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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

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43

ACOUSTICS

ASSESSMENT OF NOISE

WITH RESPECT TO COMMUNITY RESPONSE

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 1996, *Acoustics – Assessment of noise with respect to community response*, was drawn up by Technical Committee ISO/TC 43, *Acoustics*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question led to the adoption of Draft ISO Recommendation No. 1996, which was circulated to all the ISO Member Bodies for enquiry in May 1970. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	France	New Zealand
Austria	Germany	Norway
Belgium	Greece	South Africa, Rep. of
Canada	Hungary	Sweden
Czechoslovakia	Ireland	Switzerland
Denmark	Japan	U.A.R.
Finland	Netherlands	U.S.S.R.

The following Member Bodies opposed the approval of the Draft :

United Kingdom
U.S.A.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

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INTRODUCTION

The reduction, or limitation, of noise which causes annoyance is of increasing general importance. This ISO Recommendation suggests methods for measuring and rating noises in residential, industrial and traffic areas with respect to their interference with rest, working efficiency, social activities and tranquillity.

Besides noise there may be other factors in connection with sound production and radiation, for example mechanical vibrations, which also give rise to annoyance in particular situations and which make the assessment more complex. No general method exists at present to take account of these factors, but the application of numbers and corrections, other than those described, may be desirable in some cases.

The method described in this ISO Recommendation is considered suitable for predicting approximately the public reaction likely to be caused by noise, and may help authorities to set limits for noise levels.

Some problems related to aircraft noise are treated separately; see ISO Recommendation R 507*, *Procedure for describing aircraft noise around an airport*.

1. SCOPE

This ISO Recommendation is intended as a guide to the measurement of the acceptability of noise in communities. It specifies a method for the measurement of noise, the application of corrections to the measured levels (according to duration, spectrum character and peak factor), and a comparison of the corrected levels with a noise criterion which takes account of various environmental factors.

The method given for rating noises with respect to community response forms a basis on which limits for noises in various situations may be set by the competent authorities.

The method of rating involves the measurement of the A-weighted sound level in decibels (commonly called dB(A))**.

Where corrective measures are required, a frequency analysis may be necessary. The resulting data may be compared with noise rating curves, for instance the NR-curves, in order to identify the intrusive frequency bands. This more elaborate procedure is described in Appendix Y.

* 2nd edition, 1970.

** As defined in IEC Publication 123, *Recommendations for sound level meters*, or IEC Publication 179, *Precision sound level meters*.

2. NOISE MEASUREMENT

2.1 Measuring equipment

The measurements should be made with a sound level meter as specified in IEC Publication 123, *Recommendations for sound level meters*, or IEC Publication 179, *Precision sound level meters*. The A-weighting network and fast response should be used. The sound level should be measured at the place and time of the annoyance.

NOTE – Other measuring equipment including, for example, a level recorder or tape recorder, may be used if the overall performance conforms with the characteristics of a sound level meter with A-weighting network and with fast response.

2.2 Measurement conditions

- 2.2.1 Outdoor measurements should be made at 1.2 to 1.5 m above the ground and, if practical, at least 3.5 m from walls, buildings or other sound reflecting structures. When circumstances indicate, measurements may be made at greater heights and closer to the wall (for example 0.5 m in front of an open window), provided this is specified and taken into consideration.

NOTES

1. Care should be taken to avoid influence on the result from unwanted sound signals, for example noise from wind on the microphone of the measuring equipment, noise from electrical interference or noise from extraneous sources.
2. When the noise source is distant, the measured sound level may depend significantly on the climatic conditions. It is recommended that extreme conditions be avoided. If possible, a typical value and an indication of the range of variation should be obtained.

- 2.2.2 Indoor measurements should be made at a distance of at least 1 m from the walls, 1.2 to 1.5 m above the floor, and about 1.5 m from the window(s). In order to reduce disturbances from standing waves, the sound levels measured indoors should be averaged over ± 0.5 m about each of at least three positions. This is especially important when measuring low-frequency noise. The arithmetic average of the readings determines the value to be taken.

The measurements should generally be made with windows closed. If the room is regularly used with open windows, measurements should also be made under this condition.

If the noise is not steady, the level and duration of the noise must be determined; if necessary, records of the level may be made. The period of time in which the time history of the sound level is observed must be chosen according to the character of the variations of the noise. If possible, the period should cover more than one typical variation cycle.

3. DETERMINATION OF THE RATING SOUND LEVEL L_r

In many cases corrections to the measured sound level, L_A , are needed to obtain a better estimate of the community response to the noise. These corrections are dependent on the character of the noise with respect to peak factor, spectrum character, duration and fluctuation. The sum of L_A and possible corrections is termed the rating sound level, L_r , i.e. the sound level of a steady noise without impulsive character or pure tones which is assumed to cause the same community response as the measured noise.

3.1 The procedure is as follows :

- 3.1.1 Steady noise (such as rain noise) without impulsive character or audible tones is rated by the sound level L_A in dB(A), measured by means of the sound level meter.