

## Background

### Why sound pressure has been removed

The first measure of sound to be universally accepted, sound pressure level in recent years has been deemphasized, as sound power level has increased in importance, because of its advantages over sound pressure level. Sound power, a description of product noise emission, allows direct determination of room noise unlike sound pressure level, which describes receiver immission and depends on location relative to the product. Elimination of sound pressure level increases clarity by preventing possible confusion between sound power level and sound pressure level and by preventing confusion of bystander and operator sound pressure levels, which are measured at different locations relative to the product.

### GUIDANCE TO MANUFACTURERS

Companies wishing to continue to report sound pressure level may do so using section P15 “Additional Information”, provided that it is measured and reported at the locations prescribed by Table C.1 in Annex C of ECMA-74. Reporting emission sound pressure level at other positions is not allowed because it creates distortion in the marketplace.

### Entering acoustic noise emission data into the ECMA-370 THE ECO DECLARATION

Following [ECMA-109](#) and [ISO/DIS 9296](#), enter into P10.1 the mean A-weighted sound power level  $L_{WA,m}$  and the statistical adder  $K_v$ . The sum of  $L_{WA,m}$  and  $K_v$  form the statistical upper limit A-weighted sound power level  $L_{WA,c}$  formerly termed  $L_{WAd}$ , and roughly 0,3 B higher than  $L_{WA,m}$ <sup>1</sup>. Check the boxes corresponding to the standards followed during noise measurements, as applicable. If appropriate, enter the name of the voluntary program whose criteria the product meets in 10.2, and check the appropriate assessment (“yes”, “no”, or “not applicable”).

**Large scale equipment:** Certain equipment like paper machines and large scale imaging equipment are so large as to make sound power measurement difficult. For such equipment and equipment within the scope of the EU Machinery Directive ([2006/42/EC](#)) “n/a” shall be entered for the sound power related quantities  $L_{WA,m}$  and  $K_v$ , and acoustical noise shall be measured and reported in section P15 “Additional Information” according to the following standards:

- [EN 13023](#) Noise measurement methods for printing, paper converting, paper making machines and auxiliary equipment – Accuracy grades 2 and 3, and
- [EN ISO 11204](#), ISO 11204 Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections)

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<sup>1</sup> The value of  $L_{WA,c}$  in this edition of ECMA-370 (and the latest ECMA-109, and ISO/DIS 9296) is the same as the value of  $L_{WAd}$  in the previous versions of ECMA-370, ECMA-109 and in ISO 9296:1988.

**GUIDANCE TO CUSTOMERS****Understanding the acoustic noise data**

Understanding the acoustic noise data requires some appreciation of acoustic noise emission, immission and perception. Sound power level is a descriptor of product noise emission. Most eco-criteria assess product noise emission against sound power criteria. Here are examples of typical sound power level:

- 3,0 B : soft whisper
- 3,5 – 4,0 B : quiet notebook computer
- 7,0 B : normal conversation
- 10,0 B : automobile on highway

A one bel increment corresponds to a ten-fold increase in sound power level, because the bel is logarithmic. Many find the logarithmic bel to be unintuitive, especially when combining sources, for example:

- Two identical sources generate combined sound power 0,3 B higher than each individual source.
- Ten identical sources generate combined sound power 1,0 B higher than each individual source.

Perception differs from immission, which generally scales with emission. In other words, sound pressure level (immission) generally increases with sound power level (emission). Perception of immission sound pressure level differences is as follows:

- 0,1 B (1 dB) difference is barely noticeable
- 0,3 B (3 dB) difference is noticeable
- 1,0 B (10 dB) difference is very noticeable, corresponding to a doubling (or halving) of loudness

The prospective customer will find it useful to keep these perceptual graduations in mind when comparing acoustic performance of [candidate](#) products. Also important is to make sure that the comparison involves consistent noise emission metrics and equipment operating conditions. This means that a customer wanting to compare products regarding their acoustic noise performance, must ensure that the assessed products have the same capacity / performance.

Finally, the prospective customer must remember that acoustic immission, expressed in terms of sound pressure level, is experienced by and relevant to the worker. The employer has the responsibility of providing an environment with appropriate acoustic immission to the employee. Immission depends on emission of and distance from the various sources, ambient noise, and room acoustic properties; see [ECMA TR/27](#) or [ISO 11690-3](#) for guidance.

Acoustical noise immission must meet regulatory and possibly also more demanding comfort requirements. The EU frame Directive [89/391/EEC](#) requires employers to provide a workplace with 8-hour equivalent average sound pressure level  $L_{pAeq8}$  at 85 dB or lower; hearing protectors must be worn at higher  $L_{pAeq8}$  levels ([2003/10/EC](#)). National regulations like the German accident protection regulation [BGV B3](#) require lower  $L_{pAeq8}$  values: 55 dB for predominant mental work, 70 dB for predominant office work, and 85 dB for all other activities. In almost all situations, comfort requirements are more demanding than regulatory requirements.

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