

TECH TALK

TT-06

July 2004



Noise Criteria (NC) – Part 1

by Dave Fetters

The selection of grilles, registers, or diffusers (GRDs) can sometimes be influenced by noise generated by airflow passing through the device. Many applications require a quiet environment where the designer wants to limit, or not add to, the background noise level by carefully choosing the air delivery product.

Movie and recording studios, sound stages, libraries, concert halls, executive boardrooms, and churches all require attention to the *noise criteria* (abbreviated as NC) for GRDs. NC is a single-number designation that gives us a comparable reference of how loud a register will be at a certain CFM delivery. Usually, a single NC number is assigned to a particular style and size of a register at a fixed airflow rate. Any change in the size or style of GRD, as well as to the airflow rate, will affect the NC rating. The NC number is a simplified approach to acoustics—the study of sound. The terminology and

technology used to measure sound is cumbersome for those of us who don't work with it on a regular basis. Therefore, NC was conceived to provide uncomplicated information to meet acoustic design goals without having to resort to sound consultants. It is not, however, a perfect number for giving us a total picture of the acoustic environment. For instance, NC does not tell us anything about the frequency at which the "loudest" sound occurred. Except for rooms where sound intensity and sound quality are critical to the occupancy, NC is adequate for the majority of HVAC work.

The velocity of the air passing through the various styles of faces influences sound levels attributed to GRDs. Additional influence on potential sound is determined by whether dampers are installed or not, the damper settings, the blade deflection settings, and GRD

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location. But the biggest influence is the air velocity. As velocity increases, the noise criteria will likely increase at a faster rate. Doubling the velocity can more than double the NC rating.

Sometimes, system noise is unfairly blamed on the register. System noise of rumble, hiss, whistle, whine, and vibration are generated by pumps, fans, compressors, combustion, motors, and turbulent airflow in poorly designed ductwork, and this noise is conducted by ductwork and/or radiated from the system. A quick check of whether the register is contributing to the overall noise spectrum can be made by removing it from its mounting location while the system is operating and comparing the sound levels.

Many of Hart & Cooley's GRDs have NC ratings in the engineering data tables. For those products that do not have NC, there is a table in our catalog and on our web site of recommended maximum velocities that should be considered to ensure low noise based on occupancies.

Next month we will continue with Part II of this discussion.



Hart & Cooley, Inc. 800.433.6341 *toll-free*
500 East Eighth Street 616.392.7855 *phone*
Holland, MI 49423 800.223.8461 *toll-free fax*
info@hartcool.com 616.392.7971 *fax*
www.hartandcooley.com