

# Sheet Metal Plenum Design and Installation Instructions

## Introduction

Many *Unico System* installers are beginning to use metal duct for the entire main trunk line (plenum). This instruction describes the best method for using metal duct.

Consult the Unico Engineering Department if you need to use a non-standard duct size or shape.

## Duct Size

There are two types of duct that may be used: rectangular or round. Round duct is used for most systems and is the preferred type. Rectangular duct is primarily used in unusual situations or when the installer wishes to make his own duct. Unico provides plenum adapters for both types.

The size of the plenum, as in any duct system, depends on the length of the plenum. In most cases, where the plenum duct length is less than 150 feet (45 m), the plenum will be 7-inch (178 mm) diameter or 8.5 x 8.5-inch (216 x 216 mm) square. However, in certain instances you will need to use larger duct. Specifically, a larger duct is necessary for the 3660 or 4860 unit before splitting the flow or if the plenum length is more than 150 feet. Consult the Duct Layout and Design Manual for more specific information on duct sizing.

Table 1 lists the maximum airflow for various round duct sizes. For rectangular duct sizes, size the duct for equal friction. If using a tee to split the airflow it is acceptable to reduce the duct size immediately after the tee. Unico has available several reducer tees, part numbers starting with UPC-19.

*Note: Each elbow or tee is equivalent to 15 feet (5 m) of straight duct.*

## Installation

The metal duct must be designed for 4-inches of water (992 Pa) internal pressure. It can be spiral, seamless, or snap lock. A sheet metal thickness of at least 26 gauge (0.45 mm) is recommended in order to cut the 2-inch (50 mm) holes for the branch ducts without collapsing the duct.

**Sealing.** It is extremely important to seal all of the duct seams and joints, including any longitudinal snap-lock seams. The method of sealing shall be in accordance with

Table 1. Duct Size Limitations

Round Size	Rectangular Equivalent	Maximum Airflow
7.0 (178)	6-1/2 x 6-1/2 (165 x 165) 6 x 8 (152 x 203) 4 x 12 (102 x 305) 3-1/2 x 14 (89 x 356)	600 CFM (330 L/s)
9.0 (229)	8-1/2 x 8-1/2 (216 x 216) 8 x 10 (203 x 254) 6 x 12 (152 x 305) 4 x 20 (102 x 508) 3-1/2 x 24 (89 x 610)	1000 CFM (472 L/s)
10.0 (254)	9-1/2 x 9-1/2 (240 x 240) 8 x 12 (228 x 305) 6 x 14 (152 x 356) 4 x 24 (102 x 610)	1250 CFM (590 L/s)
11.0 (279)	10-1/2 x 10-1/2 (267 x 267) 10 x 12 (254 x 305) 8 x 14 (203 x 356) 6 x 18 (152 x 457)	1500 CFM (708 L/s)

the latest edition of SMACNA *HVAC Duct Construction Standards-Metal and Flexible*, or the latest edition of the ASHRAE *Handbook-HVAC Systems and Equipment*.

**Insulation.** The *Unico System* is designed to produce a greater temperature drop across the heat exchanger than a conventional system. To prevent condensation or excessive duct losses to the surrounding air, wrap the duct with at least 1.5 inches (38 mm) or fiberglass blanket insulation or insulation sleeve. The insulation must include an outer vapor seal. When local codes dictate the R-factor, it may be necessary to use thicker insulation. Be sure to seal the joints with an aluminum tape.

If the duct is hung with straps, use a rigid insulation material under the duct where it is supported. This will ensure the duct is fully insulated.

## Metal Return Duct

If the return duct is made of metal, always add an acoustical lining to the inside of the duct. This is in addition to or instead of the wrapped insulation. The duct should be sealed at the seams and be designed for a negative 0.5 inches of water (124 Pa) static pressure.