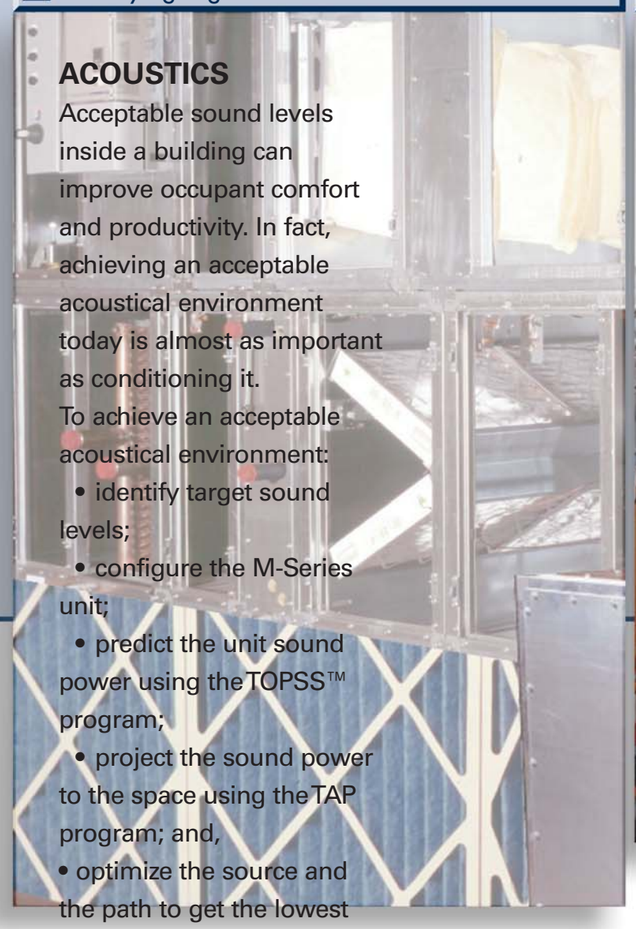
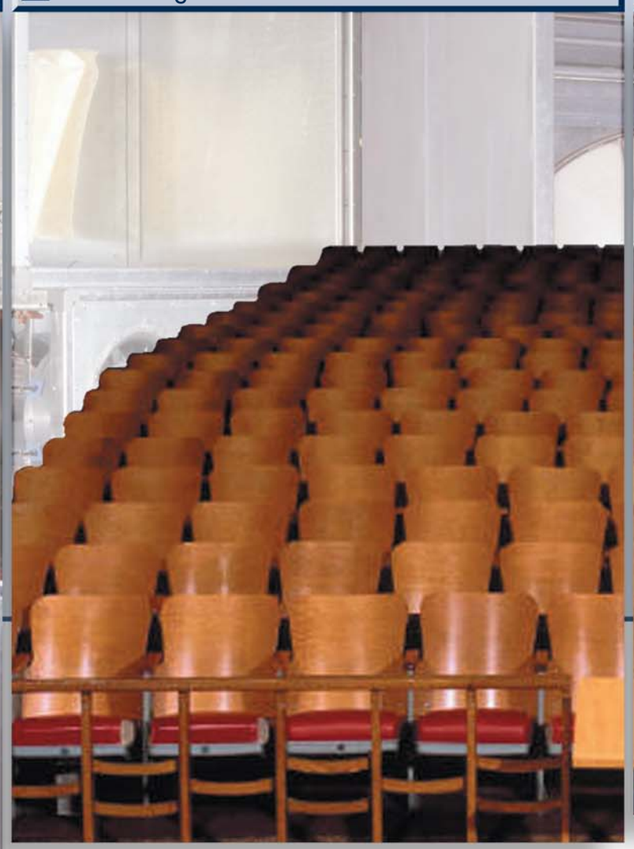
M-Series Climate Changer™ Air Handler

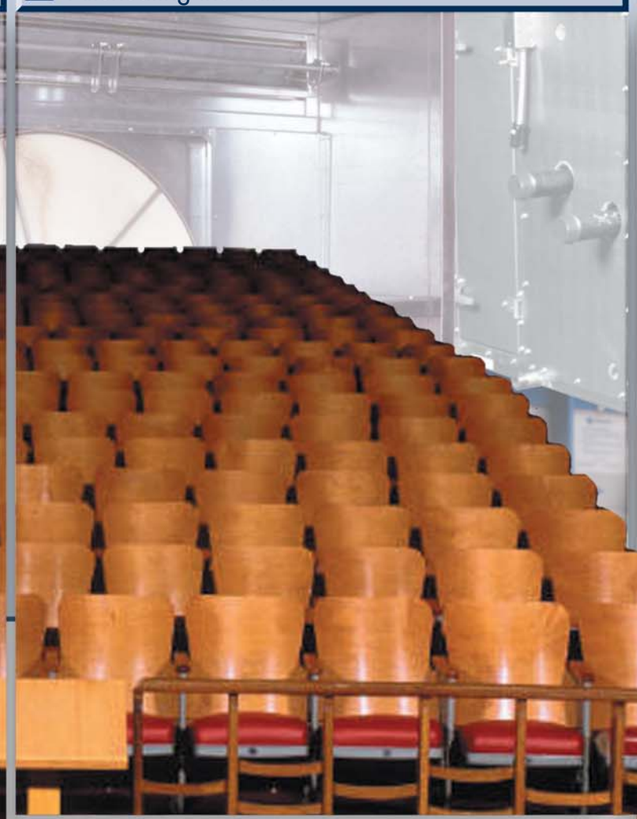
Literature Order Number	CLCH-SLP019-EN
Date	January 2003
Supersedes	New
Stocking Location	Inland – La Crosse

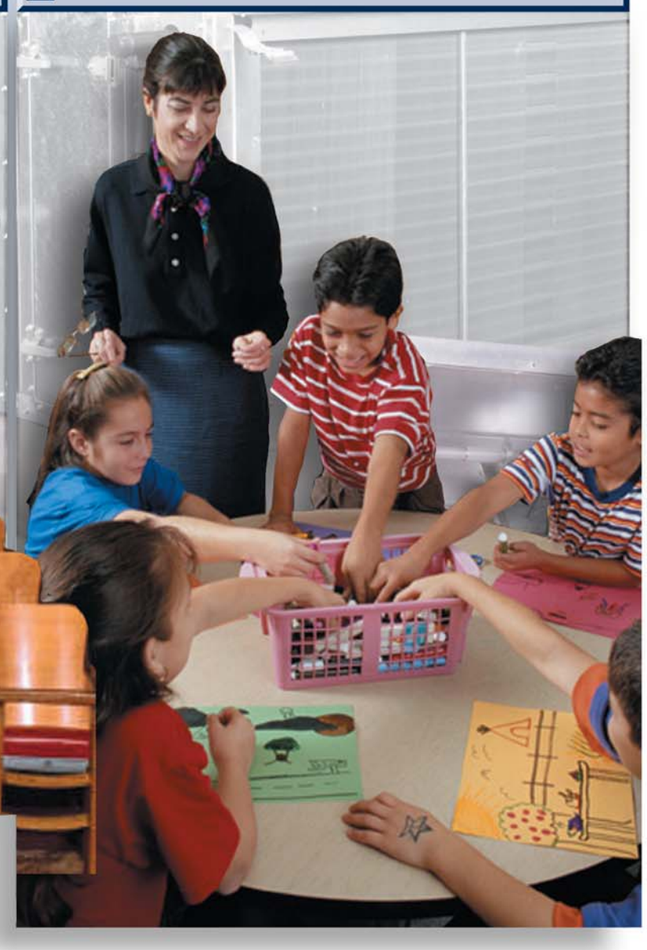
Trane
A business of American Standard Companies
www.trane.com

For more information, contact your local Trane office or e-mail us at comfort@trane.com









ACOUSTICS

Acceptable sound levels inside a building can improve occupant comfort and productivity. In fact, achieving an acceptable acoustical environment today is almost as important as conditioning it.

To achieve an acceptable acoustical environment:

- identify target sound levels;
- configure the M-Series unit;
- predict the unit sound power using the TOPSS™ program;
- project the sound power to the space using the TAP program; and,
- optimize the source and the path to get the lowest cost system that meets the acoustical requirements.

For acoustically sensitive applications, Trane strongly recommends that you work with your local Trane sales representative to find the most cost-effective solution that meets your job requirements.

TRANE®

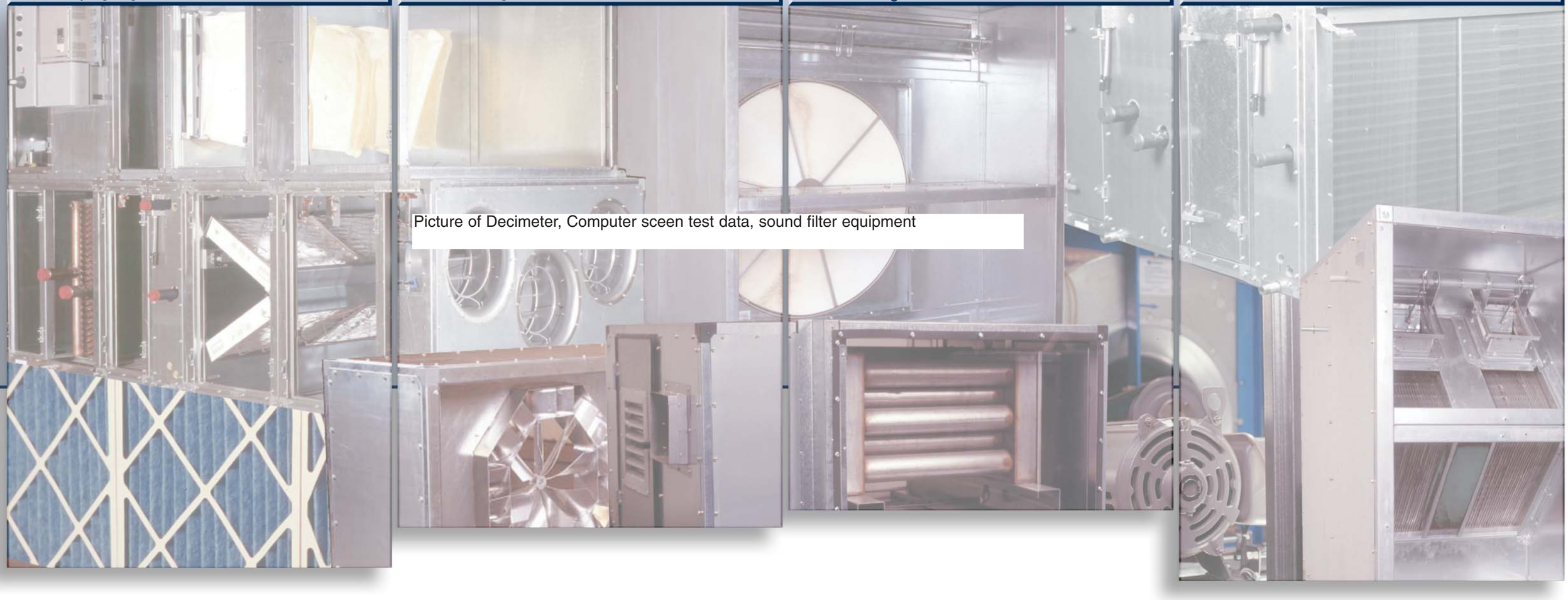
Identifying Taget Sound Levels

Identifying Target Sound Levels
The acoustical goal of an air-handling system is to create a space that is not too noisy, yet not too quiet. As building occupants have become more knowledgeable in recent years concerning desired space sound levels, specifications have become more detailed with regard to sound-level requirements. In fact, standards from ASHRAE, the Acoustical Society of America (ASA), and the American National Standards Institute (ANSI), as well as some local and state codes, have set forth minimum sound levels.

Quiet is relative. The key to any acoustically successful project, is to determine the required sound levels and then to clearly quantify them in specifications.

When identifying target sound levels for a project, it is important to understand that these levels are directly affected by the activities in the space. For example, a teacher standing in the front of a classroom will have a certain sound projection level. If the sound entering the classroom from the HVAC system is just 3 dB below the teacher's voice, a student seated in the back row will only hear a portion of what the teacher says. However, if the background sound is 15 dB below the teacher's voice, the student will hear every word the teacher says.

Identifying Taget Sound Levels | Attenuating the Source | Attenuating the Path | Noise-Reduction Ideas



Attenuating the Source

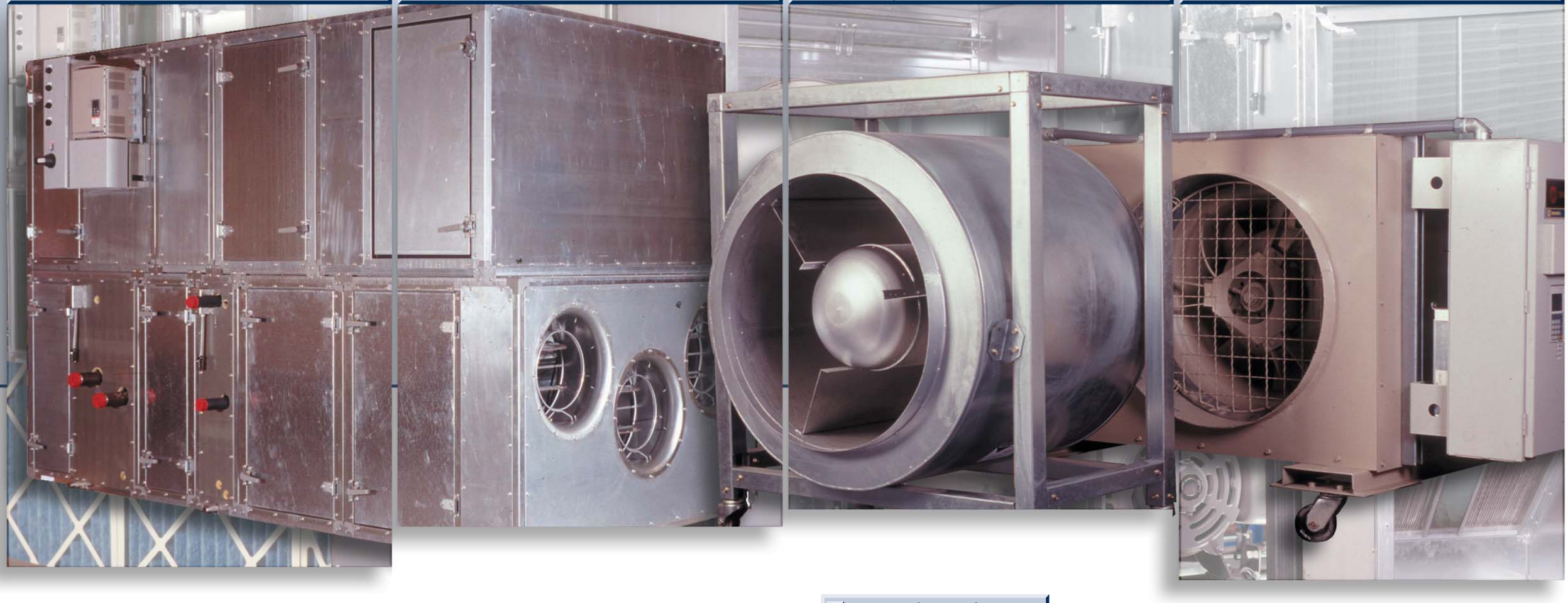
The key to a quiet design is to know which air-handler options and layouts have a sound source that achieves the target sound level when reduced by path attenuation. To succeed, the designer must start with accurate, tested sound data. Trane has the most complete sound-power data in the industry.

Obviously, a quieter sound source requires less attenuation in the sound path. Using a quieter fan or additional source attenuation increases the initial cost of the air handler; however, this cost is generally offset by path-reduction cost savings.

Traditionally, ASHRAE algorithms have been used to predict the sound-power levels of air-handling units. Although this method is easy to do, it can be inaccurate. It can produce results that deviate from tested data by as much as 15 dB. For more accurate sound data, ARI has established Standard 260, which is a method of rating sound data for ducted air-handling equipment. It is intended to be a guide for the industry, including HVAC manufacturers, engineers, installers, contractors, and consumers. ARI Standard 260:

- strengthens testing and calibration procedures;
- provides repeatable results;
- uses a reverberant-room approach, a mapped sound-rating concept, and reference sound-source calibration;
- is application driven; and,
- includes ducted outlet, ducted inlet, and casing, or radiated, test configurations.

It is important to note that sound data for the M-Series Climate Changer™ air handler is taken per ARI Standard 260. M-Series sound power covers eight octave bands and is unweighted. The TOPSS™ program provides this ARI Standard 260-tested sound data.



Attenuating the Path

The path of sound as it travels from the source to the receiver impacts the final sound levels in the space. Sound paths can be described as airborne, breakout, or transmission. Airborne paths describe sound that travels through the air in the ductwork, either with or against the airflow. Breakout paths describe sound that travels through the duct wall. Transmission paths describe sound that travels through the building structure, such as the casing radiated sound of an air handler.

To effectively predict sound levels in a space, a sound-path-receiver model must be developed for all possible sound paths from the source to the receiver. These paths can be modeled using sound path modeling programs like the Trane Acoustics Program. The flexibility of such programs enables the designer to model the effects of different types of path attenuation.

Noise-Reduction Ideas

Noise-Reduction Ideas	**Suggestions**
Overall unit sound power (Lw)	• In VAV systems, use variable-frequency drives for fan modulation. • Change fan types. Vaneaxial fans generally have the lowest outlet and inlet sound of all fan types. • Increase the fan size. • Use a central exhaust fan rather than a return fan.
Discharge sound power	• Use discharge plenums. • Use rectangular or round outlet silencers. • Use perforated walls. • Use multiple-discharge plenum outlet ducts. • Use discharge plenums with side openings.
Inlet sound power	• Use a large inlet plenum. • Use rectangular or round inlet silencers. • Stack the inlet modules.
Casing (radiated) sound power	• Increase the gauge thickness of discharge-module casings.