

# CHANGES IN NORWEGIAN SOUND QUALITY CLASSIFICATION STANDARD

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## 1. INTRODUCTION

Norwegian standard for sound classification NS 8175 is closely connected to technical regulations for buildings, and it was revised in 2005 and 2008.

A national guideline T-1442 for area planning was published for outdoor noise in 2004, resulting in new limits. Handling of measurement uncertainty in standards is confusing when comparing the results with limits.

## 2. CHANGES IN THE STANDARD

In the last years, accessibility in buildings for disabled people has been in public focus and is also required by the technical regulations.

Public responses on the contents of the standards were collected and discussed. Several kinds of noise or sound insulation problems and practical solutions were considered.

Limit values for reverberation time in kindergartens, day-care facilities for school-children and first-year classrooms, specified according to sound quality class, are shown. The acoustic conditions in open plan teaching environments for people with visual and hearing impairments shall meet internationally recommended guidelines.

The changes in building traditions have raised new noise problems and uncertainty of sound insulation, e.g. insulations requirements for the outer walls between dwellings and open air porticos/external stairs.

Most of the Nordic countries have introduced some additional criteria for measurement of impact sound levels between rooms that have great difference in size. There seems to be no obvious reasons to make different solutions for such measurements.

Authorities have implemented a new recommendation on noise management in land-use planning T-1442. New limit values are given as  $L_{den}$  and as statistical A-weighted maximum sound levels  $L_{p,AFmax,95}$ . The indoor levels are given as  $L_{p,AeqT}$ -values. Measures were needed for sound classification and noise measurement methods to verify these limits.

Uncertainty in measurement results is determined and reported in standards. How the uncertainty is handled in regulations and guidelines is considered as an authority matter.

In case no instructions or criteria are given, the sound classification standard NS 8175 specifies that the measurement result (given as expected value) is compared with the limits. As an example, the measurement result for A-weighted equivalent continuous sound pressure level may be given for low number of measurements as follows:

$$L_{eq,x} = \overline{L_{p,Aeq,T_n}} + \frac{\ln(10)}{20} \sigma^2 \text{ dB} \quad (1)$$

## 3. CONCLUSIONS

The sound classification of buildings and renewal of the limits is an ongoing process. The limits given in relation to the technical regulations have to be verifiable.

More knowledge on how to quantify the internal sound level limits for service equipment in the same dwelling is needed. Practical, harmonized measurement methods for external noise are missing.

The methods for determination of measurement uncertainty have become complicated. Qualified guidance and application of measurement uncertainty and use in legal criteria would be helpful.