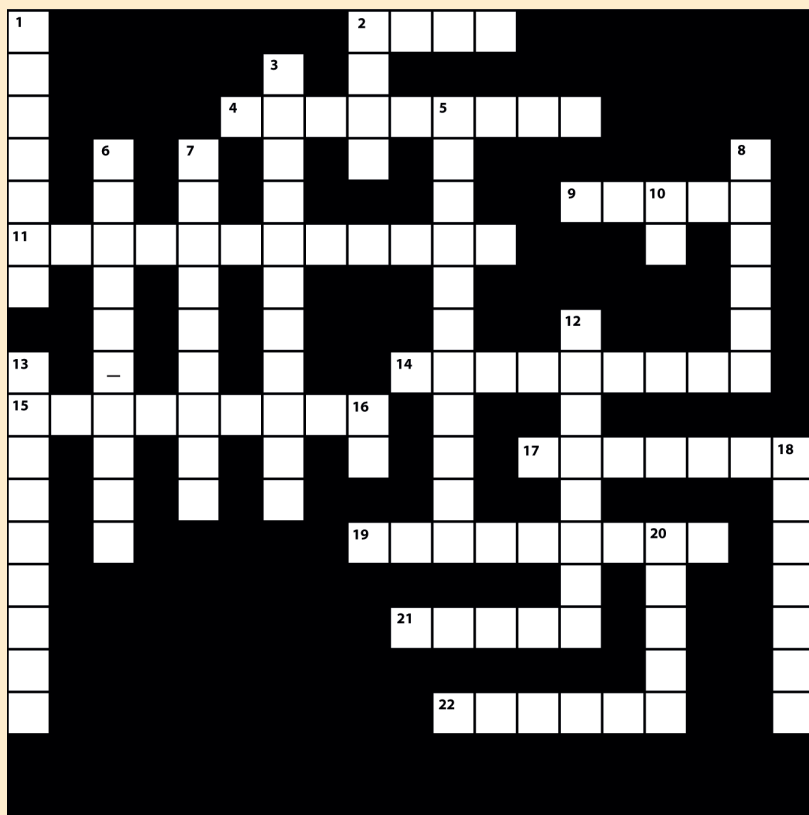




# Take the HVAC CHALLENGE™

BY STEVEN G. LIESCHEIDT, P.E., CSI-CCS, CCPR

## Sound and Vibration Control



### ACROSS

- This organization publishes S3.18 – Guide for the Evaluation of Human Exposure to Whole Body Vibration.
- This type of damper is typically located immediately downstream of the supply fan and is used to reduce airflow and increase pressure drop across the fan, while the fan speed remains constant.
- A stalling fan can indicate operation in this region of the fan curve.
- This loss is the ratio of sound power incident on a partition to the sound power transmitted through a partition.
- This loss in a duct silencer is the reduction in the sound power level at the receiver after the silencer is installed in the system.
- This type of joint has one or more convolutions and can accommodate all modes of axial, lateral, and angular movement and misalignment for isolation of vibration.
- In general, for a given design, fan sound is at a minimum near this point of efficiency.
- This type of transmission of sound is through the supply air duct and consists of two components – sound transmitted from the air

handler through the supply air duct to the occupied areas and sound transmitted via duct breakout through a section of the supply air duct to occupied areas.

- Grilles, registers, diffusers, air valves, fan-powered boxes, and fancoil units are example of this type of sound source in an HVAC system.
- This organization publishes Standard 68 – *Laboratory Method of Testing to Determine the Sound Power in a Duct.*

### DOWN

- This factor of background noise takes into account whether the noise is perceived as a rumble, roar, hiss, or tone, which may result in complaints of annoyance and stress.
- This organization publishes \_\_\_\_\_ 300 – *Reverberant Room Method for Sound Testing of Fans.*
- This type of silencer uses sound-absorptive media such as fiberglass as the primary means of attenuating sound.
- This type of sound is generated when airflow turbulence occurs at duct elements

- such as duct fittings, dampers, air modulation units, sound attenuators, and room air devices.
- This frequency is represented by the number of times per second that a fan impeller passes a stationary item.
- These problems occur when the operating speed of the equipment is the same as or close to this frequency of the equipment component, the vibration isolation system, or other building component.
- Adequate noise and vibration control in an HVAC system is best achieved during this phase of a project.
- This method for rating noise is a family of criterion curves and a rating procedure that assesses background noise in spaces both on the basis of its effect on speech and on subjective sound quality.
- This is sound associated with fan or airflow noise inside a duct that radiates through duct walls into the surrounding area.
- If this factor of the background noise loudness relative to that of normal activities is clearly noticeable, then the noise is likely to be distracting and cause complaints.
- This method for rating noise is a single number rating that is somewhat sensitive to the relative loudness and speech interference properties of a give noise spectrum.
- The octave \_\_\_\_\_ frequencies are the frequencies that designate a range of octave bands.
- These problems are more complex than vibration problems and usually require the services of an acoustical engineer or consultant.

To brush up on the facts behind this month's clues, refer to Chapter 47 ("Sound and Vibration Control") in the 2003 ASHRAE Handbook — Applications.

Liescheidt is owner of SPPEC-SS Consulting, LLC in St. Louis. E-mail him at [sppccss@sbc-global.net](mailto:sppccss@sbc-global.net).



## Solution to June's HVAC Challenge™

