

# Quiet-Duct® Silencers

A Complete Range of Engineered Noise Control  
for Air Handling Systems



- Quiet-Duct Ultra™ /Low
- Quiet-Duct Ultra™ /Green
- Quiet-Duct Ultra™ /ZAPD
- Quiet-Duct Ultra® Commercial Series
- Quiet-Duct Clean Flow™ Silencers
- Quiet-Duct Conic Flow®
- D-Duct Diffuser
- Ultra-Pals™ Packless
- Quiet-Duct® Elbow Silencers





# Quiet-Duct® Silencers

## A Complete Range of Engineered Noise Control for Air Handling Systems

The **Quiet-Duct® Commercial** line of silencers are the backbone of IAC's HVAC silencers. These are the most used and specified silencers in the HVAC industry. They provide an awesome design flexibility suitable for many different types of applications and can be easily fitted into any existing system.

The **Quiet-Duct Ultra™/Low** line of silencers offers the industry's first published and guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

The **Quiet-Duct Ultra™/Green** line was developed in response to the trend for environmentally friendly building products. This 100% environmentally friendly attenuation solution uses recycled acoustic fill material and delivers performance that meets or exceeds that of a standard Quiet-Duct silencer.

The **Quiet-Duct Ultra™/ZAPD** line was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss.

The **Quiet-Duct Clean-Flow™** line is for systems requiring a higher degree of cleanliness and hygiene, such as in hospitals or clean rooms. Linings on the fill material guard against erosion of particulate matter into the air-stream.

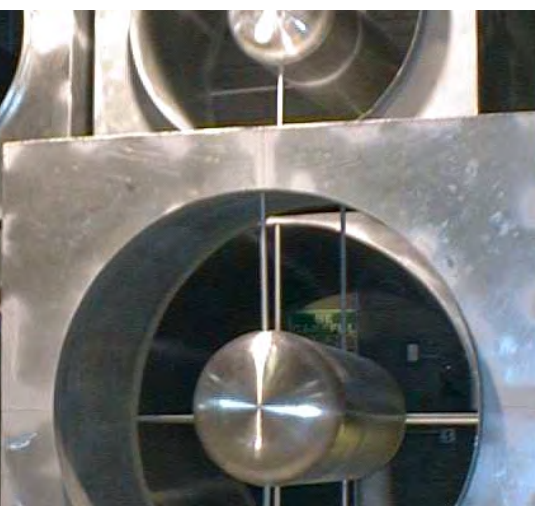
The **Quiet-Duct Conic-Flow®** line are circular silencers that are an excellent solution when you have round ductwork being utilized and installed.

The **Ultra-Pals™ Packless** line is the ultimate solution for ultra-clean environments and corrosive/flammable environments. The complete absence of fill makes these ideally suited for any application where particulate matter or fiber erosion from conventional fill materials could contaminate the air/gas streams.

The **Quiet-Duct® Elbow** line has the capability to both nest and stack the elbow silencer modules so the size is scalable while the aerodynamics and acoustical performances are maintained.

**IAC Acoustics offers  
the broadest range  
of silencers in the industry**





## Typical Applications

- Hospitals, Pharmaceutical and Science Labs
- Office Buildings
- Tunnel Exhaust Applications
- Hotels and Restaurants
- Generator Enclosures
- Automobile Plants
- Universities, Schools and Dorm Rooms
- Auditoriums, Concert Halls, Stadiums and Arenas
- Churches
- Data Centers
- Airport Terminals
- Police and Fire Stations
- Dust Collectors
- Military Installations
- Waste Water Treatment Plants

## Features & Benefits

- Straight-through air passages designed for maximum air handling at minimum pressure drop
- Acoustic baffles designed for maximum attenuation at low frequencies
- Bell-mouth entrance and exit to minimize turbulence, pressure drop and self-noise
- Aeroacoustic and aerodynamic performance data is based on NVLAP-accredited laboratory tests conducted in accordance with ASTM E 477 and ISO 7235
- Solid, round noses that increase noise reduction
- Forward and reverse flow

# Leadership in Silencer Development & Technology

A question frequently asked by our customers is whether duct lining alone can provide sufficient attenuation from noise handling equipment. In most cases the answer is “no.”

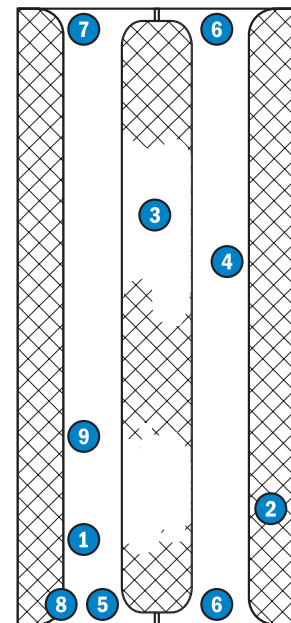
As an example based on the guidelines from the 1999 ASHRAE Fundamentals Handbook, in the 250 Hz octave band, an 18 in. x 54 in. duct would require 57 feet of one-inch-thick, 1.5 lb/ft.<sup>3</sup>-density, surface-coated, duct-liner material to achieve as much insertion loss (i.e. 32 dB) as one five-foot-long IAC 5 LFS Silencer. In the lower frequencies, such as 125 Hz, even greater lengths of duct lining would be required to achieve the 10-20 dB insertion loss typically achievable by many of the broad range of IAC silencers including the LFS series.

## Dynamics of Duct Silencer Design

Proper structural design assures long, trouble-free life.

The attributes of a typical Quiet-Duct Silencer include:

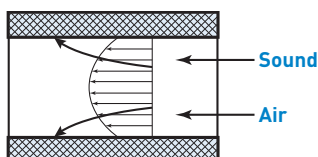
1. Die-formed, single-piece splitter construction throughout.
2. Shell-noise radiation minimized by double-skin or splitter construction in most models.
3. Acoustic baffles designed for maximum attenuation at low frequencies, the toughest job of all.
4. Straight-through air passages designed for maximum air handling at minimum pressure drop.
5. Solid, rounded noses that increase noise reduction.
6. Bell-mouth entrance and exit to minimize turbulence, pressure drop and self noise.
7. No protruding fastener heads to cause turbulence or self-noise.
8. Solid air-impingement surfaces and self-cleaning air passages to minimize dirt entrapment.
9. Acoustic fill protected against erosion by perforated metal containments.



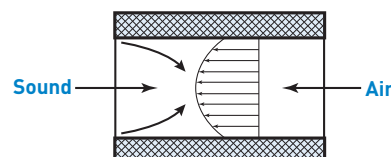
## Forward & Reverse Flow

In 1972, IAC developed silencer Dynamic Insertion Loss and Self-Noise ratings both under Forward Flow (+) and Reverse Flow (-) conditions for rectangular and cylindrical silencers.

Since attenuation values are generally higher in the first five octave bands in the reverse flow mode compared to the forward flow mode, more economical silencer selections can often be made on return air systems.



**Forward Flow** occurs when air and sound waves travel in the same direction, as in an air conditioning system or fan discharge. Under forward flow conditions, high frequency sound is refracted into the duct silencer walls.



**Reverse Flow** occurs when air and sound waves travel in opposite directions, as in a typical return-air system. Under reverse flow conditions, sound is refracted away from the walls and towards the center of the duct silencer.



## A Complete Family of Silencers

All of IAC's silencers were developed in response to specific requirements from acoustical consultants, consulting engineers, owners and contractors. Having been pre-tested for performance, they provide the most economical choices for solving the wide variety of noise control problems encountered in HVAC engineering.

IAC standard, rectangular silencer cross sections range from 6 in. x 6 in. to 48 in. x 48 in. For small mains, branches, and duct run-outs, module sizes fit every need. When large silencer banks are required, multiple-module assemblies can be arranged to provide almost limitless dimensional flexibility.

Silencer	Application
Quiet-Duct Ultra™ / Low	For conventional applications where guaranteed performance is required down to 31.5 Hz
Quiet-Duct Ultra™ / Green	A 100% environmentally friendly attenuation solution
Quiet-Duct Ultra™ / ZAPD	For applications in which acoustic attenuation is required and no allowance can be made for pressure loss
Quiet-Duct® Commercial Series	For conventional applications including low frequency
Clean-Flow™ Rectangular	For systems requiring a higher degree of cleanliness and hygiene such as in hospitals or clean rooms
Conic-Flow® Tubular	For silencer applications including low frequency
D-Duct™ Acoustic Diffuser	For use on axial-fan systems.
Ultra-Pals™ Rectangular Packless	The ultimate solution for ultra-clean environments and corrosive/flammable environments
Ultra-Pals™ Tubular Packless	For small-diameter circular duct systems such as fume hoods
Quiet-Duct® Elbow	For HVAC systems where straight runs of ductwork are not available





# One Stop for Silencer Information & Specification

## Benefits of Passive Silencer Design

All of the silencers manufactured by IAC are of passive design which means that they do not require mechanical or electrical means to function. They work by providing a trouble-free static means for dissipating sound energy by converting it into minute quantities of heat. Passive silencers provide low first cost, simple installation, and maintenance-free lifetime operation to make them the natural choice in HVAC-engineered noise control.

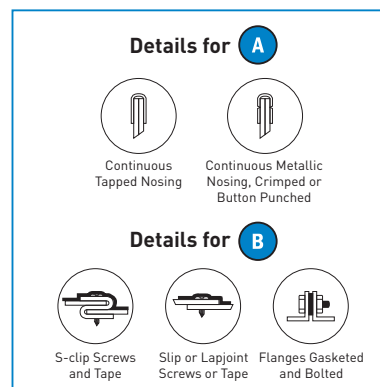
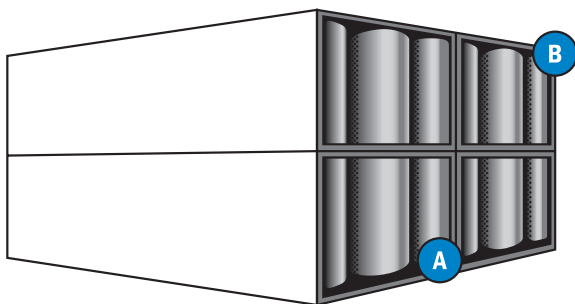
## Sources of Design Information

The effective and economical application of noise control methods depends on an accurate knowledge of the system's silencing requirements. There are several sources of information available for determining the required noise reduction for a wide range of HVAC applications. The ASHRAE Handbook presents a procedure for calculating the noise reduction required. IAC also offers several methods which conform to the guide and quickly yield accurate results for specific issues, including:

- IAC HVAC Virtual Tool
- The IAC Snap Form
- The IAC Quiet-Duct Silencers Catalog
- The IAC Quiet-Duct Silencers Catalog

# Operation & Maintenance Instructions

1. IAC Silencers have no moving parts and therefore require no lubrication or routine maintenance.
2. All silencers are furnished rigidly constructed, well-made and free of any defects in materials or workmanship. To ensure continuing proper operation, the silencers should be visually inspected at least once a year to verify that:
  - a. Perforated acoustic splitters are undamaged, remaining parallel and true.
  - b. Airspaces between the acoustic splitters are free of any debris.
  - c. The holes in the perforated steel are open and free of dust or other foreign material.
3. In the event that debris must be cleaned from the airspaces or the perforated metal, the silencer should be vacuum-cleaned or wiped clean with a cloth dampened in a mild detergent solution.
4. In no event should solutions that might affect the galvanized protection on the steel be used to clean IAC Silencers.
5. The occurrence of "White Rust" (zinc oxide) on galvanized silencers is a normal event and not a maintenance item. It occurs when the zinc in the galvanizing reacts electrolytically with moisture to protect the steel.
6. In the event of fire, flood, structural damage or other severe occurrences, contact your local IAC Representative or the IAC Factory direct for specific instructions and recommendations.



*Multiple units are easily field-assembled using these types of connections.*

## Notes

1. For maximum structural integrity, Quiet-Duct™ Silencer splitters should be installed vertically. When vertical installation is not feasible, structural reinforcement is required for silencers wider than 24 in.
2. Unless otherwise indicated, connecting ductwork is assumed to have the same dimensions as fan intake or discharge openings.
3. When elbows are directly connected to the entrance of the silencers, the direction of the splitters should be parallel to the plane of the elbow turn.
4.  $L_1$  = Distance from fan exhaust to entrance of discharge silencer.  
 $L_2$  = Distance from fan inlet to exit of intake silencer.
5.  $\Delta P$  Factor = Pressure Drop multiplier relative to silencer laboratory-rated-data and as specified by ASHRAE.
6.  $D$  = Diameter of round duct or equivalent diameter of rectangular duct.
7. Unless otherwise noted, multipliers shown do not include pressure drop of other components (elbows, transitions, dump losses, etc.), which must be calculated separately.
8. The  $\Delta P$  Factors given are subject to minimum duct runs of 2.5  $D$  after discharge silencers and 2.5  $D$  before intake silencers. Otherwise, use additional multipliers as shown, such as for fans, elbows, silencers immediately at system entrance or exit, or other system components.

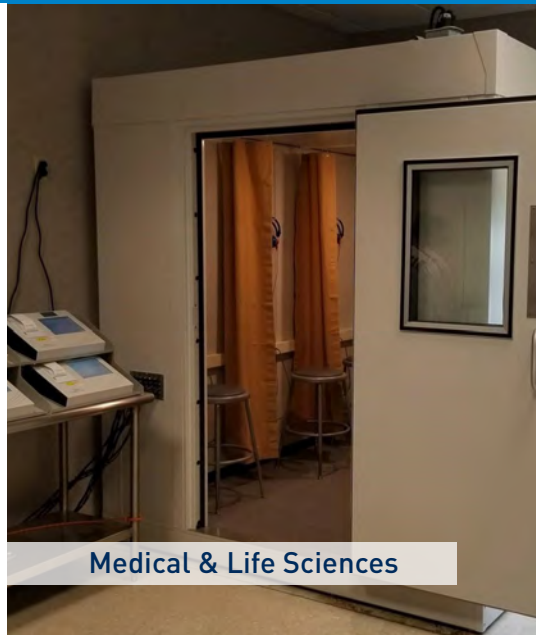


# Making the World a Quieter Place

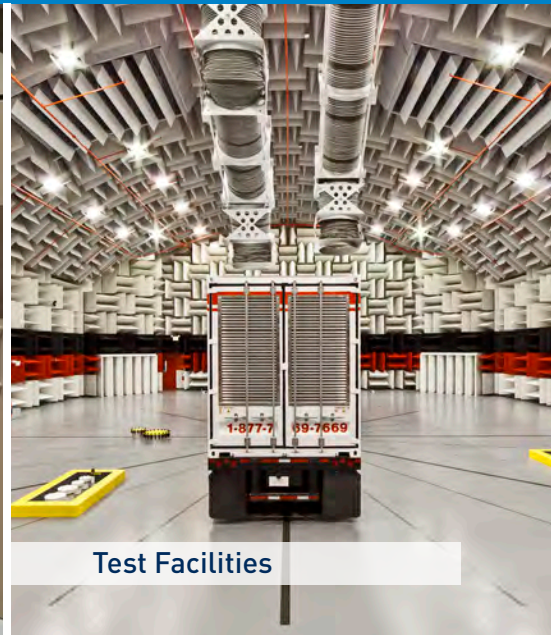
Markets Served by IAC Acoustics



Architectural



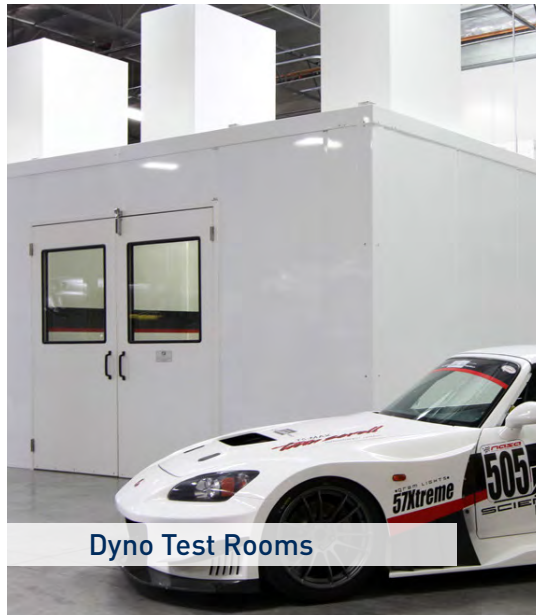
Medical & Life Sciences



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Industrial



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