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COUNCIL DIRECTIVE

of 12 May 1986

on the protection of workers from the risks related to exposure to noise at work

(86/188/EEC)

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COUNCIL DIRECTIVE

of 12 May 1986

on the protection of workers from the risks related to exposure to noise at work

(86/188/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 100 thereof,

Having regard to the proposal from the Commission, drawn up after consulting the Advisory Committee on Safety, Hygiene and Health Protection at Work ([1]);

Having regard to the opinion of the European Parliament ([2]),

Having regard to the opinion of the Economic and Social Committee ([3]),

Whereas the Council resolutions of 29 June 1978 and 27 February 1984 on action programmes of the European Communities on safety and health at work ([4]) provide for the implementation of specific harmonized procedures for the protection of workers exposed to noise; whereas the measures adopted in this field vary from State to State and it is recognized that they urgently need to be approximated and improved;

Whereas exposure to high noise levels is encountered in a large number of situations and therefore many workers are exposed to a potential safety and health hazard;

Whereas a reduction of exposure to noise reduces the risk of hearing impairment caused by noise;

Whereas, where the noise level at the workplace involves a risk for the health and safety of workers, limiting exposure to noise reduces that risk without prejudice to the applicable provisions on the limitation of noise emission;

Whereas the most effective way of reducing noise levels at work is to incorporate noise prevention measures into the design of installations and to choose materials, procedures and working methods which produce less noise; whereas the priority aim must be to achieve the said reduction at source;

Whereas the provision and use of personal ear protectors is a necessary complementary measure to the reduction of noise at source, where exposure cannot reasonably be avoided by other means;

Whereas noise is an agent to which Council Directive 80/1107/EEC of 27 November 1980 on the protection of workers from the risks related to exposure to chemical, physical and biological agents at work ([5]) applies; whereas Articles 3 and 4 of the said Directive provide for the possibility of laying down limit values and other special measures in respect of the agents being considered;

Whereas certain technical aspects must be defined and may be reviewed in the light of experience and progress made in the technical and scientific field;

Whereas the current situation in the Member States does not make it possible to fix a noise-exposure value below which there is no longer any risk to workers' hearing;

([1]) OJ No C 289, 5. 11. 1982, p. 1; OJ No C 214, 14. 8. 1984, p. 11.
([2]) OJ No C 46, 20. 2. 1984, p. 130; OJ No C 117, 30. 4. 1984, p. 5.
([3]) OJ No C 23, 30. 1. 1984, p. 36.
([4]) OJ No C 165, 11. 7. 1978, p. 1; OJ No C 67, 8. 3. 1984, p. 2.
([5]) OJ No L 327, 3. 12. 1980, p. 8.

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Whereas current scientific knowledge about the effects that exposure to noise may have on health, other than on hearing, does not enable precise safety levels to be set; whereas, however, reduction of noise will lower the risk of illnesses unrelated to auditory complaints; whereas this Directive contains provisions which will be reviewed in the light of experience and developments in scientific and technical knowledge in this field,

HAS ADOPTED THIS DIRECTIVE:

Article 1

1. This Directive, which is the third individual Directive ►M1 ——— ◄ has as its aim the protection of workers against risks to their hearing and, in so far as this Directive expressly so provides, to their health and safety, including the prevention of such risks arising or likely to arise from exposure to noise at work.

2. This Directive shall apply to all workers, including those exposed to radiation covered by the scope of the EAEC Treaty, with the exception of workers engaged in sea transport and in air transport.

For the purpose of this Directive, the expression 'workers engaged in sea transport and in air transport' shall refer to personnel on board.

On a proposal from the Commission the Council shall examine, before 1 January 1990, the possibility of applying this Directive to workers engaged in sea transport and in air transport.

3. This Directive shall not prejudice the right of Member States to apply or introduce, subject to compliance with the Treaty, laws, regulations or administrative provisions ensuring, where possible, greater protection for workers and/or intended to reduce the level of noise experienced at work by taking action at source, particularly in order to achieve exposure values which prevent unnecessary nuisance.

Article 2

For the purposes of this Directive, the following terms shall have the meaning hereby assigned to them:

1. *Daily personal noise exposure of a worker* $L_{EP,\ d}$

   The daily personal noise exposure of a worker is expressed in dB (A) using the formula:

$$L_{EP,d} = L_{Aeq,Te} + 10 \log_{10} \frac{T_e}{T_o}$$

   where:

$$L_{Aeq,Te} = 10 \log_{10} \left\{ \frac{1}{T_e} \int_o^{T_e} \left[\frac{p_A(t)}{p_o} \right]^2 dt \right\}$$

   T_e = daily duration of a worker's personal exposure to noise,

   T_o = 8 h = 28 800 s,

   P_o = 20 μPa,

   P_A = 'A'-weighted instantaneous sound pressure in pascals 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 minimizes 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.

   The daily personal noise exposure does not take account of the effect of any personal ear protector used.

2. *Weekly average of the daily values* $L_{EP,\ w}$

   The weekly average of the daily values is found using the following formula:

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$$L_{EP,w} = 10 \log_{10} \left[\frac{1}{5} \sum_{k=1}^{m} 10^{0,1 \, (L_{EP,d})_k} \right]$$

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

Article 3

1. Noise experienced at work shall be assessed and, when necessary, measured in order to identify the workers and workplaces referred to in this Directive and to determine the conditions under which the specific provisions of this Directive shall apply.

2. The assessment and measurement mentioned in paragraph 1 shall be competently planned and carried out at suitable intervals under the responsibility of the employers.

Any sampling must be representative of the daily personal exposure of a worker to noise.

The methods and apparatus used must be adapted to the prevailing conditions in the light, particularly, of the characteristics of the noise to be measured, the length of exposure, ambient factors and the characteristics of the measuring apparatus.

These methods and this apparatus shall make it possible to determine the parameters defined in Article 2 and to decide whether, in a given case, the values fixed in this Directive have been exceeded.

3. Member States may lay down that personal exposure to noise shall be replaced by noise recorded at the workplace. In that event the criterion of personal exposure to noise shall be replaced, for the purposes of Articles 4 to 10, by that of noise exposure during the daily work period, such period being at least eight hours, at the places where the workers are situated.

Member States may also lay down that, when the noise is measured, special consideration shall be given to impulse noise.

4. The workers and/or their representatives in the undertaking or establishment shall be associated, according to national law and practice, with the assessment and measurement provided for in paragraph 1. These shall be revised where there is reason to believe that they are incorrect or that a material change has taken place in the work.

5. The recording and preservation of the data obtained pursuant to this Article shall be carried out in a suitable form, in accordance with national law and practice.

The doctor and/or the authority responsible and the workers and/or their representatives in the undertaking shall have access to these data, in accordance with national law and practice.

Article 4

1. Where the daily personal exposure of a worker to noise is likely to exceed 85 dB (A) or the maximum value of the unweighted instantaneous sound pressure is likely to be greater than 200 Pa [1], appropriate measures shall be taken to ensure that:

(a) workers and/or their representatives in the undertaking or establishment receive adequate information and, when relevant, training concerning:

[1] 140 dB in relation to 20 μPa.
If the maximum value of the 'A'-weighted sound pressure level, measured with a sound-level meter using the time characteristic I (according to 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

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— potential risks to their hearing arising from noise exposure,

— the measures taken in pursuance of this Directive,

— the obligation to comply with protective and preventive measures, in accordance with national legislation,

— the wearing of personal ear protectors and the role of checks on hearing in accordance with Article 7;

(b) workers and/or their representatives in the undertaking or establishment have access to the results of noise assessments and measurements made pursuant to Article 3 and can be given explanations of the significance of those results.

2. At workplaces where the daily personal noise exposure of a worker is likely to exceed 85 dB (A), appropriate information must be provided to workers as to where and when Article 6 applies.

At workplaces where the daily personal noise exposure of a worker is likely to exceed 90 dB (A) or where the maximum value of the unweighted instantaneous sound pressure is likely to exceed 200 Pa, the information provided for in the first subparagraph must, where reasonably practicable, take the form of appropriate signs. The areas in question must also be delimited and access to them must be restricted, where the risk of exposure so justifies and where these measures are reasonably practicable.

Article 5

1. The risks resulting from exposure to noise must be reduced to the lowest level reasonably practicable, taking account of technical progress and the availability of measures to control the noise, in particular at source.

2. Where the daily personal noise exposure of a worker exceeds 90 dB (A), or the maximum value of the unweighted instantaneous sound pressure is greater than 200 Pa:

(a) the reasons for the excess level shall be identified and the employer shall draw up and apply a programme of measures of a technical nature and/or of organization of work with a view to reducing as far as reasonably practicable the exposure of workers to noise;

(b) workers and their representatives in the undertaking or establishment shall receive adequate information on the excess level and on the measures taken pursuant to subparagraph (a).

Article 6

1. Without prejudice to Article 5, where the daily personal noise exposure of a worker exceeds 90 dB (A) or the maximum value of the unweighted instantaneous sound pressure is greater than 200 Pa, personal ear protectors must be used.

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

3. Personal ear protectors must be supplied in sufficient numbers by the employer, the models being chosen in association, according to national law and practice, with the workers concerned.

The ear protectors must be adapted to the individual worker and to his working conditions, taking account of his safety and health. They are deemed, for the purposes of this Directive, suitable and adequate if, when properly worn, the risk to hearing can reasonably be expected to be kept below the risk arising from the exposure referred to in paragraph 1.

4. Where application of this Article involves a risk of accident, such risk must be reduced as far as is reasonably practicable by means of appropriate measures.

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Article 7

1. Where it is not reasonably practicable to reduce the daily personal noise exposure of a worker to below 85 dB (A), the worker exposed shall be able to have his hearing checked by a doctor or on the responsibility of the doctor and, if judged necessary by the doctor, by a specialist.

The in which this check is carried out shall be established by the Member States in accordance with national law and practice.

2. The purpose of the check shall be the diagnosis of any hearing impairment by noise and the preservation of hearing.

3. The results of checks on workers' hearing shall be kept in accordance with national law and practice.

Workers shall have access to the results which apply to them in so far as national law and practice allow.

4. Member States shall take the necessary measures with a view to the doctor and/or the authority responsible giving, as part of the check, appropriate indications on any individual protective or preventive measures to be taken.

Article 8

1. Member States shall take appropriate measures to ensure that:

(a) the design, building and/or construction of new plant (new factories, plant or machinery, substantial extensions or modifications to existing factories or plant and replacement of plant or machinery) comply with Article 5 (1);

(b) where a new article (tool, machine, apparatus, etc.) which is intended for use at work is likely to cause, for a worker 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 is made available about the noise produced in conditions of use to be specified.

2. The Council shall establish, on a proposal from the Commission, requirements according to which, so far as is reasonably practicable, the articles referred to in paragraph 1 (b), when properly used, do not produce noise likely to constitute a risk to hearing.

Article 9

1. In the case of workplaces where the noise exposure of a worker varies markedly from one working day to the next, Member States may, for workers performing special operations, exceptionally grant derogations from Article 5 (2), Article 6 (1) and Article 7 (1), but only on condition that the average weekly noise exposure of a worker, as shown by adequate monitoring, complies with the value laid down in these provisions.

2. (a) In exceptional situations where it is not reasonably practicable, by technical measures or organization of work, to reduce daily personal noise exposure to below 90 dB (A) or to ensure that the personal ear protectors provided for in Article 6 of this Directive are suitable and adequate within the meaning of the second subparagraph of Article 6 (3), the Member States may grant derogations from this provision for limited periods, such derogations being renewable.

In such a case, however, personal ear protectors affording the highest degree of protection which is reasonably practicable must be used.

(b) In addition, for workers performing special operations, Member States may exceptionally grant derogations from Article 6 (1) if its application involves an increase in the overall risk to the health and/or safety of the workers concerned and if it is not reasonably practicable to reduce this risk by any other means.

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(c) The derogations referred to in (a) and (b) shall be subject to conditions which, in view of the individual circumstances, ensure that the risks resulting from such derogations are reduced to a minimum. The derogations shall be reviewed periodically and be revoked as soon as is reasonably practicable.

(d) Member States shall forward to the Commission every two years an adequate overall account of the derogations referred to in (a) and (b). The Commission shall inform the Member States thereof in an appropriate manner.

Article 10

The Council, acting on a proposal from the Commission, shall re-examine this Directive before 1 January 1994, taking into account in particular progress made in scientific knowledge and technology as well as experience gained in the application of this Directive, with a view to reducing the risks arising from exposure to noise.

In the context of this re-examination, the Council, acting on a proposal from the Commission, shall endeavour to lay down indications for measuring noise which are more precise than those given in Annex I.

Article 11

Member States shall see to it that workers' and employers' organizations are consulted before the provisions for the implementation of the measures referred to in this Directive are adopted, and that where workers' representatives exist in the undertaking or establishments they can check that such provisions are applied or can be involved in their application.

Article 12

1. For the measurement of noise and checking workers' hearing, any methods may be used which at least satisfy the provisions contained in Articles 3 and 7.

2. Indications for measuring noise and for checking workers' hearing are given in Annexes I and II.

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Annexes I and II shall be adapted to technical progress in accordance with the procedure laid down in Article 17 of Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at the workplace ([1]).

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Article 13

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 1 January 1990. They shall forthwith inform the Commission thereof.

However, in the case of the Hellenic Republic and the Portuguese Republic the relevant date shall be 1 January 1991.

2. Member States shall communicate to the Commission the provisions of national law which they adopt in the field covered by this Directive. The Commission shall inform the other Member States thereof.

Article 14

This Directive is addressed to the Member States.

([1]) OJ L 183, 29. 6. 1989, p. 1.

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ANNEX I

INDICATIONS FOR MEASURING NOISE

A. 1. **General**

The quantities defined in Article 2 can be either:

(i) measured directly by integrating sonometers, or

(ii) calculated from measurements of sound pressure and exposure duration.

Measurements may be made at the work place(s) occupied by workers, or by using instruments attached to the person.

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

2. **Instrumentation**

2.1. If integrating averaging sonometers are used, they shall comply with IEC standard 804.

If sonometers are used, they shall comply with IEC standard 651. Instruments incorporating an overload indication are preferred.

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

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

2.3. All equipment shall be calibrated in a laboratory at suitable intervals.

3. **Measurement**

3.1. An on-site check shall be made at the beginning and end of each day of measurement.

3.2. Measurement of workplace sound pressure should preferably be made in the undisturbed sound field in the workplace (i. e. with the person concerned being absent) and with the microphone located at the position (s) normally occupied by the ear exposed to the highest value of exposure.

If it is necessary for the person to be present, either:

(i) 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

(ii) if the microphone must be located very close to the person's body, appropriate adjustments should be made to determine an equivalent undisturbed pressure field.

3.3. Generally, time weightings 'S' and 'F' 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 $L_{Aeq,\ T_e}$ when the noise level fluctuates very rapidly.

3.4. *Indirect measurement of exposure*

The result of the direct measurement of $L_{Aeq,\ T_e}$ 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.

4. **Accuracy of measuring noise and determining the exposure**

The type of the instrument and the standard deviation of the results influence the accuracy of measurement. 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; if no decision can be taken, the measurement must be repeated with a higher accuracy.

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

B. Short-term measurements with ordinary sonometers are quite satisfactory for workers performing, at a fixed location, repetitive activities which generate roughly the same levels of broad-band noise throughout the day. But when the sound pressure to which a worker is exposed shows fluctuations spread over a wide range of levels and/or of irregular time characteristics, determining the daily personal noise exposure of a worker becomes increasingly complex; the most accurate method of measurement is there-

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fore to monitor exposure throughout the entire shift, using an integrating averaging sonometer.

When 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 3.2 above), the results make it possible, with certain exceptions to determine whether a given exposure has been exceeded (see 4) even in complex situations; that method is thus generally applicable, and is well suited for reference purposes.

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ANNEX II

INDICATIONS FOR CHECKING WORKERS' HEARING

In the framework of checking workers' hearing the following points are taken into consideration:

1. The check should be carried out in accordance with occupational medical practice and should comprise:
   - — where appropriate, an initial examination, to be carried out before or at the beginning of exposure to noise,
   - — regular examinations at intervals which are commensurate with the seriousness of the risk and are determined by the doctor.
2. Each examination should consist of at least an otoscopy combined with an audiometric test including pure-tone airconduction threshold audiometry in accordance with 6 below.
3. The initial examination should include a medical history; 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 five years where the worker'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 national law and practice and may be organized in successive stages (screening, specialist examination).
6. The audiometric test should comply with the specifications of ISO standard 6189-1983, supplemented as follows:

   Audiometry also covers the frequency of 8 000 Hz; 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.