



## How to Determine the Height of the Grille Cutout on Spiral or Oval Duct

The following instructions apply to all three types of direct mount grille for oval or spiral duct; saddle, universal and radius.

Cutting the proper height hole on the curve of oval duct or spiral duct is not as straight forward as just laying the tape measure on the curved duct and measuring out the nominal height of the grille.

The reason for this is the curved surface of the duct as can be seen in Figure 1 below. Projecting the grille height on to the curved surface shows that the length of the arc AB is longer than the length of line segment AB or the grille height.

To cut the proper height hole on oval or spiral duct for a grille, you must determine the arc length which is equivalent to the height grille on a specific diameter oval or spiral duct.

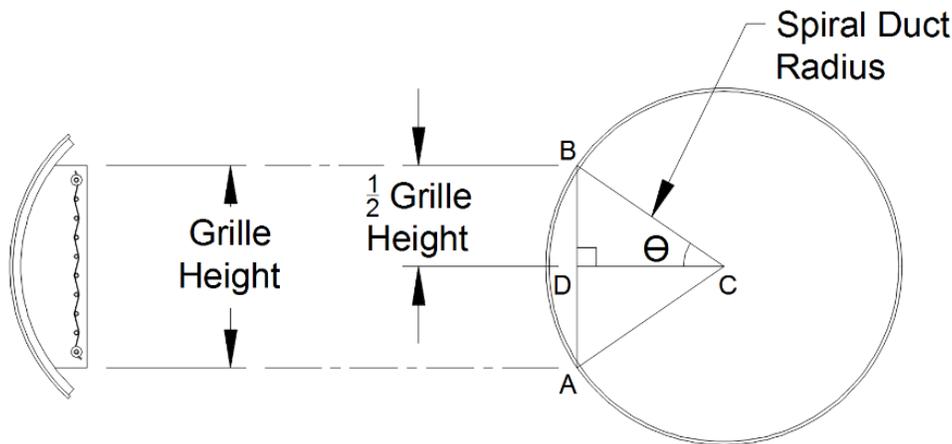


Figure 1

The first step is to determine the degrees of arc that equals the grille height on a specific diameter, this will require the use of a scientific calculator. Using some trigonometry, we can figure out the required arc length. Start by setting up a right triangle in which the base is equal to half the height of the grille and the hypotenuse is equal to the radius of the curved surface, see Figure 1 above.

$$\text{Degrees of Arc} = 2 \times \left[ \sin^{-1} \left\{ \frac{(0.5 \times \text{Grille Height})}{(0.5 \times \text{Duct Diameter})} \right\} \right]$$

The next step is to convert the degrees of arc to the length of arc.

$$\text{Arc Length} = \left( \frac{\text{Degrees of Arc}}{360} \right) \times 2 \times \pi \times (0.5 \times \text{Duct Diameter})$$

The calculated arc length will be the required grille cutout height.

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