

December 2002

**RECOMMENDATION
concerning
PRESENTATION OF ACOUSTICAL DATA
OF
FAN COIL UNITS**

It is now well understood that only the sound power level correctly represents the sound radiated by a fan coil unit. Nevertheless there is still confusion between sound power and sound pressure and the comparison between products is not always obvious. The purpose of this Recommendation is to explain clearly the relation between these quantities and to suggest the uniform presentation of acoustical data.

EUROVENT/CECOMAF

EUROPEAN COMMITTEE OF

**AIR HANDLING, AIR CONDITIONING AND REFRIGERATION
EQUIPMENT MANUFACTURERS**

1 - SOUND POWER LEVEL

The sound power level radiated by a sound source to the environment is the unique characteristic of the source as its value is independent of environment. The power is normally given in Watts but due to large variation of sound power of usual sources, a logarithmic scale has been used and sound power levels are expressed in decibels (dB).

2 - SOUND PRESSURE LEVEL

The sound pressure is the measure of intensity of sound in a given point of space. This is the characteristic interesting for people exposed to a noise. The sound pressure depends on many parameters: sound power of the source and its directivity, distance from the source, environment (hard walls or not, absorbent surfaces). The sound pressure level also expressed in dB may be calculated from the sound power level only if all relevant parameters are known.

3 - FREQUENCY

The sensitivity of our ears depends of the frequency of sound. In order to simplify the presentation, a limited number of frequency bands have been introduced: octave and third octave are currently used.

4 - WEIGHTING

In order to take into account the physiological sensibility to the sound, various weighting systems have been introduced. As our impression of sound intensity is very complex, the simple systems are usually not sufficient and more complicated presentation are used. The following are the most known:

- dB A level: as our sensitivity to sound is lower for low frequency a simple electronic filters allows to measure directly the sound approximately as heard by us. The same system is used even for sound power levels although in principle it is not applicable. The dBA are frequently used in outdoor applications where the compliance with community noise regulations is considered. However, it has also some application for indoor application where specifying limits are used.
- NC criteria, expressed as a rating number, such as NC-35 are most frequently used for rating the air conditioning noise in indoor applications.
- RC criteria, expressed as a rating number plus a subjective quality descriptor such as RC 35 (N). In this case the subjective quality of sound and not just the level are taken into account.

5 – DETERMINATION OF SOUND POWER LEVEL

The experimental determination of sound power level is carried out following the well-established international test standards. For fan coil units the most appropriate is the reverberation room method used by Eurovent Certification. The only shortcoming of this method is lack of information on directivity.

6 – DETERMINATION OF SOUND PRESSURE LEVEL

From known sound power level if environmental parameters are also well defined it is possible to calculate at any point of space the sound pressure level and compliance with various criteria: dBA, NC, NR. Therefore the specifier needs to know only the sound power level of the fan coil unit given by octave or third octave bands.

7 – PRESENTATION IN CATALOGUES

The catalogue must present the sound power level for each fan speed at least per octave band. A-weighted sound power level, being certified by Eurovent should be indicated. Presentation of sound pressure, A-weighted sound pressure, NC criteria or NR criteria could be added but the exact conditions of installation and environment must be described. Given for some typical environment these values may help the customer to have some idea of the noise level produced by the fan coil unit, but the comparison between different products can be made only on the basis of the sound power level.

The following table gives the recommended presentation of sound characteristics of a fan coil unit.

Model	Fan Speed	Sound Power Level Lw (dB)							LwA dBA
		Octave band centre frequency in Hz							
		125	250	500	1000	2000	4000	8000	
ABC Cooling Capacity	1	32	36	37	31	20	15	13	36
	2	40	44	45	42	34	23	16	46
2.40 kW	3	44	48	49	47	41	32	23	50

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