

Noise Control Article

PRICE[®]

The Science of Comfort[™]

TWO SIDES TO EVERY NOISE

By Alex Michaud, M.Sc.

Senior Product Manager – Noise Control

Noise is usually either black or white – acceptable or annoying. The former often goes unnoticed, while the latter requires attention.

Price offers a wide variety of noise control products that are often viewed from the mechanical perspective (e.g. supply and return ductwork silencers). A more holistic method is to address the acoustical impact from both the architectural and mechanical design perspectives. This approach improves the opportunity for noise issues to be properly resolved by the responsible party who understands the problems and has the ability to solve them prior to construction. With this mindset, the following explores both noise types and provides some corresponding solutions.

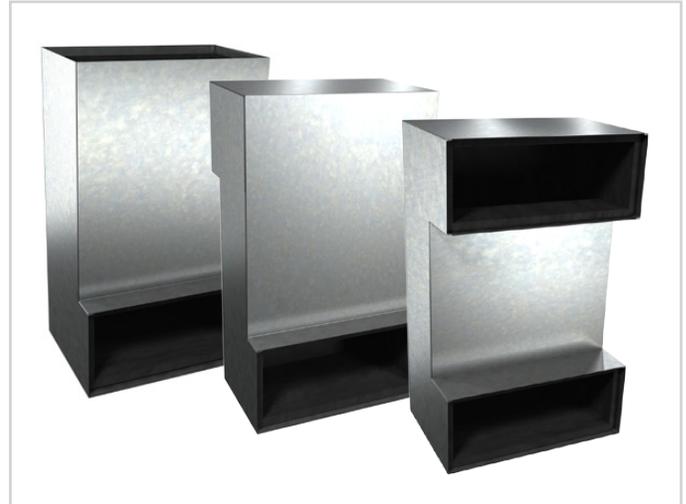
ARCHITECTURAL ACOUSTICS

Architectural design criteria typically focus on:

- Sound transmission across building assemblies (partitions, ceilings, etc.)
- Background or ambient noise (HVAC systems, equipment, outdoor)
- Speech privacy

Sound transmission is often described by STC (Sound Transmission Class), which measures the amount of noise that is reduced by a building assembly, such as a wall or floor. Our STC-rated Acoustical Panels (QLP) are available in various thicknesses and with absorptive media options. As depicted in **Figure 1**, one application for Acoustic Panels is to improve partition noise isolation performance.

A less obvious noise isolation application is for partitions that require an STC rating, but do not extend to the slab or have return air penetrations above the finished ceiling. In these cases, partition STC is compromised and often inadequate for more acoustically sensitive occupied spaces, such as conference rooms or private offices. Our Cross Talk Silencers (XTL, XTZ, XTU) and Thin Line Return Dissipaters (TLRD) can provide additional noise reduction to ensure that overall partition assemblies provide adequate noise isolation.



XTL, XTZ, XTU - Cross Talk Silencers



TLRD®, TLRD®-LP, TLRD®-LP-T - Thin Line Return Dissipaters

For example, two adjacent rooms separated by a non-full height partition can be negatively impacted by noise flanking through the common ceiling plenum. As depicted in **Figure 1**, this noise path can be addressed by using our Thin Line Return Dissipaters (TLRD) at return grilles with the added benefit of reducing visibility into the plenum space.

Background noise is often described using Noise Criterion (NC), a series of octave-band curves defining acceptable sound pressure levels from 63 to 8,000 Hz. Background noise is typically governed by mechanical equipment and industry guidelines of acceptable levels as outlined by ASHRAE (HVAC Applications 48.3).

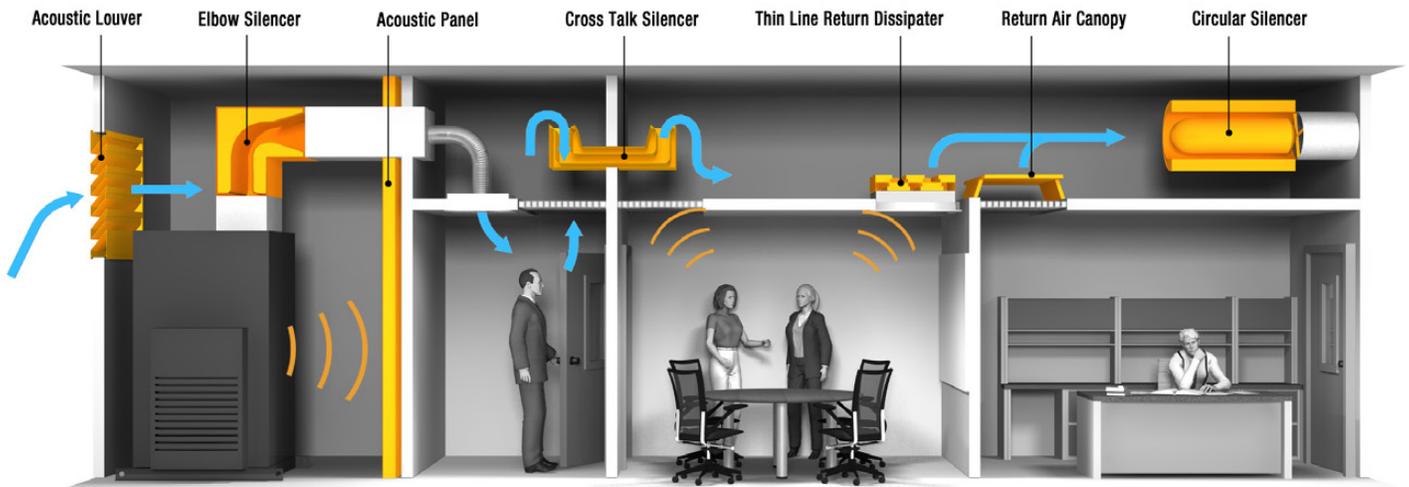


Figure 1: The Price Noise Control Solution

Background noise guidelines are provided in **Table 1:**

Table 1: Background Noise Guidelines

Room/Space Type	Recommended NC Level
Concert Hall, Theater	NC-20 to 25
Teleconference rooms	NC-25 to 30
Residences, Patient rooms	NC-30
Conference/Meeting rooms	NC-30 to 35
Private office	NC-35
Open office	NC-40 to 45
Lobby, Pantry, Restroom, Corridor	NC-45
Kitchen, Laundry	NC-50

Speech privacy between two closed-plan spaces can be described using Speech Privacy Potential (SPP) and is the combination of background noise (NC) in the receiving space and acoustic separation (STC) of the total construction between the spaces:

$$SPP = NC + STC$$

This formula illustrates the compromise between maintaining a low background noise level (NC) and the noise isolation (STC) required to achieve acceptable speech privacy (SPP). For reference, typical conference rooms and private offices should have a minimum privacy (SPP) rating of 75.

MECHANICAL NOISE

Acoustic criteria for mechanical design focuses on achieving specific background noise levels within an occupied space. Mechanical noise is typically addressed by looking at three major paths:

- Supply/discharge
- Return/intake
- Radiated

Supply noise is probably the most commonly addressed path, since the airflow and noise are travelling in the same direction. In actuality, supply noise is often the least problematic because it is well recognized by the design community. Supply noise is typically addressed by using a combination of long ductwork runs, branches, elbows, and duct silencer components to reduce noise transmission.

A traditional rule of thumb for “safe” design often includes requiring a minimum of 15 - 20 ft of lined ductwork between relevant mechanical equipment and the diffusers in the occupied space. This simple rule is not always feasible or allowed in modern construction. Price offers rectangular, circular, and elbow silencers with various media types including absorptive (fiberglass), film lined (fiberglass with thin plastic liner), and packless (no acoustic media).

A variety of options within these larger parameters are also offered, such as high transmission loss (HTL) casing and tuned silencers that focus on specific frequencies to reduce tonal noise. Our Quiet Terminals (‘Q’ series) provide another supply noise control solution by combining



Quiet Terminal with Optional Return Attenuator

terminal units with 3 ft long silencers to ensure rated performance with no system effects. This engineered solution is AHRI certified and reduces both installation complexity and prevents performance mismatch.

Return noise is addressed similarly to supply noise, though the duct runs are often shorter or nonexistent and require silencers to make up the difference. Fan powered terminal unit intake noise is often not considered until the final stages of design when it is too late to simply relocate the boxes over less sound sensitive locations. Price Quiet Terminals can be provided with optional 3 ft and 5 ft lined attenuators to reduce the associated intake noise. Utilizing our Dissipative Silencers (TLRD) at return grilles as depicted in **Figure 1** is another method for reducing noise from common return plenums. Situations with noise transferring through un-ducted return openings can be addressed using our Cross Talk Silencers.



Custom Price Acoustic Enclosure at a mixed use luxury building in NYC

Finally, **radiated noise** is often not addressed because of a lack of communication and understanding among the design and construction trades involved on the job. Price Acoustic Panels (QLP) greatly reduce the transmission of noise from rooftop units, generators, and internal mechanical equipment. Additional noise attenuation is achieved by using our acoustic enclosures, which combine our Acoustic Panels with relevant silencers and/or Acoustic Louvers (QA, QAF) to meet airflow requirements. The ceiling applications described above can also apply for terminal unit radiated noise through open return grilles. Specifically, a Dissipative Silencer (TLRD-LP) provides more insertion loss than typical ceiling tile. Table 2 lists insertion loss for both the Price Dissipative Silencer (TLRD-LP) and general ceiling tile (ASHRAE).

Table 2: Insertion Loss Comparison

Assembly	Insertion Loss, dB						
	63	125	250	500	1000	2000	4000
TLRD-LP	2	3	4	8	14	18	16
Ceiling Tile	1	2	4	8	9	9	14

SUMMARY

Solutions to most “noise problems” typically require the holistic evaluation of multiple paths with each requiring individual attention. By properly addressing all noise sources, offices are more productive, conference room meetings are more effective, and hospital patients are more comfortable. All of the design criteria described above may not be directly relevant for every job, but each should be considered. Doing so will not only improve the end result, but also provide more opportunity for involvement throughout the building process. Most importantly, clients will be confident that all of their noise control concerns, not just the “usual suspects”, are addressed prior to construction.

In addition to offering the widest selection of noise control products in the industry, Price provides acoustical analysis services to ensure that desired project goals and design criteria are satisfied.

For more information on our Noise Control Products, please contact us at NoiseControl@priceindustries.com or visit us online at pricenoisecontrol.com.