

# *Sound Advice*

Helpful Information from *Stewart Acoustical Consultants*

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## **INFORMATION NEEDED TO EVALUATE NOISE OF HVAC SYSTEMS**

by Noral D. Stewart

The noise in HVAC systems comes primarily from the main fans, flow of air through the system, VAV boxes, and flow through diffusers. Both the noise coming out the diffusers and that leaking through ceilings from ducts and components above must be considered. Sometimes there are problems with turbulence causing duct vibration, or improper vibration isolation of fans or other equipment.

The following is a list of most of the information needed to evaluate a HVAC system.

### Main Air Handlers

1. The sound power radiated from the inlet and discharge. This should be over the range of expected operating conditions for variable volume systems if available. If the supplier is not controlled, data should be obtained from all acceptable suppliers.
2. The total cfm of the fans and method of modulating flow of variable volume systems.
3. Sound power data will not be available for some smaller systems. In this case, there is more risk in estimating the noise. We then need the cfm, static pressure, horsepower, peak static efficiency, ideally the complete fan curve, fan type, wheel diameter, number of blades, and a sketch of the total air handler housing.
4. Vibration isolation plans, especially important if near critical areas or not on grade.

### Duct Plans

The following information must be on drawings or provided otherwise.

1. Plans for all ducts from which length and cfm in each section can be determined.
2. Cross-sectional dimensions of each duct section and dimensions of any plenums. Where lining is used, clearly indicate if dimensions are sheet metal or clear inside area.
3. Location and thickness of any duct liner, and locations of any external thermal insulation.
4. Location, model number and size for silencers. (We may need manufacturer's data sheets with insertion loss and self-noise in some cases if we do not have them.)
5. Details of any external lagging treatments used to control breakout.

### VAV Components and Mixing Boxes

1. Manufacturer data sheets showing both discharge and radiated sound power for various operating conditions.
2. Operating cfm and static pressure needed to determine sound power from data sheets.
3. The performance of any silencers used with these devices.

### Diffusers

The manufacturer's data sheets should show NC ratings as a function of cfm, and clearly indicate the "room factor" used to obtain the NC rating from sound power.