

**No. 24****THE HEALTH AND SAFETY AT WORK ORDINANCE, 1999**

(Ordinance 6 of 1999)

**REGULATIONS MADE UNDER SECTION 38**

In exercise of the powers conferred upon him under section 38 of and the Schedule to the Health and Safety at Work Ordinance 1999<sup>(a)</sup> and of all other powers enabling him in that behalf, the Administrator hereby makes the following Regulations:-

**Citation and commencement**

1. These Regulations shall be cited as the Health and Safety at Work (Protection of Employees from Noise) Regulations 2003 and shall come into force on the date of their publication in the Gazette.

**Interpretation**

2. - (1) In these Regulations, unless the context otherwise requires:-

“daily personal noise exposure of an employee” ( $L_{EP,d}$ ) means the level of daily personal noise exposure of an employee ascertained in accordance with Part I of Schedule 1 but taking no account of the effect of any personal ear protector used;

“exposure” means exposure at work;

“the Ordinance” means the Health and Safety at Work Ordinance 1999;

“weekly average of the daily values” ( $L_{EP,w}$ ) means the weekly average of the daily values ascertained in accordance with Part II of Schedule 1.

(2) In these Regulations, unless the context otherwise requires:-

(a) any reference to a numbered regulation or a numbered Schedule is a reference to the regulation or Schedule so numbered in these Regulations;

(b) any reference to a numbered paragraph is a reference to the paragraph so numbered in the regulation or Schedule in which it appears.

**Application**

3. - (1) These Regulations shall apply with a view to protecting persons at work against risks to their hearing and, to the extent that these Regulations so provide, to their health and safety (including preventing such risks) arising or likely to arise from exposure to noise at work.

(2) These Regulations shall not apply to or in relation to:-

(a) the master or crew of any sea-going vessel or to the employer of such persons, in relation to the normal

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<sup>(a)</sup> Ordinance 6 of 1999.

on-board activities of the crew under the direction of the master; or

- (b) the captain or crew of any aircraft or hovercraft which is moving under its own power or to the employer of such persons, in relation to the normal on-board activities of the crew under the direction of the captain.

(3) In these Regulations, unless the context otherwise requires, any reference to an employer includes a reference to a self-employed person and any duty imposed by these Regulations upon an employer in respect of his employees shall extend to a self-employed person in respect of himself.

(4) Where any duty is imposed by these Regulations on an employer in respect of his employees, that employer shall, so far as is reasonably practicable, be under a like duty in respect of any other person at work who may be affected by the work carried on by the employer.

#### **Assessment and measurement of exposure to noise**

4. - (1) Every employer shall ensure that noise experienced at work is assessed and, when necessary, measured in order to identify the employees and workplaces referred to in these Regulations and to determine the conditions under which the specific provisions of these Regulations apply.

(2) The assessment and measurement referred to in paragraph (1) shall be competently planned and carried out at suitable intervals.

(3) Any sampling undertaken must be representative of the daily personal exposure of the employee to noise.

(4) The methods and apparatus used to assess and measure noise exposure must be adapted to the prevailing conditions, taking into account, in particular, of:-

- (a) the characteristics of the noise to be measured;
- (b) the length of exposure;
- (c) ambient factors; and
- (d) the characteristics of the measuring apparatus.

(5) The methods and apparatus used must make it possible to determine the daily personal noise exposure of the employees concerned and the weekly average of the daily values for the purposes of ascertaining whether, in any given case, any limits imposed by these Regulations have been exceeded.

(6) The assessments and measurements shall be carried out by the employer in consultation with the employees' representatives or where there is no employees' representative, with the employees themselves.

(7) Where there is reason to suspect that an assessment or measurement is no longer valid or where there has been a material change in the work to which the assessment or measurement relates, the employer shall ensure that such assessment or measurement, as the case may be, is reviewed and, where appropriate, revised.

(8) The results of the assessments and measurements shall be

recorded and kept in the undertaking for at least 10 years and shall be made available to:-

- (a) any employee exposed to noise;
- (b) the Safety Officer;
- (c) the Examining Medical Practitioner;
- (d) the members of the Safety Committee or the employees' representatives; and
- (e) any inspector.

### **Information for employees**

5. – (1) Where the daily personal exposure of an employee to noise is likely to exceed 85 dB(A) or the maximum value of the unweighted instantaneous sound pressure is likely to exceed 200 Pascals (Pa), the employer shall ensure that:-

- (a) employees or their representatives in the undertaking receive adequate information and, where relevant, training concerning:-
  - (i) any potential risks to their hearing arising from noise exposure;
  - (ii) the measures taken pursuant to these Regulations;
  - (iii) the obligation to comply with protective and preventive measures taken;
  - (iv) the wearing of personal ear protectors and the role of checks on hearing in accordance with Regulation 8;
- (b) employees or their representatives in the undertaking have access to the results of noise assessments and measurements made pursuant to Regulation 4 and can be given explanations of the significance of those results by the Safety Officer or the Examining Medical Practitioner or otherwise, by the employer.

(2) Where the daily personal noise exposure of an employee is likely to exceed 85 dB(A), appropriate information must be provided to employees as to where and when Regulation 7 applies.

(3) Where the daily personal noise exposure of an employee is likely to exceed 90 dB(A) or where the maximum value of the unweighted instantaneous sound pressure is likely to exceed 200 Pa:-

- (a) the information provided for in paragraph (1), where reasonably practicable, must take the form of appropriate signs; and
- (b) the areas affected must be delimited and access to them shall be restricted, where the risk of exposure so justifies and where these measures are reasonably practicable.

(4) For the purposes of paragraph (1), if the maximum value of the 'A'-weighted sound pressure level, measured with a sound-level meter using the time characteristic I (Impulse) (according to publication 651 of the International Electrotechnical Commission (IEC 651)) does not exceed 130 dB(AI), the maximum value of the unweighted instantaneous sound pressure can be assumed not to exceed 200 Pa.

### **Reduction of noise**

6. – (1) The risks resulting from exposure to noise must be reduced to the lowest level reasonably practicable, taking into account:-

- (a) technical progress; and
- (b) the availability of measures to control the noise, in particular at source.

(2) Where the daily personal noise exposure of an employee exceeds 90 dB(A) or the maximum value of the unweighted instantaneous sound pressure exceeds 200 Pa:-

- (a) the reasons for the excess level must be identified and the employer shall draw up and apply a programme of measures of a technical nature or of organisation of work or both, with a view to reducing, as far as reasonably practicable, the exposure of employees to noise;
- (b) employees and their representatives and the Safety Committee in the undertaking must receive adequate information on the excess level and on the measures taken pursuant to sub-paragraph (a) above.

### **Use of personal ear protectors**

7. – (1) Without prejudice to Regulation 6, where the daily personal noise exposure exceeds 90 dB(A) or the maximum value of the unweighted instantaneous sound pressure exceeds 200 Pa, suitable and adequate personal ear protectors must be used.

(2) Where the exposure referred to in paragraph (1) is likely to exceed 85 dB(A), suitable and adequate personal ear protectors must be made available to employees.

(3) Personal ear protectors must be supplied in sufficient numbers by the employer, the models being chosen in consultation with the employees concerned, the Examining Medical Practitioner and the Safety Officer.

(4) Ear protectors must be adapted to the individual employee and to his working conditions, taking account of his health and safety.

(5) Ear protectors shall be deemed suitable and adequate if, when properly worn, the risk to hearing can reasonably be expected to be kept below the risk arising from the level of exposure referred to in paragraph (1).

(6) Where compliance with paragraphs (1) to (5) of this Regulation involves a risk of accident, such risk must be reduced, as far as is reasonably practicable, by means of appropriate measures.

### **Medical surveillance and recommendations for personal protective or preventive measures**

8. – (1) Where it is not reasonably practicable to reduce the daily personal noise exposure of an employee to below 85 dB(A), the employee exposed must be able to have his hearing checked by or under the supervision of a medical practitioner and, if judged necessary by the medical practitioner, by a specialist.

(2) The purpose of the check referred to in paragraph (1) is the

diagnosis of any hearing impairment by noise and the preservation of hearing.

(3) The results of checks on employees' hearing shall be recorded and kept in the undertaking for 40 years and employees shall have access to the results which apply to them.

(4) The medical practitioner who carries out or supervises the carrying out of the checks referred to in paragraph (1) may recommend individual protective or preventive measures to be taken.

### **New plant and new articles for use at work**

**9.** – (1) The design, build and construction of new plant (including new factories, plant or machinery, substantial extensions or modifications to existing factories or plant and replacement of plant or machinery) must be such that compliance with paragraph Regulation 6(1) is practicable.

(2) Where any new article (including any new tool, machine, apparatus or other equipment) which is likely to cause, for an employee who uses it properly for a conventional eight-hour period, a daily personal noise exposure equal to or greater than 85 dB(A) or an unweighted instantaneous sound pressure the maximum value of which is equal to or greater than 200 Pa, adequate information must be made available by the employer about the noise produced in the conditions of use to be specified.

### **Exemptions**

**10.** – (1) Where the noise exposure of an employee varies markedly from one working day to the next, the Chief Officer may, exceptionally, grant exemptions in respect of employees performing special operations from Regulation 6(2), Regulation 7(1) and Regulation 8(1), but only on condition that the average weekly noise exposure of the employees concerned, as shown by adequate monitoring, does not exceed the limits specified in the said provisions.

(2) Where it is not reasonably practicable, by technical measures or organisation of work, to reduce daily personal noise exposure to below 90 dB(A) or to ensure that the personal ear protectors provided for in Regulation 7 are suitable and adequate within the meaning of paragraph (5) of that Regulation, the Chief Officer may, exceptionally, grant exemptions from those requirements for limited periods, such exemptions being renewable, but only on condition that personal ear protectors affording the highest degree of protection which is reasonably practicable are used.

(3) The Chief Officer may, exceptionally, grant exemptions in respect of employees performing special operations from Regulation 7(1), if compliance with it would involve an increase in the overall risk to the health or safety of the employees concerned and if it is not reasonably practicable to reduce such risk by any other means.

(4) The exemptions referred to in paragraphs (2) and (3) shall be:-

- (a) subject to conditions which ensure, taking into account the individual circumstances, that the risks resulting from such exemptions are reduced to a minimum; and

- (b) re-examined periodically and revoked as soon as is reasonably practicable.

**Methods for measuring noise and checking employees' hearing**

**11.** – (1) Subject to paragraph (2), the employer may use any suitable methods to measure noise and carry out checks on employees' hearing, provided that such methods satisfy the provisions of Regulations 4 and 8, respectively.

(2) The recommendations for measuring noise set out in Schedule 2 and for checking employees' hearing set out in Schedule 3 shall be taken into consideration by the employer when determining the methods to be used for the purposes of paragraph (1).

**SCHEDULE 1**  
(Regulation 2(1))

**PART I**

**DAILY PERSONAL NOISE EXPOSURE OF EMPLOYEES**

The daily personal noise exposure of an employee ( $L_{EP,d}$ ) is expressed in dB(A) and is ascertained using the formula:-

$$L_{EP,d} = LA_{eq, T_e} + 10 \log_{10} \dots\dots$$

where:-

$$LA_{eq, T_e} = 10 \log_{10} \dots\dots$$

and

$T_e$  = the daily duration of an employee's personal exposure to noise,

$$T_0 = 8h = 28\ 800\ s,$$

$$p_0 = 20\ mPa; \text{ and}$$

$p_A$  = 'A'-weighted instantaneous sound pressure in pascals (Pa) to which is exposed, in air at atmospheric pressure, a person who might or might not move from one place to another while at work; it is determined from measurements made at the position occupied by the person's ears during work, preferably in the person's absence, using a technique which minimises the effect on the sound field.

If the microphone has to be located very close to the person's body, appropriate adjustments should be made to determine an equivalent undisturbed field pressure.

**PART II**

**WEEKLY AVERAGE OF DAILY PERSONAL  
NOISE EXPOSURE OF EMPLOYEES**

The weekly average of an employee's daily personal noise exposure ( $L_{EP,w}$ ) is expressed in dB(A) and is ascertained using the formula:-

$$L_{EP,w} = 10 \cdot \log_{10} \dots\dots\dots$$

where:-

$(L_{EP,d})_k$  are the values of  $L_{EP,d}$  for each of the  $m$  working days in the week being considered.

**SCHEDULE 2**

(Regulation 11(2))

**RECOMMENDATIONS FOR MEASURING NOISE****General**

1. – (1) The daily noise exposure of employees and weekly average of the daily values can be:-

- (a) measured directly by integrating sonometers; or
- (b) calculated from measurements of sound pressure and exposure duration.

(2) Measurements may be made:-

- (a) at the work places occupied by employees; or
- (b) by using instruments attached to the person.

(3) The location and duration of the measurements must be suitable and sufficient to ensure that exposure to noise during the working day can be recorded.

**Instrumentation**

2. – (1) Where integrating averaging sonometers are used, they must comply with IEC standard 804.

(2) Where sonometers are used, they must comply with IEC standard 651 and instruments incorporating an overload indication are preferred.

(3) If data are stored on tape as an intermediate step of the measurement procedure, potential errors caused by the process of sorting and replay must be taken into account when analysing the data.

(4) An instrument used to measure directly the maximum (peak) value of the unweighted instantaneous sound pressure must have an onset time constant not exceeding 100 ms.

(5) All equipment must be calibrated in a laboratory at suitable intervals.

**Measurement**

3. – (1) An on-site check must be made at the beginning and end of each day of measurement.

(2) Measurement of workplace sound pressure should preferably be made in the undisturbed sound field in the workplace (that is with the person concerned being absent) and with the microphone located at the positions normally occupied by the ear exposed to the highest value of exposure.

(3) If it is necessary for the person to be present:-

- (a) the microphone should be located at a distance from the person's head which will reduce, as far as possible, the effects of diffraction and distance on the measured value (a suitable distance is 0,10 m); or
- (b) where the microphone must be located very close to the person's body, appropriate adjustments should be made to determine an equivalent undisturbed pressure field.



(4) Time weightings 'S' (slow) and 'F' (fast) are valid as long as the measurement time interval is long compared with the time constant of the weighting chosen but they are not suitable for determining  $LA_{eq,T_e}$  when the noise level fluctuates very rapidly.

(5) The result of the direct measurement of  $LA_{eq,T_e}$  can be approximated with a knowledge of the exposure time and the measurement of clearly distinguishable sound-pressure-level ranges; a sampling method and a statistical distribution may be useful.

#### **Accuracy of measuring noise and determining the exposure**

**4.** – (1) The type of the instrument and the standard deviation of the results influence the accuracy of measurement.

(2) For comparison with a noise limit, the measuring accuracy determines the range of readings where no decision can be made as to whether the value is exceeded.

(3) If no decision can be taken, the measurement must be repeated with a higher accuracy.

(4) Measurements of the highest accuracy enable a decision to be taken in all cases.

**5.** – (1) Short-term measurements with ordinary sonometers are quite satisfactory for employees performing, at a fixed location, repetitive activities which generate roughly the same levels of broad-band noise throughout the day.

(2) Where the sound pressure to which an employee is exposed shows fluctuations spread over a wide range of levels or of irregular time characteristics, determining the daily personal noise exposure of an employee becomes increasingly complex, in which case, the most accurate method of measurement is to monitor exposure throughout the entire shift, using an integrating averaging sonometer.

(3) Where an integrating averaging sonometer conforming to IEC standard 804 (which is well suited for measurement of the equivalent continuous sound pressure level of impulse noise) complies at least with the specifications of type 1 and has recently been fully calibrated in a laboratory and the microphone is properly located (see paragraph 3.2 above), the results make it possible, with certain exceptions, to determine whether a given exposure has been exceeded (see paragraph 4 above), even in complex situations: that method is thus generally applicable, and is well suited for reference purposes.

**SCHEDULE 3**

(Regulation 11(2))

**RECOMMENDATIONS FOR CHECKING EMPLOYEES' HEARING**

1. The hearing check should be carried out in accordance with occupational medical practice and should comprise:-

- (a) where appropriate, an initial examination, to be carried out before or at the beginning of exposure to noise;
- (b) regular examinations at intervals which are commensurate with the seriousness of the risk and are determined by the medical practitioner.

2. Each examination should consist of at least an otoscopy combined with an audiometric test including pure-tone airconduction threshold audiometry in accordance with paragraph 6.

3. - (1) The initial examination should include a medical history.

(2) The initial otoscopy and the audiometric test should be repeated within a period of 12 months.

4. The regular examination should be carried out at least every 5 years where the employee's daily personal noise exposure remains less than 90 dB(A).

5. The examinations should be carried out by suitably qualified persons in accordance with existing legislation and practice and may be organised in successive stages (screening, specialist examination).

6. The audiometric test should comply with the specifications of ISO standard 6189-1983, (where ISO means the International Organisation for Standardisation) supplemented as follows:-

- (a) audiometry also covers the frequency of 8000 Hz;
- (b) the ambient sound level enables a hearing-threshold level equal to 0 dB in relation to ISO standard 389-1975 to be measured.

However, other methods may be used if they give comparable results.

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Dated this 20th day of February 2003.

By the Administrator's Command,  
J.C.A. JARVIS CBE,  
Chief Officer,  
Sovereign Base Areas.

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