



BSI Standards Publication

Acoustics — Determination of occupational noise exposure — Methodology

National foreword

This British Standard is the UK implementation of EN ISO 9612:2025. It is identical to ISO 9612:2025. It supersedes BS EN ISO 9612:2009, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EH/1/3, Residential and industrial noise.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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European foreword

This document (EN ISO 9612:2025) has been prepared by Technical Committee ISO/TC 43 "Acoustics" in collaboration with Technical Committee CEN/TC 211 "Acoustics" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2025, and conflicting national standards shall be withdrawn at the latest by December 2025.

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The text of ISO 9612:2025 has been approved by CEN as EN ISO 9612:2025 without any modification.

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 211, *Acoustics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 9612:2009), which has been technically revised.

The main changes are as follows:

- A reshaping of the guidance on measurement of L_{p,A,eqT_m} for the task-based strategy (9.3).
- A revision of the measurement plan for the job-based strategy (10.2).
- The addition of Homogeneous noise Exposure Groups (HEG) sampling requirements for the full-day measurement strategy and the addition of criteria to validate sampling (11.3).
- Some precisions and clarifications on the instrumentation section.
- Some additions to the test report section: number of peak events, $L_{EX,8h,95\%}$.
- The addition of C.7 in Annex C, which gives the formulae to calculate the measurement uncertainty when multiple nominal days are used. An Annex H is also introduced to clarify uncertainty of peak measurements.
- The introduction of a new Annex G.
- The introduction of a new Annex H.
- A full revision of the Excel calculation file attached to this document.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document provides a stepwise approach to the determination of occupational noise exposure from noise level measurements. The procedure contains the following major steps: work analysis, selection of measurement strategy, measurements, error handling and uncertainty evaluations, calculations, and presentation of results. This document specifies three different measurement strategies: task-based measurement; job-based measurement; and full-day measurement. This document gives guidance on selecting an appropriate measurement strategy for a particular work situation and purpose of investigation. This document also provides an informative spreadsheet to allow calculation of measurement results and uncertainties. ISO is not responsible for errors that shall arise or occur with the use of this spreadsheet.

This document recognizes the use of hand-held sound level meters as well as personal sound exposure meters. The methods specified optimize the effort required for obtaining a given accuracy.

Acoustics — Determination of occupational noise exposure — Methodology

1 Scope

This document specifies a method for measuring workers' exposure to noise in a working environment and calculating the noise exposure level. This document deals with A-weighted levels but is applicable also to C-weighted levels. Three different strategies for measurement are specified. The method is applicable for detailed noise exposure studies or epidemiological studies of hearing damage or other adverse effects.

The measuring process requires observation and analysis of the noise exposure conditions so that the quality of the measurements can be controlled. This document provides methods for estimating the uncertainty of the results.

This document is not intended for assessment of masking of oral communication or assessment of infrasound, ultrasound and non-auditory effects of noise. It does not apply to the measurement of the noise exposure of the ear when hearing protectors are worn.

Results of the measurements performed in accordance with this document can provide useful information when defining priorities for noise control measures.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1999, *Acoustics — Estimation of noise-induced hearing loss*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

IEC 60942, *Electroacoustics — Sound calibrators*

IEC 61252, *Electroacoustics — Specifications for personal sound exposure meters*

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

A-weighted equivalent continuous sound pressure level

$L_{p,A,eqT}$

ten times the logarithm to the base 10 of the ratio of the time average of the square of the A-weighted sound pressure, p_A , during a stated time interval of duration T (starting at t_1 and ending at t_2), to the square of a reference value, p_0 , expressed in decibels:

$$L_{p,A,eqT} = 10 \lg \left[\frac{\frac{1}{T} \int_{t_1}^{t_2} p_A^2(t) dt}{p_0^2} \right] \text{ dB}$$

where the reference sound pressure, p_0 , is 20 μPa

Note 1 to entry: Adapted from ISO/TR 25417:2007[9].

3.2

A-weighted noise exposure level normalized to an 8 h work day <daily noise exposure level>

$L_{EX,8h}$

daily noise exposure level, in decibels, given by the formula:

$$L_{EX,8h} = L_{p,A,eqT_e} + 10 \lg \left[\frac{T_e}{T_0} \right] \text{ dB}$$

where

L_{p,A,eqT_e} is the A-weighted equivalent continuous sound pressure level for T_e ;

T_e is the effective duration, in hours, of the working day;

T_0 is the reference duration, $T_0 = 8 \text{ h}$.

Note 1 to entry: If the effective duration of the working day, T_e , is equal to 8 h, then $L_{EX,8h}$ equals $L_{p,A,eq8h}$.

Note 2 to entry: If the average or normalized exposure over a number of days is desired, the following formula can be used:

$$\bar{L}_{EX,8h} = 10 \lg \left[\frac{1}{X} \sum_{x=1}^X 10^{0,1 \cdot L_{EX,8h,x}} \right] \text{ dB}$$

where $L_{EX,8h,x}$ is the daily noise exposure level for day x .

The value of X is chosen according to the purpose of the averaging process. For example, $X = 5$ leads to a daily noise exposure level normalized to a nominal week of five 8 h working days.

Note 3 to entry: This definition differs from that given in ISO/TR 25417:2007[9].

3.3

nominal day

working day over which it is chosen to determine the noise exposure

Note 1 to entry: The nominal day is determined from the work analysis and depends on the purpose of the measurements. See also 7.3.

Note 2 to entry: The noise exposure level is normally calculated on a daily basis, but there can be circumstances where the use of weekly or longer noise exposure periods is considered appropriate.

Note 3 to entry: The nominal day can be a synthesized working day that includes fragments of different real working days of a week or of several consecutive weeks.

3.4**C-weighted peak sound pressure level** $L_{p,Cpeak}$

ten times the logarithm to the base 10 of the ratio of the square of the C-weighted peak sound pressure, p_{Cpeak} , to the square of a reference value, p_0 , expressed in decibels

$$L_{p,Cpeak} = 10 \lg \frac{p_{Cpeak}^2}{p_0^2} \text{ dB}$$

where the reference sound pressure, p_0 is 20 µPa

3.5**task**

distinct part of a worker's occupational activity

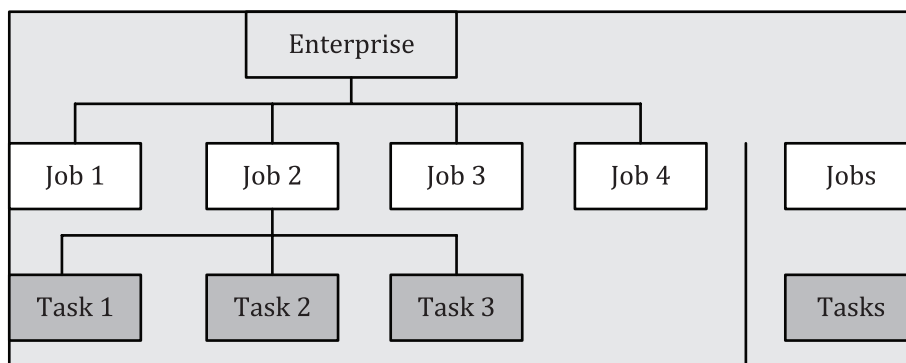
Note 1 to entry: [Figure 1](#) illustrates the hierarchy of jobs and tasks.

3.6**job**

overall occupational activity that is carried out by a worker, consisting of all the tasks performed by the worker during the entire working day or shift

Note 1 to entry: A worker often has a job title that describes his or her job, sometimes complemented with an additional description to ensure clear identification, e.g. "welder - process line A".

Note 2 to entry: [Figure 1](#) illustrates the hierarchy of jobs and tasks.

**Key**

Job 1 scaffolders
 Job 2 welders
 Job 3 painters
 Job 4 store keepers

Task 1 planning
 Task 2 grinding
 Task 3 welding

Figure 1 — An example illustrating the hierarchy of jobs and tasks

4 Symbols

Symbol	Description	Unit
c_i	sensitivity coefficient related to each input quantity	
c_1	sensitivity coefficient associated with job noise level sampling	
$c_{1a,m}$	sensitivity coefficient associated with noise level sampling of task m	
$c_{1b,m}$	sensitivity coefficient associated with estimation of duration of task m	
c_2	sensitivity coefficient associated with measurement instrumentation	

Symbol	Description	Unit
c_3	sensitivity coefficient associated with microphone position	
i	task sample number	
I	total number of task samples	
j	number of observations of task duration	
J	total number of observations of task duration	
k	coverage factor related to a confidence interval	
K_N	denominator as given in C.3.3, Note 2	
$L_{EX,8h}$	A-weighted noise exposure level normalized to a nominal 8 h working day	dB
$\bar{L}_{EX,8h}$	A-weighted noise exposure level normalized to a nominal 8 h working day averaged over a number of days	dB
$L_{EX,8h,95\%}$	A-weighted noise exposure level including its associated uncertainty - 95 % level of confidence NOTE Statistically, assuming a normal distribution of the noise exposure measurements, for 95 % of the samplings the noise exposure will be equal to or below this level	dB
$L_{EX,8h,m}$	A-weighted noise exposure level of task m contributing to the daily noise exposure level	dB
$L_{p,A,eqT}$	A-weighted equivalent continuous sound pressure level over a period T	dB
L_{p,A,eqT_m}	A-weighted equivalent continuous sound pressure level for task m	dB
$L_{p,A,eqT_m,i}$	A-weighted equivalent continuous sound pressure level of sample i for task m	dB
L_{p,A,eqT_n}	A-weighted equivalent continuous sound pressure level of job sample n	dB
L_{p,A,eqT_e}	A-weighted equivalent continuous sound pressure level for the effective duration of the working day	dB
$L_{p,Cpeak}$	C-weighted peak sound pressure level	dB
m	task number	
M	total number of tasks	
n	Job/day sample numbers	
N	total number of job/day samples	
n_G	number of workers in a homogeneous noise exposure group	
p_0	reference sound pressure; $p_0 = 2 \times 10^{-5}$ Pa	Pa
p_A	A-weighted sound pressure	Pa
p_{Cpeak}	C-weighted peak sound pressure	Pa
Q_2	correction for measurement instrumentation	dB
Q_3	correction for microphone position	dB
T	time period over which an average is taken	h
T_0	reference duration; $T_0 = 8$ h	h
T_e	effective duration of the working day	h
T_m	duration of task m	h
$T_{m,j}$	duration of sample j of task m	h
T_n	duration of sample n (job or full-day approaches)	h
U	expanded uncertainty	dB
u	combined standard uncertainty	dB
u_i	standard uncertainty of each input quantity	dB
u_1	standard uncertainty of the energy average of a number of measurements of A-weighted equivalent continuous sound pressure level	dB
$u_{1a,m}$	standard uncertainty due to noise level sampling of task m	dB

Symbol	Description	Unit
$u_{1b,m}$	standard uncertainty due to the estimation of duration of task m	h
u_2	standard uncertainty due to the instrumentation	dB
$u_{2,m}$	standard uncertainty due to the instrumentation in the task method	dB
u_3	standard uncertainty due to microphone position	dB
$\bar{U}$	expanded uncertainty for multiple nominal days	dB
x	day number for multiple nominal days	
X	total number of days for multiple nominal days	

5 Instrumentation

5.1 Sound level meters and personal sound exposure meters

Measurements can be made by using either integrating-averaging sound level meters or personal sound exposure meters.

Sound level meters, including the microphone and associated cables, shall meet the requirements for IEC 61672-1, class 1 or class 2 instrumentation. Class 1 instrumentation is preferred and should be used when measuring at very low temperatures or when the noise is dominated by high frequencies (see also NOTES 2 and 4).

Personal sound exposure meters, including the microphone and cable, shall meet the requirements specified in IEC 61252. Personal sound exposure meters also fulfilling the requirements of IEC 61672-1, class 1, are recommended when measuring at very low temperatures or when the noise is dominated by high frequencies (see also NOTES 2 and 4).

NOTE 1 Personal sound exposure meter is often referred to as "noise dose meter" or "noise dosimeter".

NOTE 2 For IEC 61672-1, class 1 instruments, the specified tolerance limits are applied for the temperature range from -10 °C to +50 °C. For instrumentation in accordance with IEC 61672-1, class 2, and for personal sound exposure meters in accordance with IEC 61252, the influence of variations in the air temperature on the measured signal level is specified over the range from 0 °C to +40 °C. In order to maintain accuracy when performing measurements outside this temperature range, it can be necessary to use an instrument for which the manufacturer specifies compliance for a wider temperature range. Alternatively, a sound level meter in accordance with IEC 61672-1, class 1, can be selected. In cold conditions, the measuring instrument can be kept warm, e.g. under clothing, such that only the microphone is exposed to low temperatures.

NOTE 3 The choice of the instrumentation influences the uncertainty of the measurements.

NOTE 4 For personal sound exposure meters, IEC 61252 allows wide tolerances in the frequency characteristics above 4 000 Hz, which can lead to incorrect measurement of high frequency sound such as that from air nozzles. In order to reduce the uncertainty when measuring noise dominated by high frequencies, it can be necessary to use a measuring instrument for which the manufacturer specifies high frequency characteristics within a narrower tolerance range. Alternatively, a sound level meter specified in accordance with IEC 61672-1, class 1 or 2, can be selected in the following way. Due to the tolerances defined in IEC 61672-1, class 2 sound level meters can be appropriate for measurements up to 8 kHz. Measurements up to 16 kHz can only be performed by using a sound level meter meeting the requirements of class 1. Assessment of airborne sound beyond 16 kHz can produce unreliable results even when using class 1 sound level meters (see also [Clause 1](#)).

Personal sound exposure meters can have a cut-off level at around 70 dB. This can influence the value of the measured noise exposure, but only at low exposure levels.

5.2 Calibrator

For class 1 measuring instrument, the sound calibrator shall conform to class 1 specifications of IEC 60942.

For class 2 measuring instrument, the sound calibrator shall conform to either class 1 or 2 specifications of IEC 60942.

5.3 Periodic verification

The calibration of the sound calibrator and the compliance of the integrating-averaging sound level meter with the requirements of IEC 61672-1, IEC 61252 and other relevant standards shall be verified at intervals in a laboratory making calibrations traceable to appropriate standards.

Unless national regulations dictate otherwise, it is recommended that the sound calibrator and the compliance of the integrating-averaging sound level meter with the requirements of IEC 61672-1 be verified at intervals not exceeding 2 years.

The date for the last periodic verification, the name of the laboratory that performed it, and the outcome shall be recorded and given in the measurement report.

6 Methodology – Chronological steps

6.1 Step 1: Work analysis

The work analysis shall provide sufficient information about the work and the workers under consideration so that an appropriate measurement strategy can be selected and measurements can be planned. Work analysis shall be carried out in accordance with [Clause 7](#).

6.2 Step 2: Selection of the measurement strategy

A measurement strategy shall be selected from task-based measurement, job-based measurement and full-day measurement as specified in [Clause 8](#). More than one measurement strategy can be used, if relevant (see [B.6](#)).

6.3 Step 3: Measurements

The basic measurement quantity shall be $L_{p,A,eqT}$. In addition, $L_{p,C_{peak}}$ shall be measured, if relevant. The measurements shall follow the chosen strategy as specified in one of [Clauses 9, 10](#) or [11](#) and comply with the requirements of [Clause 12](#).

6.4 Step 4: Error handling and uncertainties

Sources of errors and uncertainties that shall influence the result shall be evaluated in accordance with [Clauses 13](#) and [14](#).

6.5 Step 5: Calculation and presentation of results and uncertainty

Calculate $L_{EX,8h}$ as specified for the selected strategy (see [Clauses 9, 10](#), and [11](#)) and the uncertainty as specified in [Annex C](#). The results and uncertainties can be calculated by using the spreadsheet in <https://standards.iso.org/iso/9612/ed-3/en>.

The results shall be presented as specified in [Clause 15](#). [Annexes D, E](#) and [F](#) provide practical examples for the task-based, job-based, and full-day measurements, respectively.

7 Work analysis

7.1 General

Work analysis is required in all situations. It shall provide the information necessary to

- describe the activities of the enterprise and the jobs of the workers under consideration,
- define homogeneous noise exposure groups (see [7.2](#)), if relevant,
- determine a nominal day or several nominal days, as appropriate, for each worker or group,

- d) identify tasks which make up the jobs, if relevant,
- e) identify possible significant noise events,
- f) choose the measurement strategy, and
- g) establish the measurement plan.

The work shall be analysed with emphasis put on production, process, organization, workers and activities.

The measurements shall be performed by using the task-based, job-based or full-day strategy. Whichever strategy is used, it is essential to identify all events which are significant with regard to noise exposure and to make sure that the measurement plan takes them into account. See [Annex A](#) for an example of a checklist.

NOTE The order in which the items above are performed can depend on the complexity of the situation on site. The items are strongly connected, and the process can therefore be iterative in complex situations, i.e. increased knowledge about one of the items can result in a new description or redefinition of others.

7.2 Defining homogeneous noise exposure groups (HEG)

Measurement efforts can be reduced by defining homogeneous noise exposure groups. These are groups of workers that are performing the same job and are expected to have similar noise exposures during the working day. If used, the homogeneous noise exposure group shall be clearly identified.

NOTE The term "similar noise exposure group" is sometimes used instead of "homogeneous noise exposure group".

Homogeneous noise exposure groups can be defined in a number of ways. For example, it may be possible to define such groups according to job title, function, work area or profession. Alternatively, the groups can be defined by analysing the work according to production process or work activity criteria.

In whichever way the groups are defined, they should be verified in consultation with the workers and supervisors, and ultimately by evaluating the measurement results, see [10.4](#).

7.3 Determination of a nominal day

A nominal day, including work periods and breaks, shall be determined in consultation with both workers and management. The work shall be studied in order to obtain an overview and understanding of all factors, which can influence the noise exposure. See [Annex A](#) for more details.

Issues that shall be addressed are:

- a) tasks (content and duration) and variation within tasks;
- b) main noise sources and noisy work areas;
- c) work pattern and any significant noise events, resulting in a change of the noise level or which can result in peak levels exceeding regional regulation limits;
- d) number and duration of breaks, meetings, etc., and whether they should be regarded as a part of the nominal day.

Measurements shall be planned to ensure that all significant noise events are included. For each of the events, it shall be recorded when it occurred, its nature, duration and daily frequency. An example of a checklist to ensure that significant noise events are detected during the work analysis is given in [Annex A](#).

In some cases, the work and consequently the noise exposure, varies from day to day so that there is no typical daily exposure, e.g. for workers who work in different locations or jobs each day. In these cases, the nominal day can be defined from work situations during several days, e.g. one week. See also Notes to [3.2](#) and [3.3](#).

Any indicators that characterize the work with respect to noise shall be identified, quantified, and reported. Examples of such indicators are: type of production in process; materials; quantities; thickness of work pieces; adjustment; speed; and number of workers involved.

If the purpose of measurements is to estimate the long-term risk of hearing impairment of workers, then the nominal day chosen shall be representative of the average exposure over the period under consideration, in accordance with ISO 1999.

8 Selection of measurement strategies

8.1 General

The selection of an appropriate measurement strategy is influenced by several factors such as the purpose of the measurements, complexity of the work situation, number of workers involved, effective duration of the working day, time available for measurement and analysis, and amount of detailed information required.

8.2 Measurement strategies

Three measurement strategies for the determination of workplace noise exposure are offered by this document. These are:

- a) task-based measurement: the work performed during the day is analysed and split up into a number of representative tasks, and for each task separate measurements of sound pressure level are taken (see [Clause 9](#));
- b) job-based measurement: a number of random samples of sound pressure level are taken during the performance of particular jobs (see [Clause 10](#));
- c) full-day measurement: sound pressure level is measured continuously over complete working days (see [Clause 11](#)).

Detailed guidance on the choice of the measurement strategy is given in [Annex B](#).

A guidance for the evaluation of the daily noise exposure level of workers who perform several types of work in a same day or over several days is provided in [Annex G](#).

9 Strategy 1 – Task-based measurement

9.1 Dividing the nominal day into tasks

For the workers or homogeneous noise exposure groups under evaluation, the nominal day shall be divided into tasks. Each task shall be defined such that $L_{p,A,eqT}$ is likely to be repeatable. Care shall be taken to ensure that all relevant noise contributions are included. Detailed information regarding the duration of tasks is particularly important for noise sources with high noise levels.

Identification of the noise sources and tasks that give the highest peak levels is important to obtain a correct determination of both $L_{p,A,eqT}$ and $L_{p,Cpeak}$.

The use of a handheld tool can be regarded as a separate task. This will better guide the noise reduction plan and will likely reduce the measurement uncertainty.

9.2 Duration of tasks

The durations of the tasks, T_m , shall be determined. This can be done by:

- a) interviewing the workers and the supervisor;
- b) observing and measuring durations during noise measurements;
- c) gathering information regarding operation of typical noise sources (e.g. work processes, machines, activities at the workplace and in its surroundings).

Optionally, the duration of a task can be regarded as a variable. To determine possible variations in duration, the task can be observed and the duration recorded, for instance, three times. Alternatively, multiple workers and supervisors can be asked to indicate the most reasonable duration range.

If J observations of the task duration, $T_{m,j}$, are available, the arithmetic average value of task duration, T_m , is given by [Formula \(1\)](#):

$$T_m = \frac{1}{J} \sum_{j=1}^J T_{m,j} \quad (1)$$

The sum of individual durations of tasks, T_m , which make up the nominal day, shall correspond to the effective duration of the working day. The effective duration of the working day, T_e , is given by [Formula \(2\)](#):

$$T_e = \sum_{m=1}^M T_m \quad (2)$$

where

T_m is the arithmetic average duration of task m ;

m is the number of a task;

M is the total number of tasks.

NOTE Task-based measurements can, for instance, be combined with full-day measurements to verify that all relevant sources are included.

9.3 Measurement of L_{p,A,eqT_m} for tasks

9.3.1 General

For each task, the L_{p,A,eqT_m} representative of the noise exposure of the worker shall be measured in accordance with [Clause 12](#). The measurements shall cover variations in noise level within each task in time, space and working conditions.

The measurement technician shall ensure that the work situation is representative. The worker under consideration shall be observed during the measurements whenever possible. If the operating or work conditions deviate from the normal situation, this shall be recorded and reported.

In cases when it is difficult for the measurement technician to follow the worker's activities without interfering with them, the activities during the measurements shall be registered by other means, e.g. by interviews and/or by reviewing work record sheets filled in by the worker, and reported.

9.3.2 Number of measurements

To cover as much of the actual variation in noise levels as possible, it is recommended to measure on different workers within a HEG. In this case, at least 5 measurements shall be made for each task. Otherwise, at least 3 measurements shall be made for each task, if just one worker is sampled. A recommendation of the number of workers on which the tasks measurements can be performed in function of the HEG size is given below:

Table 1 — Minimum recommended number of workers, $n_{\min}$, on which measurements can be taken as a function of the size of the HEG, n_G

n_G	1 to 2	3 to 5	6 to 11	12 to 15	16 to 20	Above 21
$n_{\min}$	1	2	3	4	5	6

If the range for $L_{p,A,eqT_m,i}$ is larger than 5 dB (if a group of workers is sampled), or larger than 3 dB (if only one worker is sampled), then select one of the following two options:

- a) subdivide the task into two tasks, and carry out for both tasks new measurements with the above indicated minimum numbers of samples. Proceed iteratively until the appropriate max-min range limit is complied with for each sub-task.
- b) repeat the measurements with a longer duration of each measurement. If the appropriate max-min range limit is then complied with, proceed by discarding the previous set of measurements and retain only the latter set. If the appropriate max-min range is not complied with, then reconsider option a).

9.3.3 Time and duration of measurements

To cover as much of the actual variation in noise levels as possible, it is recommended to measure at different times during the task. Measurement times shall be selected after a careful examination of the work situation, so that the full set of measurements (see 9.3.2) shall be representative of the noise level of the whole task. Splitting a single long measurement into many short measurements, in order to reduce the calculated uncertainty, is therefore not acceptable. This would not ensure representativity of the task noise level, and it would result in an unrealistically low sampling uncertainty (see C.2.3).

As a general rule, the duration of each measurement shall be at least 5 min if the duration of the task is longer than 5 min, or equal to the duration of the task if the latter is shorter than 5 min. The duration of each measurement can, however, be reduced if the sound pressure level is found to be stable, or if the noise from the task is considered to be a minor contributor to the total noise exposure. In order to warrant an accurate average value of L_{p,A,eqT_m} the minimum and maximum duration of the consecutive measurements of one specific task should not differ by more than 25 %.

NOTE The sound pressure level is considered stable when the overall equivalent sound pressure level does not change by more than 0,2 dB when increasing the measurement duration by 30 s.

If the task noise is cyclic, the duration of each measurement shall correspond to the duration of an integer number (≥ 3) of full cycles, and not be shorter than 3 min.

9.3.4 Calculation of the A-weighted equivalent continuous sound pressure level

Calculate the A-weighted equivalent continuous sound pressure level for task m from I separate measurements, $L_{p,A,eqT_m,i}$, by Formula (3) as follows:

$$L_{p,A,eqT_m} = 10 \lg \left(\frac{1}{I} \sum_{i=1}^I 10^{0,1 \cdot L_{p,A,eqT_m,i}} \right) \text{dB} \quad (3)$$

where

$L_{p,A,eqT_m,i}$ is the i^{th} determination of the A-weighted equivalent continuous sound pressure level for task m of duration T_m ;

i is the measurement number;

I is the total number of measurements carried out for task m .

Calculate the uncertainty in accordance with C.2.

9.4 Calculation of contribution from each task to daily noise exposure level

The calculation specified in this subclause shall be performed if a value for the relative contribution of each task to the daily noise exposure level is required. Otherwise, proceed to 9.5.

The noise contribution from task m to the daily A-weighted noise exposure level, $L_{EX,8h,m}$, can be calculated from [Formula \(4\)](#):

$$L_{EX,8h,m} = L_{p,A,eqT_m} + 10 \lg \left(\frac{T_m}{T_0} \right) \text{dB} \quad (4)$$

where

L_{p,A,eqT_m} is the A-weighted equivalent continuous sound pressure level for task m as given by [Formula \(3\)](#);

T_m is the arithmetic average duration in hours of task m as given by [Formula \(1\)](#);

T_0 is the reference duration in hours of the working day, $T_0 = 8$ h.

This intermediate result can help to identify which tasks contribute most to $L_{EX,8h}$ and support decisions with regard to effective reduction of exposure to noise.

9.5 Determination of daily noise exposure level

Calculate the daily A-weighted noise exposure level $L_{EX,8h}$ from [Formula \(5\)](#) or from [Formula \(6\)](#).

[Formula \(5\)](#) allows the calculation of daily A-weighted noise exposure level from the L_{p,A,eqT_m} and the duration of each of the tasks. It uses the level calculated from [Formula \(3\)](#) and the duration in accordance with [9.2](#).

$$L_{EX,8h} = 10 \lg \left(\sum_{m=1}^M \frac{T_m}{T_0} 10^{0,1 L_{p,A,eqT_m}} \right) \text{dB} \quad (5)$$

where

L_{p,A,eqT_m} is the A-weighted equivalent continuous sound pressure level for task m as given by [Formula \(3\)](#);

T_m is the arithmetic average duration in hours of task m as given by [Formula \(1\)](#);

T_0 is the reference duration in hours of the working day, $T_0 = 8$ h;

m is the task number;

M is the total number of tasks m contributing to the daily noise exposure level.

[Formula \(6\)](#) allows the calculation of the A-weighted noise exposure level from the noise contribution of each of the tasks. It shall be used if the relative contribution from each task m has been calculated in accordance with [9.4](#) using [Formula \(6\)](#):

$$L_{EX,8h} = 10 \lg \left(\sum_{m=1}^M 10^{0,1 L_{EX,8h,m}} \right) \text{dB} \quad (6)$$

where

$L_{EX,8h,m}$ is the A-weighted noise exposure level of task m contributing to the daily noise exposure level;

m is the task number;

M is the total number of tasks m contributing to the daily noise exposure level.