

COMMISSION OF THE EUROPEAN COMMUNITIES

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Proposal for a
COUNCIL DIRECTIVE

on the protection of workers from the risks related to exposure to chemical,
physical and biological agents at work: noise

(submitted to the Council by the Commission)

COM(82) 646 final

PROPOSAL FOR A COUNCIL DIRECTIVE ON THE
PROTECTION OF WORKERS FROM THE RISKS
RELATED TO EXPOSURE TO CHEMICAL, PHYSICAL
AND BIOLOGICAL AGENTS AT WORK : NOISE

EXPLANATORY MEMORANDUM

1. Justification

Introduction

A major factor contributing to an increase in the risks to which workers are exposed is noise. When it exceeds certain threshold values, it affects health and working efficiency. Its effects range from psychological nuisance to organic damage, in particular hypacusia, which is one of the commonest recognized occupational diseases in our industrialized countries. It is therefore not surprising that this subject is of concern both to management and labour and to the relevant authorities in Member States, and that it has been listed among the risks covered by the action programme on safety and health at work (*).

Given the number of workers involved, the human and social cost of the effects of exposure to noise and the economic and technological constraints connected with the reduction of sound levels, it is clearly advisable to tackle the problem from various angles. For several years now the aim of the Community action programme on the environment has been to limit sound emission and the approximation of laws relating to various sorts of noisy equipment has also been directed to this end. Furthermore,

* OJ C 165 of 11.7.1978.

Community research programmes endeavour amongst other things to reach a clearer understanding of the effects on health of exposure to noise in areas where our knowledge is inadequate. This Proposal aims to protect workers against risks to their safety and hearing which may be due to excessive exposure to noise at work. Such risks are the major hazards since their consequences are the most serious. Moreover present scientific knowledge enables the risk to hearing to be assessed reasonably accurately, unlike effects other than those involving hearing.

The problem

It has been established by many studies on the subject that, while no predictions can be made concerning the effect of exposure to a given noise level at work on the auditory acuity of an individual, the effect of such exposure on a group may be assessed and the percentage of its members suffering some loss of hearing may be estimated. By way of an example, the table gives values for male workers 60 years old who have been exposed to various noise levels for 40 years. Two figures relating to loss of hearing have been used; one indicates difficulty in understanding conversation in the presence of everyday noises, i.e. an early stage of a perceptible handicap; the other indicates an equivalent difficulty in understanding in a quiet atmosphere, which constitutes a definite social handicap. Moreover such losses of hearing fall far short of levels generally entitling workers to compensation for deafness resulting from exposure at work.

Percentage of workers who will probably suffer from a handicap
due solely to noise

	Equivalent exposure level in dB(A)				
	80	85	90	95	100
Perceptible handicap	0	6%	17%	36%	48%
Definite handicap	0	3%	12%	28%	55%

The exact number of workers exposed to various noise levels in the Community is unknown; nevertheless it may be stated on the basis of estimates that a total of 20 to 30 million workers are subjected at work to an equivalent continuous level exceeding 80 dB(A) (which may result in a risk to hearing). Half of these are at workplaces where the mean ambient noise level exceeds 85 dB(A) and 6 to 8 million of the latter are subjected to a noise level exceeding 90 dB(A).

The situation

Regulations on the protection of workers against noise vary considerably within the Community.

In Belgium, in accordance with the Règlement Général sur la Protection du Travail (general regulations on worker protection) excessive noise must be reduced at source; where necessary, the exposure time must be reduced and hearing protectors must be worn. Furthermore, where the noise level exceeds 90 dB(A), the workers become subject to medical surveillance.

In Denmark, the act governing the working environment states that full safeguards for health and safety must be provided at work; administrative regulations lay down an equivalent continuous level of 90 dB(A), and technical plant must not give rise to any hazards, due to noise in particular. Other measures are being drawn up.

In the Federal Republic of Germany, accident prevention provisions make the reduction of exposure to noise compulsory, where the equivalent continuous level exceeds 85 dB(A), employers must provide hearing protectors, which are required to be worn in "noisy areas", defined as those where the level exceeds 90 dB(A). Workers assigned to such areas are subject to medical surveillance. Furthermore, the general workshop regulations lay down maximum equivalent continuous levels of 55, 70 or 85 dB(A) depending on the nature of the work (with possible exemptions allowing the maximum level permissible to be increased to 90 dB(A)).

In Ireland, regulations on workshops do not permit workers to be exposed to noise liable to cause damage to health; if the sound pressure level exceeds 90 dB(A), the exposure time must be reduced or hearing protectors must be provided and worn.

In France, the Code du Travail (labour code) states that the intensity of noise must be kept at a level which is not damaging to health; 85 and 90 dB(A) are laid down as warning and danger levels respectively, and provision is made for the medical surveillance of workers exposed to noise levels exceeding 85 dB(A).

In Italy, legislation on occupational health and the national health service makes provision in very general terms for the reduction of harmful noise; work is in progress to draw up specific measures.

In the Netherlands, an order on safety states that insofar as possible, the level of noise at the workplace must not be such as to expose workers to risk; specific proposals are being drawn up.

In the United Kingdom, the Health and Safety at Work Act ensures that workers are protected at work; a code of good practice recommends that the equivalent continuous level be limited to 90 dB(A), and where this is not reasonably feasible, hearing protectors must be worn. More detailed regulations are being considered.

The measures proposed

The aim of this Proposal is to ensure that a minimum level of worker protection from the effects of noise is achieved throughout the Community through the approximation of the relevant legislative provisions. This is in line with the provisions of Council Directive 80/1107 of 27 November 1980 on the protection of workers from the risks related to exposure to chemical, physical and biological agents at work (*).

The introduction of a maximum permissible level of exposure to noise at work limits the hazard to which exposed workers are subject, and with the proposed daily sound exposure level ($L_{EX,d}$) of 85 dB(A), it may be expected that at the end of their working life a maximum of 6% of these workers will suffer from a perceptible auditory handicap due to their exposure to noise at work, the handicap involved being socially significant for half of these. Furthermore, it should be noted that the 85 dB(A) figure already appears in regulations in force in the Federal Republic of Germany and in France.

(*) OJ No L 327 of 3.12.80, p.8

Moreover, the permissible instantaneous sound pressure is limited to the level laid down in recommendations of the World Health Organization, preventing acute accidents.

These measures must be supplemented by health surveillance of workers whose exposure is liable to exceed these limits. Such surveillance must be capable of detecting at an early stage those individuals whose hearing is at risk, and allowing the required measures to be taken before their handicap deteriorates beyond an acceptable limit.

An analysis of the costs and benefits arising from a protection programme against noise has been attempted on several occasions, but it has not been possible to reach any quantitative conclusions; nevertheless, as regards their quality, the results seem positive and this is certainly the case in the medium term. As a guide, a programme involving noise measurement, audiometric surveillance of workers and reduction of exposure by means of hearing protectors represents an annual expense of the order of 20 ECU per person exposed. Technical measures to reduce noise vary greatly in cost but may have positive spin-off.

The benefits, such as industrial relations or the social and economic cost related to a given state of health, appear difficult to quantify .

Experience in Community countries where a campaign against exposure to noise at work (involving health surveillance) has been running for several years shows that such a campaign is a practical proposition.

Consultation and cooperation

When preparing this Proposal, the Commission consulted extensively the interested parties through the Advisory Committee on Safety, Hygiene and Health Protection at Work. Furthermore, the measures proposed are in line with the recommendations of the International Labour Office (in particular ILO Convention 148) and the Inter-Governmental Maritime Consultative Organization, and take into account recent work done by the World Health Organization, the International Organization for Standardization (ISO), and the International Electrotechnical Commission (IEC).

2. Remarks on the contents of the Proposal for a Directive

Generally the provisions of this Proposal are an application to the field of noise of the measures listed in Directive EEC 80/1107.

Article 1 describes the aim of the Directive and reaffirms the right of Member States to improve worker protection; the Commission intends to introduce appropriate proposals in due course to cover the non-auditory effects of noise as well.

Article 2 defines the terms used in accordance with recent work of the ISO.

Article 3 lays down the scope of the Directive.

Article 4 lays down the maximum permissible levels of exposure to noise and provides for a transitional period to make allowance for existing plants. The Commission intends to keep the situation and current knowledge under review in order to propose a reduction in the limit values as soon as this is reasonably feasible.

Article 5 lays down the objective to be achieved by noise measurements.

Article 6 lists the measures which must be taken to ensure that the limit values of exposure are complied with and that the accident risk due to noise is reduced to a minimum.

Article 7 lays down measures for marking areas where noise constitutes a danger; if need be, Council Directive EEC 77/576 on safety signs shall apply.

Article 8 covers cases where hearing protectors are worn.

Article 9 deals with the health surveillance of workers whose exposure is likely to exceed the authorized limits.

Article 10 lists the information which must appear in the records kept in undertakings where a risk of excessive exposure exists; it also makes provision for worker access to this information within undertakings.

Article 11 ensures that workers are properly informed of the dangers connected with the noise to which they are exposed.

Article 12 deals with workplaces. It makes provision for noise to be taken into account at the design stage, and makes it compulsory for workers to be given adequate information where the utilization of equipment leads to their being exposed to an excessive risk.

Article 13 makes it compulsory for measures taken to be consonant with the gravity of the risk and provides for cooperation between employer and worker in the establishment.

Article 14 authorizes two types of exemption. Paragraph 1 allows exposure to be determined over a weekly period, and makes it the employer's responsibility to show that the stipulated average noise level is respected. Paragraph 2 authorizes exemptions from the exposure limit where the wearing of ear protectors increases the overall risk; in this case special protective measures must be implemented. The Commission intends to make use of information it is to receive in accordance with these provisions, in order to ensure a harmonized reduction in the risk incurred.

Article 15 finalizes the technical aspects.

Annexes 1 and 2 describe the reference methods to be used in cases of doubt, or where disputes arise in connection with noise measurements and audiometric examination respectively. The relevant provisions are taken from the work of the ISO and the IEC.

3. Submission of the Proposal to the European Parliament and the Economic and Social Committee

In accordance with Article 100 of the Treaty establishing the European Economic Community, the opinion of these institutions must be sought.

Proposal for a Council Directive on the protection of workers
from the risks related to exposure to chemical, physical and biological
agents at work: noise

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,

Having regard to the opinion of the European Parliament,

Having regard to the opinion of the Economic and Social Committee,

Whereas the Council Resolution of 29 June 1978 on an action programme of
the European Communities on Safety and health at work (1) provides for the imple-
mentation 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;

(1) OJ No C 165, 11.7.1978, p. 1.

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

Whereas a reduction of the 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 simplest and 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, and whereas the priority aim must be to achieve the said reduction at source;

Whereas noise is an agent to which the provisions of 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 work¹ apply; and 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 gained and progress made in the technical and scientific field;

HAS ADOPTED THIS DIRECTIVE :

(1) OJ No L 327, 3.12.1980, p. 8

Article 1

1. Without prejudice to the provisions of Directive 80/1107/EEC, the aim of this Directive is the protection of workers against risks to their hearing and safety, including the prevention of such risks, to which they are exposed or likely to be exposed at work from exposure to noise, by laying down limit values and other special measures.
2. This Directive shall not prejudice the right of Member States to apply or introduce laws, regulations or administrative provisions ensuring greater protection for workers, and/or intended to reduce the noise at work at source wherever possible, with a view to attaining levels which do not expose workers to danger or discomfort.

Article 2

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

Sound exposure level $L_{EX,T}$

The sound exposure level over a period T is expressed in dB(A) using the formula

$$L_{EX,T} = 10 \log_{10} \frac{\int_0^T p_A^2(t) dt}{E_0}$$

where $E_0 = 1.152 \times 10^{-5} \text{ Pa}^2 \text{ s}$

T = exposure time in seconds

$p_A(t)$ = instantaneous level of A-weighted sound pressure in Pascals.

The daily sound exposure level $L_{EX,d}$

is obtained by setting, in the general formula, exposure time T equal to the actual daily period spent at work.

The weekly mean of daily sound exposure levels is equal to

$$L_{EX,w} = 10 \log \left[0,2 \sum_{k=1}^M 10^{0,1 L_{EX,k}} \right]$$

where $L_{EX,k}$ are the daily sound exposure level values for each of the M working days in the week being considered.

Equivalent continuous A-weighted sound pressure level $L_{Aeq,T}$

The equivalent continuous A-weighted sound pressure level during time T in dB(A) is found by using the following formula :

$$L_{Aeq,T} = 10 \log_{10} \frac{1}{T} \int_0^T \left(\frac{p_A(t)}{p_0} \right)^2 dt$$

where :

p_0 is a reference sound pressure of 20 μ Pa

T is the measurement time in seconds

The relationship between sound exposure level and equivalent continuous A-weighted sound pressure level is found by using the following formula :

$$L_{EX,i} = L_{Aeq,i} + 10 \log_{10} \frac{T_i}{T_0}$$

$$L_{EX,T} = 10 \log_{10} \left[\sum_{i=1}^N 10^{0,1 L_{EX,i}} \right]$$

where $L_{Aeq,i}$ is the value of L_{Aeq} over the period of time T_i

$L_{EX,i}$ is the value of L_{EX} over the period of time T_i

$T = \sum_{i=1}^N T_i$ is the total exposure time

N is the total number of periods of time

T_0 is a reference period equal to 28.8×10^3 s (8 hours)

Article 3

This Directive shall apply to all employed persons whose exposure to noise at work is likely to exceed the limit values laid down in Article 4, no account being taken of any hearing protector used.

Article 4

1. The peak sound pressure to which the ear of a worker is subjected at work must not exceed the limit value of $p = 200$ Pa (i.e. 140 dB in relation to 20μ Pa).
2. The daily sound exposure level to which the ear of a worker is subjected at work must not exceed the limit value of $L_{EX,d} = 85$ dB(A).

However, where it is not reasonably feasible to comply with this limit from the date on which the measures provided for in this Directive are to take effect, the limit value may be increased to $L_{EX,d} = 90$ dB(A) for a transitional period of a maximum of five years from the aforesaid date.

Before granting such derogation, the responsible authority of the Member State shall take into account the preventive measures incorporated into the design and construction of the installation in question.

3. The limit values indicated in paragraphs 1 and 2 shall be understood as taking account of the measures taken to implement Article 6.

Article 5

1. Noise shall be assessed and measured as part of a general programme, for which the employer shall be responsible, aimed at identifying the workers referred to in Article 3 and ensuring that, taking into account fluctuations and uncertainties, the limit values laid down in Article 4 have not been exceeded.

The apparatus used shall be adapted to the conditions prevailing at the workplace.

2. The reference method for the measurement of noise is described in Annex 1 ; the technical specifications contained therein may be extended and adapted to technical progress in accordance with the procedure set out in Article 15. Other methods may be employed, in particular, methods based on the measurement of the noise level at the workplace provided however that they always ensure the detection of any failure to comply with the limit values.

Article 6

1. The exposure to noise of the workers referred to in Article 3 must always be reduced as far as reasonably practicable by means of technical or organizational measures.
2. Without prejudice to the provisions of paragraph 1, where application thereof does not bring about compliance with the limit values laid down in Article 4, hearing protectors must be used.

3. Where noise at work and/or the implementation of the provisions of paragraphs 1 and 2 involve a risk of accident, such risk must be reduced as far as reasonably practicable by means of appropriate measures, without prejudice to the provisions of Article 4.

Article 7

Wherever there is the risk of exposure as referred to in Article 3, the employer must install appropriate signs or take equivalent steps to inform workers, in accordance with the relevant provisions.

Article 8

1. Where hearing protectors are used, they must be suited to prevailing working conditions and, in particular, attenuate noise sufficiently to comply with the limit values laid down in Article 4. They shall be provided in sufficient numbers by the employer, who should allow, as far as possible, the workers concerned some choice of model.
2. The wearing of the protectors referred to in paragraph 1 must not involve an increase in the risk to the health or safety of the worker concerned.

Article 9

1. Health surveillance shall be carried out on those workers for whom, in accordance with the provisions of Article 6(2) recourse is had to hearing protectors. This surveillance shall include an audiometric examination and shall form part of general health surveillance if such exists; it shall be based on the principles governing occupational medicine generally, with a view to the early detection of any damage to hearing from noise and to the conservation of hearing .

2. The audiometric examination shall include :
 - an initial audiometry, to be carried out as soon as the provisions in Paragraph 1 apply, unless the worker concerned is at that point already subject to audiometric examinations, which shall be continued;
 - a repeat audiometry to be carried out within a period permitting the detection of any particular sensitivity to noise;
 - periodic audiometric examinations at intervals of no more than three years.
3. The reference method for the audiometric examination is described in Annex 2; the specifications contained therein may be extended and adapted to technical progress in accordance with the procedure set out in Article 15.

Other methods may be used provided that they always comply with the principles set out in paragraph 1.

4. Each worker shall have access to the results of the examinations which he has undergone in pursuance of this Directive and to the interpretation placed upon them.
5. If the physician responsible for health surveillance suspects that there are risks to hearing at work, he shall inform the employer in accordance with national legislation or practice, and shall assist in the establishment of measures to reduce the risk.
6. If the physician imposes certain noise exposure conditions on a particular worker on account of his state of health, the employer shall be required to comply with these restrictions.

Any worker removed from a job in pursuance of these provisions and in accordance with national legislation or practice, shall, where possible be transferred to another job.

7. The workers concerned and their employer may ask for the health assessment referred to in the paragraph 6 to be reviewed by a competent body.

Article 10

1. In undertakings employing workers as referred to in Article 3, the employer shall keep a record containing :
 - information gathered in pursuance of the provisions of Article 5;
 - the measures taken to implement the provisions of Article 6;
 - the conclusions communicated to him in pursuance of the provisions of Article 9.
2. The workers and/or their representatives in the undertakings or establishments, where they exist, shall have access to this information.
3. The personal file on each worker as referred to in Article 9 shall also contain the information listed in paragraph 1 of this Article concerning the aforesaid worker.

Article 11

The workers referred to in Article 3 must be informed of :

- the potential risks to their health arising from noise exposure;
- the measures taken in pursuance of the provisions of Article 6;
- the importance of complying with technical and statutory provisions;

and receive appropriate instruction and training on these points.

Article 12

1. Where new activities or new workplaces are being organized, or where existing activities or workplaces are being reorganized, the employer shall ensure that designers, builders and/or constructors comply with provisions of Article 6 (1).

2. Where any article (tool, machine, apparatus, etc.) intended for use at work causes when properly used, exposure, which is likely to exceed the limit values laid down in Article 4, the designer, manufacturer, importer or supplier of the article must take the necessary steps to obtain and make available adequate information on the exposure and on the measures which should be taken to reduce it to a minimum.

In determining what is proper use within the meaning of this paragraph, no account is to be taken of the use of hearing protectors.

Article 13

Measures taken in pursuance of this Directive shall be consonant with the gravity of the risk; they shall be decided upon and implemented by the employer after consulting the workers and/or their representatives in the undertakings or establishments, where they exist, who can check that such measures are applied or can be involved in their application.

Persons given the task of implementing these measures must have appropriate qualifications and workers are required to cooperate with employers in their implementation.

Article 14

1. In the case of workplaces where noise exposure varies markedly from one working day to the next, Member States may grant derogations from the provision of Article 4 (2), but only on condition that the weekly average of the daily sound exposure levels complies with the limit value laid down in that Article.
2. In addition, Member States may grant derogations from Article 4 if the implementation of Article 6(2) leads to an increase in the overall risk (including that not affecting hearing) to the health and/or safety of the workers concerned.

Each of these derogations shall be subject to conditions which, in view of the individual circumstances, ensure that the overall risk is reduced to a minimum and that, in particular, the health surveillance described in Article 9 is reinforced. Each derogation shall be reviewed periodically, and revoked as soon as is reasonably feasible.

Member States shall keep a record of derogations granted under the terms of this paragraph; a summary of the information contained therein shall be forwarded annually to the Commission.

Article 15

1. The provisions required for the finalization of the technical aspects referred to in Annexes 1 and 2 and their adaptation to technical progress shall be adopted by the Committee referred to in Article 9 of Directive 80/1107/EEC, in accordance with the procedure mentioned in Article 10 of that Directive.
2. The implementation of paragraph 1 shall not however lead to any change in the meaning of the limit values.

Article 16

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31 December 1984 and shall forthwith inform the Commission thereof.
2. Member States shall communicate to the Commission the texts of the provisions of national law which they adopt in the field covered by this Directive.

Article 17

This Directive is addressed to the Member States.

Done at Brussels,

For the Council

Reference method for noise measurement

Where this reference method is employed, noise measurement shall be carried out as follows.

1. Instrumentation

The daily sound exposure level ($L_{EX,d}$) or the equivalent continuous A-weighted sound pressure level for an 8-hour period ($L_{Aeq,8h}$) shall be measured directly using integrating apparatus which ensures that the sound energy, to which the ears of workers at risk are exposed throughout the actual daily period spent working, is measured in accordance with the definitions given in Article 2.

The instrument must comply at least with the Type 1 specifications in IEC Publication 651 and be designed in such a way as to provide a sufficiently wide dynamic range (to avoid any overload from peak sound pressure) and to ensure adequate integration of instantaneous pressures; it must include an overload indicator.

The maximum (peak) instantaneous sound pressure shall be measured directly using an instrument (complying with the provisions of IEC Publication 651) including a display which shows the peak value either of this sound pressure or of its level in relation to the reference pressure of 20 μ Pa; the onset time constant of this instrument shall not exceed 100 μ s.

2. Microphone siting

Wherever possible, the microphone shall be positioned where the worker's head is normally situated.

If the measuring apparatus, or the microphone alone, has to be attached to the individual worker, the microphone shall be placed at least 10 cm away from the worker's head on the side where the highest exposure has been recorded.

3. Noise attenuation through hearing protectors

When hearing protectors are worn, noise exposure (instantaneous sound pressure and daily sound exposure levels), determined on the assumption that protectors are not worn, shall be corrected by applying the corresponding attenuation factor.

4. Protocol

The protocol shall include relevant details on the method and measurement apparatus used as well as on the conditions under which the measurements were taken; in addition, it shall include an estimate of measurement uncertainties.

Reference method for audiometric surveillance

Where this reference method is employed, audiometric surveillance shall comply with the specifications of draft standard ISO DIS 6189.2 - 1981 supplemented as follows.

The audiometer shall cover at least the frequencies 500, 1000, 2000, 3000, 4000, 6000 and 8000 Hz;

the ambient sound level shall enable a hearing threshold level equal to 0 dB re ISO 389 - 1975 to be measured.

The subject must not have been exposed to a sound pressure level exceeding 80 dB(A) (account being taken of any hearing protectors worn) during the 14 hours preceding the audiometric examination.

This examination shall be preceded by an otoscopic examination; if cerumen is obstructing the auditory canal, it should be removed and the audiometric examination carried out only after a suitable interval laid down by the physician in charge of health surveillance.