in **Figure 4**. Do this for the inner radius as well.

Step 8- Use the string or a long straight edge like a 2x4 to mark the ends of the diffuser using the lines made with the protractor as seen in **Figure 5**. Double check your work by measuring the width at each end of the diffuser template, they should be equal.

Step 9- Create a 2" by 2" overlap tab as seen in **Figure 6**. The tab will be used to attach one end of the diffuser to the other end.

Step 10- Cut out the template. Make sure you don't cut off the attachment tab. Take your time and try not to crimp the sheet metal. File the cut edges when you are done cutting the template out.

Figure 6-
MARKING AN ATTACHMENT TAB

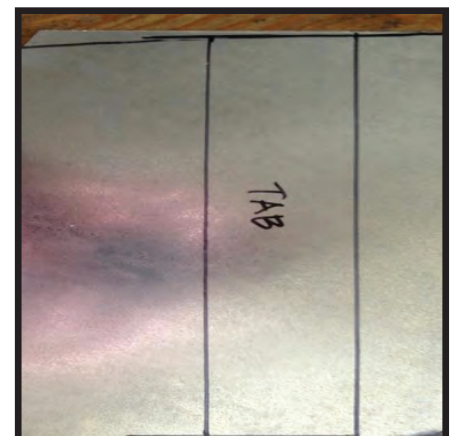


Figure 7-
CLAMPING AND
ATTACHING THE DIFFUSER

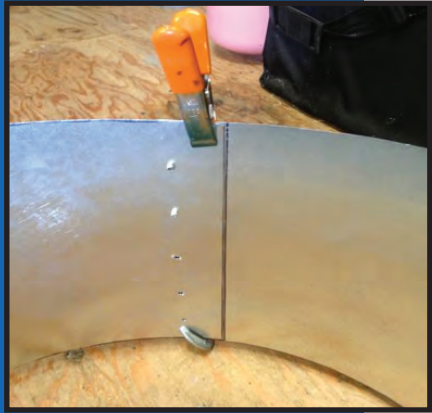
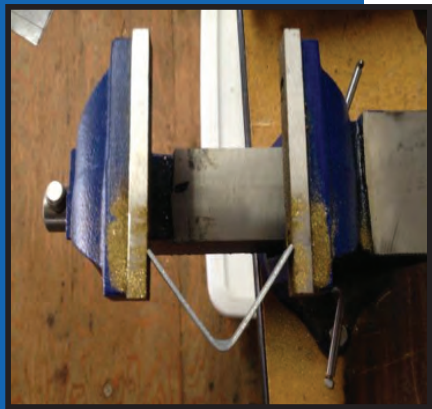


Figure 8-
BENDING THE CORNER BRACES



Step 11-

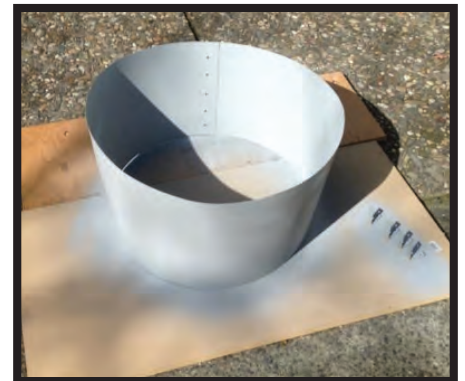
Use two clamps and position the diffuser in place by using the line you made on the attachment tab to line up the other end of the diffuser as seen in **Figure 7**.

Step 12- Use 5 self-tapping sheet metal screws or rivets to attach one end of the diffuser to the other as seen in **Figure 7**.

Step 13- Use a vise if available or a clamp and pry bar to bend the 4 corner braces to the same angle of the diffuser as seen in **Figure 8**. Bend in small increments and check with the protractor after each small bend.

Step 14- Coat the diffuser and corner braces in a few coats of spray paint that matches the color of the condensing unit as seen in **Figure 9**. Applying multiple coats ensures the diffuser won't corrode or rust over time.

Figure 9-
PAINTING THE DIFFUSER



Step 15- Attach the diffuser to the top of the condenser as seen in **Figure 10** using 16 self-tapping sheet metal screws and the 4 corner braces. **Warning: be very careful where you attach the self-tapping sheet metal screws and corner braces to the top of the condenser. You want to avoid being on top of the condenser coil. Rupturing the coil could happen if care is not taken.** Attaching the corner braces towards the corners of the condenser usually gives enough space for this as seen in **Figure 10**.



Figure 10-
ATTACHING THE DIFFUSER

IMPROVEMENT IN AIRFLOW Using a vane anemometer, airflow measurements were taken with and without the diffuser installed on the condenser seen in **Figure 10**. In this case, airflow increased by 160 CFM with the diffuser installed.

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