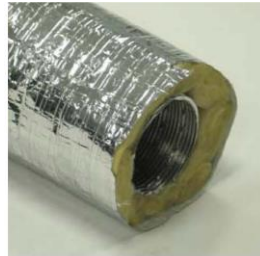




## Supply and Sound Attenuator Duct



UPC-26C



UPC-25

IL00504a.evx

Unico Model Number	Rated R-Factor
25= 2" Supply Tubing 225= 2.5" Supply Tubing 26= 2" Sound Attenuator 226= 2.5" Sound Attenuator	
UPC-26C/226 UPC-26D/226D UPC-25/225	R3.3 (standard)
UPC-26CR4/226-R4 UPC-26DR4/226D-R4 UPC-25-R4/225-R4	R4
UPC-26CR6/226-R6 UPC-25-R6/225-R6	R6
UPC-26CR8/226-R8 UPC-25-R8/225-R8	R8

Table 1. Explanation of model number nomenclature

### General

The aluminum supply tubing and sound attenuator are an insulated flexible air duct. The insulation is designed to prevent condensation from forming on the outside of the duct and to minimize thermal losses to the surrounding environment.

The supply and sound attenuator tubing are offered in two diameters with several different choices of insulation thicknesses. In most cases, the standard supply tubing should be used. However, for extremely cold or humid environments or where the local building code requires a specific R-factor and the duct is installed in an unconditioned space, use the R4, R6, or R8 products. The R4, R6, and R8 ducts have thicker and heavier insulation than the standard model to reduce thermal losses. If the standard or R4 sound attenuator tubing is necessary but a

double vapor barrier or non-porous duct is required, use the UPC-26D/226D product.

### Application

The Unico sound attenuator significantly reduces sound from the outlets. The aluminum supply tubing does not. Therefore, for proper noise control, it is recommended to use at least 3 feet (1 m) of the sound attenuator at the end of every supply branch run. Optionally, the entire branch duct can be made of one or more lengths of the sound attenuator. For long duct runs, the aluminum core tubing is stronger than the sound attenuator core and is best to construct the branch duct using almost all aluminum supply tubing with a 3-foot (0.9 m) length of sound attenuator at the end (See Figure 1).

Where runs are required to be installed in unconditioned spaces every attempt should be made to limit the length of the duct run to 12-feet or less using the proper R-factor for the application. However, as an air duct, there is no limit to the length used other than its ability to deliver the air.

Small ducts have a much higher effective efficiency than the R-factor indicates because the R-factor is based on flat wall thickness, which is appropriate for large round ducts. The small ducts were reviewed by the International Code Council Evaluation Services for compliance with LC-1001 (Listing Criteria for SDHV Air Distribution Systems). If the local code requires a minimum R-factor, you can use the evaluation report as justification for installing a small duct system with a slightly lower R-factor. The certification can be found online at

[http://www.icc-es-pmg.org/Listing\\_Directory/pdf/PMG-1002.pdf](http://www.icc-es-pmg.org/Listing_Directory/pdf/PMG-1002.pdf).

CONFORMS TO UL STD 181  
CERTIFIED TO  
CAN/ULC STD S110-M86



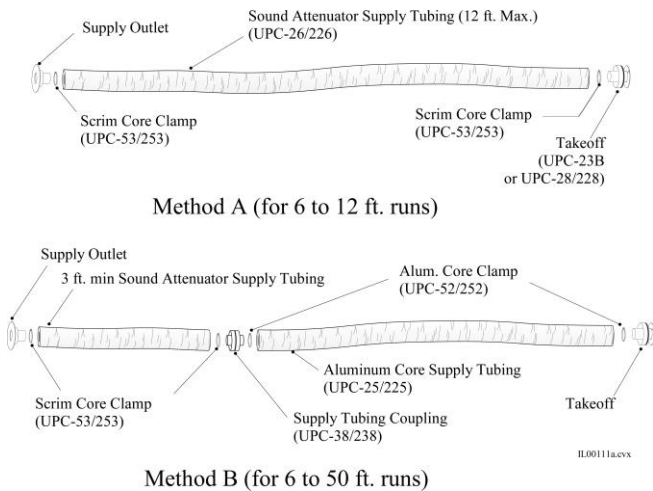


Figure 1: Assembly of Branch Duct Runs

### Construction

The aluminum supply tubing is supplied in 25-foot (7.7- m) lengths while the sound attenuator tubing is supplied in 12-foot lengths. Both the aluminum and sound attenuator tubing can be cut as needed. As shown in Figure 2, both the standard and R-4 models have 3 components.

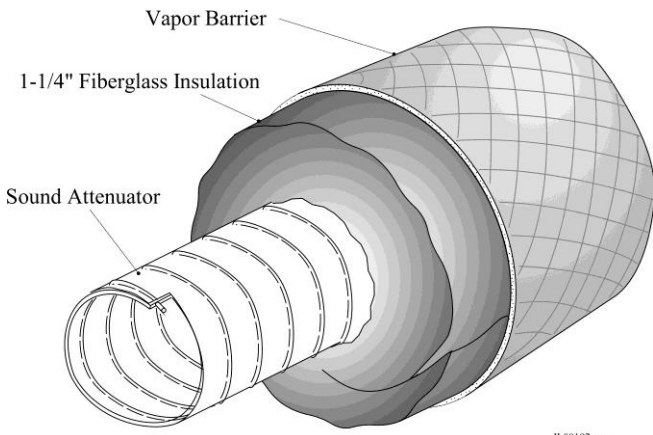


Figure 2. Typical tubing Construction (Standard and R-4)

The inner layer/core is made of two-ply corrugated aluminum for the supply tubing or spun bound nylon for the sound attenuator. The outer jacket for both models are made of two-ply reinforced reflective mylar; providing a vapor seal to prevent leakage and moisture migration, and increases the insulation factor by reducing the radiant heat transfer. The fiberglass blanket insulation fills the void between the jacket and core of the tube.

The standard and the R-4 duct have one insulation layer and vapor barrier on the UPC-26/226C and the UPC-25/225. The R6 and R8 ducts as well as the UPC-26/226D ducts have two layers of insulation and two double vapor barrier seals for both supply and sound attenuator tubing. The Fiberglass insulation for the R6 and R8 ducts are both 1-1/4" thick. The fiberglass insulation for the UPC-26D/226D ducts are both 3/4" thick.

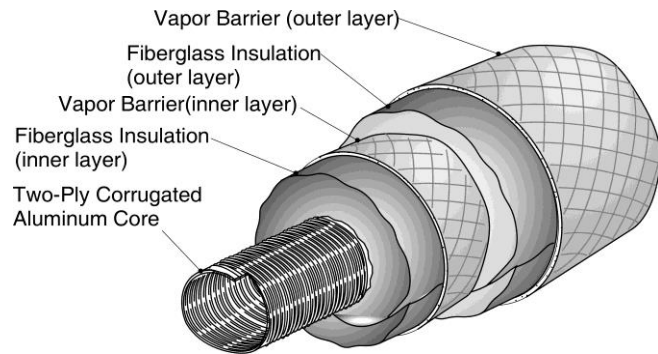


Figure 3. Typical Supply Tubing Construction (R6, R8 and the standard and R4 Double Vapor Barrier)

### Duct Heat Gain/Loss

Whenever a duct is installed in an unconditioned space, the heat gain and loss calculations must include duct loss. These are based on both thermal losses and losses due to leakage for a typical installation.

The R-factor is calculated per the Air Diffusion Council (ADC) Flexible Duct Standard. This code assumes that the duct wall is flat. This assumption works well for conventional ducts because the duct radius is usually quite large. However, for small ducts, assuming the duct wall is flat overestimates the thermal losses. Therefore, the R-factor specified for a small duct may be less than the value required for a conventional duct. This is described as an equivalent R-factor in Table 1 and is further explained in the International Code Council report (PMG-1002).

### Noise Level

Noise level is directly related to the rate at which air is being discharged from each outlet. In general, lower airflow means lower noise levels; therefore additional duct runs will be required. Refer to Table 4 as a guide in designing a duct layout that will meet your specific sound level requirements.

**Model Specifications**

**Certifications:**

UL Standard 181 *Flexible Air Ducts*

ICC-ES PMG listed (meets the following)

2009 *International Mechanical Code (Duct Systems)*

2009 *International Residential Code (Duct Systems)*

2009 *IAPMO Uniform Mechanical Code (Duct Systems)*

**Classification:** Air Duct per UL Standard 181

**Smoke Developed Rating:** less than 50

**Flame Spread Index:** less than 25

**Inside Diameter:** Model UPC-25/26: 2.0 inch (50 mm)  
Model UPC-225/226: 2.5 inch (63 mm)

**Outside Diameter:** See Tables 2 and 3

**Duct Material:** Two-ply corrugated aluminum  
Spun Bound Nylon

**Filter Particle Size:** 5μ

**Insulation:** Fiberglass

**Vapor Barrier:** Reinforced Aluminized Mylar

**Min. Pressure:** negative 0.5-inch w.c. (125 Pa)

**Max. Pressure:** 4.0 inches w.c. (1000 Pa)

**Max. Velocity:** 5000 ft/min (25 m/s)

**Min. Length:** 3 ft (1 m) *sound attenuator*  
None *supply tubing*

**Support Distance:** every 6-ft (2 m)

**Min. Inside Bend Radius:** 6 inch (150 mm)

**R-Factor:** See Table 2

Model	Outside Dia, inch	R-factor °F-hr-ft <sup>2</sup> /Btu	
		Rated*	Effective**
UPC-26C	3.5	3.3	4.0
UPC-26CR4	4.0	4.2	5.8
UPC-26CR6	5.0	6.0	9.5
UPC-26CR8	6.0	8.0	13.7
UPC-26D	3.5	3.3	4.0
UPC-26DR4	4.0	4.2	5.8
UPC-226	4.0	3.3	3.9
UPC-226-R4	4.5	4.2	5.5
UPC-226-R6	5.5	6.0	9.0
UPC-226-R8	6.5	8.0	12.9
UPC-226D	4.0	3.3	3.9
UPC-226D-R4	4.5	4.2	5.5

Table 2. Duct R-Factor (Imperial)

\* per ADC Flexible Duct Standard, based on flat thickness, k=.24 Btu-in/h•ft<sup>2</sup>•°F

\*\* per ASHARE 2001 Fundamentals Handbook p. 23.21, based on curved thickness

Note: Data at 15 ft duct length at 120°F

Model	Outside Dia, mm	R-factor W/(m2-K)	
		Rated*	Effective**
UPC-26C	89	18.7	22.7
UPC-26CR4	102	23.8	32.9
UPC-26CR6	127	34.0	53.9
UPC-26CR8	152	45.4	77.8
UPC-26D	89	18.7	22.7
UPC-26DR4	102	23.8	32.9
UPC-226	102	18.7	22.1
UPC-226-R4	114	23.8	31.2
UPC-226-R6	140	34.0	51.1
UPC-226-R8	165	45.4	73.3
UPC-226D	102	18.7	22.1
UPC-226D-R4	114	23.8	31.2

Table 3. Duct R-Factor (Metric)

\* per ADC Flexible Duct Standard, based on flat thickness, k=.24 Btu-in/h•ft<sup>2</sup>•°F

\*\* per ASHARE 2001 Fundamentals Handbook p. 23.21, based on curved thickness

Note: Data at 15 ft duct length at 120°F

Sound Level	Approx. dB(A)	2-inch Outlet		2 ½ inch Outlet		Recommended Application
		CFM	Outlet/Ton*	CFM	Outlet/Ton*	
Ultra Low	25	14	14	17	12	Multimedia Rooms
Very Low	27	19	11	23	9	Rooms with Hard Surfaces (wood or concrete floors and walls)
Low **	29	30	7	36	6	Rooms with Carpet, Drapes, Furniture
Normal	32	40	5	50	4	Large Rooms or Where Sound is not Critical (min. number of outlets)
Excessive	35	50+	4	60+	3	Industrial Environments

Table 4. Unico System Sound Level Recommendations

\* The number of outlets presume that the total airflow meets the minimum required by the air handler

\*\* Recommended

- Outlets/Ton is based on rated minimum rated airflow of 200 CFM per nominal ton

- dB(A) is A-weighted Sound Pressure level measured 3 ft (1 m) from outlet in a reverberant room 20 x 30 ft.

**NOTE:** The actual sound levels measured in a room will vary depending on how the duct was installed (bends, wrinkles, outlet design) and the room environment (carpeted, draperies, etc.). Also, the overall sound in the room depends on the number of outlets in that room.

### UnicoSystem Measured Sound Pressure Level in Occupied Space

