



Sound specifications

Introduction

In the technical design of Air Coolers and condensers, capacity and sound output are defined parameters that must be specified. With regard to sound output specifications in the international market there are a variety of calculation methods. Different sound output specifications have significance for refrigeration contractors, designers and planners. For heat exchangers and condensers, compliance with specific immission values (e.g. noise level, workplace safety legislation, etc.), is best calculated using sound power use in the form of acoustic pressure $L_p(A)$. However, for Air Coolers, information regarding sound power $L_{W(A)}$ is most suitable.

Acoustic pressure L_p

Pressure = force / surface [N/m²]
 Alternating pressure generated by acoustic oscillation in the medium (e.g. air)

- **Advantage:**
 Measurement can be directly determined
 Thermal analogy: temperature measurement
- **Disadvantages:**
 Dependent on environmental influences such as:
 installation location, environment
 Dependent on distance to the sound source and
 reference surface used

Acoustic power L_w

is the sound energy radiated per time unit in [W] = [Nm/s]

- **Advantages:**
 Independent of environmental influences,
 of distance to the sound source or on the
 reference surface used
- **Disadvantage:**
 Cannot be measured directly

Sound intensity and A-evaluation

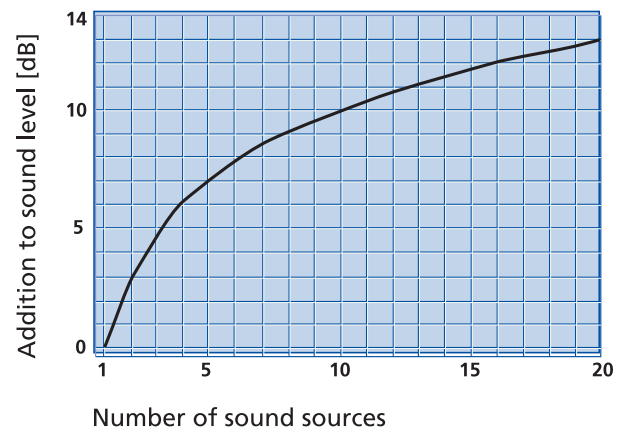
The human ear can perceive sound at frequencies between approx. 15 and 20,000 Hertz. Perception, or sensitivity to sound, depends strongly on the respective frequency. Very high and low tones are less often experienced as less loud than those in the mid-frequency range from about 1000 to 5000 Hertz. For this reason, evaluation filters in accordance with EN 61 672-1 are used. In audio technology and the environmental sector, the A-evaluation is most significant because it has similar frequency behaviour as the human ear for certain sound intensities.

Sound output specifications for Air Coolers

Due to the reflection in the cold storage area, the sound power $L_{W(A)}$ should always be used for a technical comparison between Air Coolers. In this case only sound power offers information that can be compared because it does not depend on the distance to the sound source, the installation location or the surroundings.

Sound power

Addition of sound sources at the same level



Correction of sound level by change of fan speed

