

**Ordinance on the protection of workers against the risks arising  
from exposure to noise and vibrations  
(Noise and Vibrations Occupational Safety and Health Ordinance -  
LärmVibrationsArbSchV)**

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**Footnote**

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The Ordinance was issued by the Federal Government as Article 1 of the Ordinance of 6 March 2007 I 261 after consultation of interested parties, and the special committee and of the Federal Ministry of Labour and Social Affairs in agreement with the Federal Ministry of the Interior following consultation of the Committee on Technical Work Equipment and Consumer Products and in agreement with the Federal Ministry of Economics and Technology, the Federal Ministry of Food, Agriculture and Consumer Protection, the Federal Ministry of the Environment, Nature Conservation and Nuclear Safety, the Federal Ministry of Defence and the Federal Ministry of Transport, Building and Urban Development. It entered into force on 9 March 2007 in accordance with Art. 7, Sentence 1 of the aforementioned Ordinance.

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# Section 1 Scope and Definitions

## Article 1 Scope

- (1) The purpose of this ordinance is to protect workers from risks to their health and safety arising or likely to arise from noise or vibration at work.
- (2) This ordinance shall not apply to establishments subject to the Federal Mining Act.
- (3) For imperative reasons of overriding public interest, in particular national defence or the fulfilment of intergovernmental obligations of the Federal Republic of Germany, the Federal Ministry of Defence may permit derogations from the provisions of this ordinance in respect of workers who are or are likely to be exposed to noise or vibration. In this case alternative ways of guaranteeing the safety and health of workers under this ordinance shall be specified at the same time.

## Article 2 Definitions

- (1) Noise within the meaning of this ordinance is any sound that may cause hearing impairment or any other direct or indirect risk to the safety and health of workers.
- (2) The daily noise exposure level ( $L_{EX,8h}$ ) is the time-weighted average of the noise exposure levels on the basis of an eight-hour shift. It comprises all noise events occurring at the workplace.
- (3) The weekly noise exposure level ( $L_{EX,40h}$ ) is the time-weighted average of the noise exposure levels based on a 40-hour-week.
- (4) The peak sound pressure level ( $L_{pC,peak}$ ) is the maximum value of the instantaneous sound pressure level.
- (5) Vibration means any mechanical vibration transmitted into the human body through an object and entailing a direct or indirect risk to the safety and health of workers. It includes in particular
  1. mechanical vibration that, when transmitted to the human hand-arm system, entails, or may entail, risks to the health and safety of workers, in particular bone or joint, vascular or neurological disorders, and
  2. mechanical vibration that, when transmitted to the whole body, entails risks to the health and safety of workers (whole-body vibration), in particular lower-back morbidity and trauma of the spine.

(6) The daily vibration exposure value A(8) is the time-weighted average value for hand-arm vibration in accordance with No. 1.1 of the Annex and for whole-body in accordance with No. 2.1 of the Annex, based on an eight-hour shift.

(7) State of the art means the developmental stage of advanced processes, facilities or operational methods which seems to guarantee the practical suitability of a particular measure to protect the health and safety of workers. When determining the state of the art, special consideration shall be given to comparable processes, facilities or operational methods that have proved successful in practical operation. The same shall apply to requirements in terms of occupational medicine and hygiene at work.

(8) Pupils, students and other persons in education institutions where they are exposed to noise and vibration, shall be deemed to be equivalent to workers.

## **Section 2**

### **Determination and Assessment of Risks; Measurements**

#### **Article 3 Risk Assessment**

(1) When assessing working conditions in accordance with Section 5 of the Occupational Safety and Health Act, the employer shall first ascertain whether workers are exposed or may be exposed to noise or vibration. If this proves to be the case, he shall carry out an assessment of all risks for the health and safety of workers arising from such conditions. For this purpose the employer shall identify and assess existing workplace exposures. The employer may obtain the necessary information from the manufacturer or distributor of work equipment or any other readily accessible source. If compliance with the exposure limit values and the exposure action values cannot be reliably determined, the assessment of the exposure level shall be carried out on the basis of measurement. In the light of the results of risk assessment the employers shall define protective measures reflecting the state of the art.

(2) Risk assessment pursuant to paragraph 1 shall include in particular,

1. in the case of workers' exposure to noise,

- a) the type, level and duration of exposure to noise
- b) the exposure action values referred to in Article 6, sentence 1 and the exposure values referred to in Article 8, paragraph 2,
- c) the existence of alternative work equipment and machinery reducing the exposure level of workers (substitution testing),
- d) Findings obtained from preventive occupational health care including information that is published and generally accessible,
- e) the extension of workplace exposure beyond an eight-hour shift
- f) the availability and effectiveness of hearing protectors,
- g) the effects concerning the health and safety of workers belonging to particularly sensitive risk groups, and
- h) information on noise emission provided by manufacturers

2. in the case of workers' exposure to vibration

- a) the type, level and duration of exposure to vibration, including specific working conditions such as low temperatures,
- b) the exposure limit values and action values in accordance with Article 9, paragraphs 1 and 2
- c) the existence of alternative work equipment and appliances reducing the exposure level of workers (substitution testing),

- d) Findings obtained from health surveillance including information that is published and generally accessible,
- e) the extension of workplace exposure beyond an eight-hour shift
- f) the effects concerning the health and safety of workers belonging to particularly sensitive risk groups, and
- g) information on vibration emission provided by manufacturers.

(3) The risks arising from exposure to noise or vibration shall be assessed separately and shall be brought together in a single risk assessment. The risk assessment shall take account of possible interactions or combined effects. As far as technically feasible, this applies in particular to activities involving simultaneous exposure to noise, work-related ototoxic substances or vibration. Account shall also be taken of indirect effects on the health and safety of workers, caused, for example, by interactions between noise and warning signals or other sounds whose acoustic perception is necessary to avoid risks. In the case of activities demanding a high level of concentration and attention, interference and negative effects caused by noise or vibration shall be taken into account.

(4) The employer shall document the risk assessment regardless of the number of workers. In the documentation an indication must be given of the risks that may arise at the workplace and the measures that need to be taken to avoid or minimise risks to the safety and health of workers. The risk assessment shall be kept up-to-date, when significant changes in working conditions or the results of health surveillance show it to be necessary.

#### **Article 4 Measurements**

- (1) The employer shall ensure that the measurements are carried out in conformity with the state of the art. To this end
1. measurement methods and apparatus shall be adapted to the prevailing workplace and exposure conditions; this concerns in particular the characteristics of the noise or vibration to be measured, the length of exposure and ambient factors, and
  2. measurement methods and apparatus shall make it possible to determine the respective physical parameters and to decide whether the exposure action values and the exposure limit values referred to in Articles 6 and 9 are met.

The measurements to be taken may include sampling, which shall be representative of the personal exposure of a worker. The employer shall retain records in a suitable form of the results obtained from the measurements for at least 30 years so as to permit consultation at a later stage.

(2) In addition to the requirements set out in paragraph 1, measurements to determine exposure to vibration shall be carried out in accordance with Nos. 1.2 and 2.2 of the Annex.

#### **Article 5 Expertise**

The employer shall ensure that the risk assessment is only carried out by competent persons. If the employer himself does not have the necessary knowledge, he shall seek expert advice. Competent persons are in particular company doctors and occupational safety experts.

The employer may entrust the performance of measurements only to persons who have the necessary competence and the required apparatus.

### **Section 3 Exposure Action Values and Noise Protection Measures**

#### **Article 6 Action values for noise**

The action values in respect of the daily noise exposure levels and peak sound pressure level are as follows:

1. Upper exposure action values:  $L_{EX,8h} = 85$  dB(A) and  $L_{pC,peak} = 137$  dB(C) respectively,
2. Lower exposure action values:  $L_{EX,8h} = 80$  dB(A) and  $L_{pC,peak} = 135$  dB(C) respectively,

When applying the action values the attenuation provided by individual hearing protectors worn by the worker shall not be taken into account.

#### **Article 7 Provisions aimed at avoiding or reducing noise exposure**

(1) The employer shall implement the protection measures set forth in Article 3, paragraph 1, sentence 6 in accordance with the state of the art to ensure that risks for the workers are eliminated or reduced to a minimum. The following order of priority shall be taken into account:

1. Noise emission shall be eliminated at its source or reduced to a minimum. Technical measures shall take precedence over organisational measures.
2. Measures pursuant to No.1 of this paragraph shall have priority over the use of hearing protectors provided for in Article 8.

(2) Measures pursuant to paragraph 1 shall include in particular:

1. other working methods that reduce the exposure of workers to noise,
2. in selecting and using new or existing work equipment consideration shall primarily be given to noise reduction.
3. low noise design and layout of workplaces and workstations,
4. technical measures to reduce airborne noise, e.g. by shields or enclosures, and to reduce structure-borne noise, e.g. by absorption, insulation or isolation.
5. maintenance programmes for work equipment, workplaces and installations,
6. organisation of work to reduce noise by limiting the duration and intensity of the exposure and work schedules allowing for adequate periods without harmful exposure.

(3) In rest rooms exposure to noise shall be reduced as far as possible bearing in mind the rest rooms' purpose and conditions of use.

(4) Work areas in which one of the upper action values ( $L_{EX,8h}$ ,  $L_{pC,peak}$ ) is likely to be exceeded shall be marked by the employer as noise areas and shall be delimited, where technically feasible. Workers may only enter these areas if access is necessitated by the work process and if they are using suitable personal protective equipment; paragraph 1 shall remain unaffected.

(5) Where one of the upper exposure action values is exceeded, the employer shall establish and implement a programme of technical and organisational measures intended to reduce noise exposure, taking into account in particular paragraphs 1 and 2.

#### **Article 8 Hearing protection**

(1) Where the lower exposure action values referred to in Article 6, sentence 1, No. 2 are not complied with despite the implementation of measures pursuant to Article 7 paragraph 1, the employer shall provide workers with suitable individual hearing protectors satisfying the requirements set forth in paragraph 2 of this Article.

(2) The individual hearing protectors shall be so selected by the employer as to ensure that by using them the risk to hearing is eliminated or reduced to a minimum. It shall be ensured that, taking into account the attenuation provided by the hearing protectors, the worker's exposure to noise does not exceed the maximum permissible exposure values  $L_{EX,8h} = 85$  dB(A), or  $L_{pC,peak} = 137$  dB(C) respectively.

(3) Where noise exposure at the workplace matches or exceeds one of the upper exposure action values, the employer shall ensure that the workers' individual hearing protectors are used as intended.

(4) The condition of the selected individual hearing protectors shall be checked at regular intervals. If the employer finds that the requirements set out in paragraph 2, sentence 2 of this Article are not complied with, he shall immediately identify the reasons for non-compliance and take the necessary measures to ensure permanent compliance with the requirements.

## **Section 4**

### **Exposure Limit Values, Action Values, and Vibration Protection Measures**

#### **Article 9 Exposure limit values and action values for vibration**

(1) For hand-arm vibration

1. the exposure limit value is  $A(8) = 5 \text{ m/s}^2$  and
2. the action value is  $A(8) = 2,5 \text{ m/s}^2$ .

Workers' exposure to hand-arm vibration shall be determined and assessed on the basis of the provisions of No.1 of the Annex.

(2) For whole-body vibration

1. the exposure limit value  $A(8) = 1,15 \text{ m/s}^2$  on the X and Y axes and  $A(8) = 0,8 \text{ m/s}^2$  on the Z axis and
2. the action value is  $A(8) = 0.5 \text{ m/s}^2$ .

Workers' exposure to whole-body vibration shall be determined and assessed on the basis of the provisions of No.2 of the Annex.

#### **Article 10 Provisions aimed at avoiding or reducing exposure to vibration**

(1) The employer shall implement the protection measures set forth in Article 3 paragraph 1 sentence 6 taking in accordance with the state of the art so as to ensure that risks for the workers are eliminated or reduced to a minimum. Vibration shall be eliminated at its source or reduced to a minimum. Technical measures to reduce vibration shall take precedence over organisational measures.

(2) Measures pursuant to paragraph 1 shall include in particular:

1. other working methods producing less exposure to vibration.
2. Selection and use of new or existing work equipment of appropriate ergonomic design and, taking account of the work to be done, producing the least possible vibration, e.g. vibration-damped hand-held or hand-guided work machines which reduce the vibration transmitted to the hand-arm system,
3. the provision of auxiliary equipment that reduces health hazards caused by vibration, such as seats that effectively reduce whole-body vibration,
4. maintenance programmes for work equipment, workstations and installations and driving surfaces,
5. the design and layout of workplaces and workstations,
6. training to instruct workers to operate work equipment safely and with a low level of vibration
7. limitation of the duration and intensity of the exposure,
8. work schedules allowing for adequate periods without harmful exposure, and
9. the provision of clothing to protect exposed workers from cold and damp.

(3) Particularly by implementing the measures referred to in paragraph 1 of this Article, the employer shall ensure that in the case of exposure of workers to vibration, the exposure limit values set out in Article 9 paragraph 1, sentence 1, No. 1 and Article 9, paragraph 2, sentence 1, No. 1 are not exceeded. If, despite the measures taken, the exposure limit values are exceeded, the employer shall immediately identify the reasons and take further action to reduce exposure below the exposure limit values and to prevent the limit values from being exceeded again.

(4) Where the exposure limit values and action values set out in Article 9, paragraph 1, sentence 1, No. 2 or Article 9, paragraph 2, sentence 1, No.2 are exceeded, the employer shall establish and implement a programme of technical and organisational measures intended to reduce exposure to vibration, taking into account in particular the measures referred to in paragraph 2.

## **Section 5**

### **Worker Training; Advice from the Safety and Health Commission**

#### **Article 11 Worker training**

(1) Where, in the case of exposure to noise, the lower exposure action values set out in Article 6, sentence 1, No.2, or, in the case of exposure to vibration, the exposure action values set out in Article 9, paragraph 1, sentence 1, No. 2, or Article 9, paragraph 2, sentence 1, No.2 are reached or exceeded, the employer shall ensure that the workers concerned receive training relating to the outcome of the risk assessment and informing them on the risks associated with the exposure. The training shall be provided before the commencement of employment and in regular intervals thereafter, and it shall be provided whenever major modifications of the harmful activity occur.

(2) The employer shall ensure that training pursuant to paragraph 1 of this Article is provided in a form and language understandable to the workers and that it includes in particular information on:

1. the nature of the risk
2. the measures taken to eliminate or minimise the risk taking account of the workplace conditions;
3. the exposure limit values and the exposure action values;
4. the results of exposure assessment together with an explanation of their significance and an assessment of associated potential risks and health effects;
5. the correct use of personal protective equipment
6. the circumstances in which workers are entitled to health surveillance, and the purpose of health surveillance;
7. the proper use of work equipment and safe working practices to minimise exposure;
8. Advice on how to detect and report possible damage to health;

(3) To allow an early detection of health disorders caused by noise or vibration, the employer shall ensure that when the lower exposure action values for noise or the exposure action values for vibration are exceeded, the workers concerned receive general occupational health counselling. Where necessary for medical reasons, occupational health counselling shall be provided in which the medical doctor referred to in Article 7, paragraph 1 of the Ordinance on Preventive Occupational Medicine shall participate. Occupational health counselling may be provided as part of the training in accordance with paragraph 1 of this Article.

#### **Article 12 Advice from the Safety and Health Commission**

The Committee referred to in Article 24 of the Industrial Safety Ordinance shall advise the Federal Ministry of Labour and Social Affairs also on safety and health issues related to the risks

caused by noise or vibration. Article 24, paragraphs 4 and 5 of the Industrial Safety Ordinance shall apply mutatis mutandis.

**Article 13 (deleted)**

**Article 14 (deleted)**

**Section 6**  
**Derogations, Criminal and Administrative Offences**

**Article 15 Derogations**

(1) Upon written application by the employer the competent authority may grant derogations from the provisions of Articles 7 and 10 provided that the implementation of the provision would lead to unreasonable hardship in individual cases and that the derogation is compatible with the safety of the workers concerned. Such derogations may be accompanied by ancillary provisions which guarantee, taking into account the special circumstances, that the resulting risks are reduced to a minimum. Such derogations shall be reviewed every four years and withdrawn as soon as the justifying circumstances no longer obtain. The employer's application shall contain information on

1. the risk assessment and documentation thereof;
2. the nature, extent and duration of the identified exposure;
3. the measurement results;
4. the state of the art regarding activities and work processes and on technical, organisational and personal protection measures;
5. proposed solutions and a time schedule for the reduction of workers' exposure in order to comply with the exposure limit values and exposure action values.
6. (deleted)

A derogation in accordance with the first sentence may also be applied for pursuant to other legal provisions in the context of an administrative procedure.

(2) At the request of the employer the competent authority may, for the purposes of applying the exposure limit values and the exposure action values, permit that for activities where daily noise exposure varies markedly from one working day to the next, the weekly noise exposure level is used in place of the daily noise exposure level to assess the levels of noise to which workers are exposed, on condition that

1. the weekly noise exposure level as shown by adequate monitoring does not exceed the exposure value  $L_{EX,40h} = 85 \text{ dB(A)}$ ; and
2. appropriate measures are taken in order to reduce the risk associated with these activities to a minimum.

**Article 16 Administrative and criminal offences**

- (1) Persons, who, deliberately or through negligence,
1. violate Article 3 paragraph 1 sentence 2 by not identifying and assessing the existing exposure to the extent specified in paragraph 2 of Article 3;
  2. violate Article 3 paragraph 4, sentence 1 by not documenting a risk assessment, or violate Article 3 paragraph 4 sentence 2 by not stating in the documentation the information specified in that paragraph;

3. violate Article 4, paragraph 1, sentence 1 in conjunction with sentence 2 by not ensuring that measurements are carried out according to the state of the art, or violates Article 4 paragraph 1 sentence 4 by not recording the measurement results;
4. violates Article 5, sentence 1 by not ensuring that the risk assessment is carried out by competent persons, or violates Article 5, sentence 4 by not entrusting the performance of measurements to persons referred to in that paragraph;
5. violate Article 7, paragraph 4, sentence 1 by not marking or delimiting work areas;
6. violate Article 7, paragraph 5, sentence 1 by not implementing a programme of technical and organisational measures intended to reduce noise exposure;
7. violate Article 8, paragraph 1 in conjunction with paragraph 2 by not providing the hearing protectors specified therein;
8. violate Article 8, paragraph 3 by not ensuring that the workers' hearing protectors referred to therein are used as intended;
9. violate Article 10, paragraph 3, sentence 1 by not ensuring that the exposure limit values referred to in Article 9, paragraph 1 sentence 1, No. 1 or Article 9, paragraph 2, sentence 1, No. 1 are not exceeded.
10. violate Article 10, paragraph 4, sentence 1 by not implementing a programme of technical and organisational measures intended to reduce noise exposure.
11. violate Article 11, paragraph 1 by not ensuring that workers receive training relating to the outcome of the risk assessment and providing the information specified in Article 11, paragraph 2.
12. deleted
13. deleted

shall be guilty of an administrative offence within the meaning of Section 25, Paragraph 1, number 1 of the Act on the Safety and Health at work.

(2) Persons who, by a deliberate act referred to in paragraph 1 above, put at risk the life or health of a worker shall be guilty of a criminal offence within the meaning of Section 26, number 2 of the Act on Safety and Health at Work.

#### **Article 17 Transitional provisions**

(1) In the music and entertainment sectors this Ordinance shall only be applicable from 15 February 2008.

(2) In derogation from Article 9, paragraph 2, No. 1. the exposure limit value on the z-axis shall, until 1 July 2011, be  $A(8)=1,15 \text{ m/s}^2$  for whole-body vibration in the case of military equipment of the Federal Armed Forces which was first put into operation before 1 July 2007.

(3) In derogation from Article 9, paragraph 2, No.1, the exposure limit value for whole-body vibration in z axis of  $A(8) = 0,8 \text{ m/s}^2$  may, until 31 December 2011, be exceeded up to a maximum level of  $1,15 \text{ m/s}^2$  on 30 days per year in the case of activities involving the use of construction machinery and equipment manufactured before the year 1997 where compliance with the exposure limit value set out in Article 9 paragraph 2, No. 1 is not feasible despite all measures provided for by this Ordinance.

## Annex Vibration

### 1. Hand-Arm Vibration

#### 1.1 Identification and assessment of exposure

The assessment of the level of exposure to hand-arm vibration is performed according to the state of the art based on the calculation of the daily exposure value normalised to an eight-hour reference period  $A(8)$  expressed as the square root of the sum of the squares (rms)(total value) of the frequency-weighted acceleration values determined on the orthogonal axes  $a_{hwx}$ ,  $a_{hwy}$ ,  $a_{hwz}$ .

The assessment of the level of exposure may be carried out on the basis of an estimate based on information provided by the manufacturers concerning the level of vibration emission from the work equipment used, and based on the observation of specific work practices or on measurement.

#### 1.2 Measurement

When measurement is employed in accordance with Article 4, paragraph 2

- a) the methods used may include sampling, which must be representative of the personal exposure of a worker to the mechanical vibration in question; the methods and apparatus used must be adapted to the particular characteristics of the mechanical vibration to be measured, to ambient factors and to the characteristics of the measuring apparatus
- b) in the case of devices which need to be held with both hands, measurements must be made on each hand. The exposure is determined by reference to the higher value of the two; information for the other hand shall also be given.

#### 1.3 Interferences

Article 3, paragraph 3, sentence 2 will apply in particular where the mechanical vibration interferes with the proper handling of controls or reading of indicators.

#### 1.4 Indirect risks

Article 3, paragraph 3, sentence 2 will apply in particular when the mechanical vibration interferes with the stability of structures or the security of joints.

#### 1.5 Individual protectors

Personal protective equipment against hand-arm vibration may contribute to the programme of measures referred to in Article 10, paragraph 4

### 2. Whole-Body Vibration

#### 2.1 Assessment of Exposure

The assessment of the level of exposure to whole-body vibration is performed according to the state of the art and is based on the calculation of the daily exposure  $A(8)$  normalised to an eight-hour reference period; it is calculated on the basis of that corrected (rms) value of the frequency-weighted accelerations  $1,4_{awx}$ ,  $1,4_{awy}$  or  $1,4_{awz}$  determined on three orthogonal axes x, y or z which results in the shortest period before the exposure action value or exposure limit value is exceeded. The assessment of the level of exposure may be carried out on the basis of an estimate based on information provided by the manufacturers concerning the level of vibration emission from the work equipment used and based on the observation of specific work practices or on measurement.

#### 2.2 Measurement

When measurement is employed in accordance with Article 4, paragraph 2, the methods may include sampling, which must be representative of the personal exposure of a worker to the mechanical vibration in question. The methods used must be adapted to the particular characteristics of the mechanical vibration to be measured, to ambient factors and to the characteristics of the measuring apparatus.

### 2.3 Interferences

Article 3, sentence 2 will apply in particular where the mechanical vibration interferes with the proper handling of controls or reading of indicators.

### 2.4 Indirect risks

Article 3, paragraph 3, sentence 2 will apply in particular when the mechanical vibration interferes with the stability of structures or the security of joints.

### 2.5 Extension of exposure

Where the extension of workplace exposure beyond an eight-hour shift means that workers are using rest facilities supervised by the employer, exposure to whole-body vibration in those facilities must be reduced to a level compatible with their purpose and conditions of use, except in cases of force majeure.