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GOVERNMENT DECREE

of 27 November 2000

on Health Protection against the Adverse Effects of Noise and Vibrations

The government, pursuant to Article 108, Paragraph 3, of Act No. 258/2000 Coll. on Public Health Protection and on the Amendment of Some Related Acts on the Application of Articles 30 and 32 and Article 34, Paragraph 1, and pursuant to Article 134c, Paragraph 7, of Act No. 65/1965 Coll., of the Labour Code, as amended by Act No. 155/2000 Coll., hereby decrees:

Article 1

Basic Provisions

- (1) This Decree establishes the hygienic emission limits for noise and vibrations at the workplace, at housing and public facilities construction sites and for ambient noise and vibrations, as well as the manner of their measurement and evaluation. Noise emission levels are established by specific legal regulations¹. The basic concepts, definitions and designations of value are indicated in Annex 1 to this Decree.
- (2) This Decree does not apply to current household noises, voice expressions by people and animals or music and noise generated by public activities, unless the noise in question results from the public production of music or from production or other enterprising activity. It does not extend to unique noise events nor to noise and vibrations obtaining inside public transport vehicles, with the exception of noise and vibrations generated at the vehicle's maintenance and service sites.

Article 2

Basic Concepts

¹ For instance, Government Decree No. 170/1997 Coll., Establishing the Technical Requirements for Machinery and Equipment, as amended by Government Decree No. 15/1999 Coll., Act No. 47/1997 Coll. on Civil Aviation and on Amending Act No. 455/1991 Coll. on Trade Entrepreneurial Activities (the Trade Act), as amended by subsequent legislation, as amended by Act 189/1999 Coll., Act No. 38/1995 Coll., on the Technical Conditions for the Operation of Road Vehicles on Surface Communications.

For the purposes of this Decree, the concepts indicated below shall be understood to mean the following:

- (a) noise – any sound which may pose health or other hazards;
- (b) vibrations – any vibrations transmitted to the human body by hard bodies if they pose health or other hazards;
- (c) maximum permissible value – a value, based on health considerations and taking into account the adverse effect of noise and vibrations, established for a residential area;
- (d) housing constructions – constructions designed fully or partially for residential purposes;
- (e) public facilities constructions – constructions designed to be used for public utility purposes, such as healthcare, social or veterinary care, temporary accommodation, school or pre-school education, science and research, culture, sports, services, trade, public catering, public administration and church activities;
- (f) ambient space – space beyond two metres from a residential or a public utility building and areas used for recreation, sports, medical treatment, hobbies and other activities, with the exception of communications and outdoor work-site areas.

Article 3

Sustained and Variable Noise

- (1) Sustained and variable noise levels at the workplace shall be expressed by the equivalent levels of acoustic pressure ($A_{LAeq,T}$). For evaluation purposes, a standard noise exposure level shall be established for the usual 8-hour working day ($L_{EX,8h}$) or a weekly noise exposure level ($L_{EX,w}$) shall be established on the basis of the daily noise exposure level mentioned. Noise load shall be expressed by means of noise exposure (A_{EAT}).
- (2) The maximum permissible equivalent level of acoustic pressure A for an 8-hour working day ($LA_{eq,8h}$), which is the maximum permissible standard level of exposure to noise for a normal 8-hour working day ($L_{EX,8h}$), or the maximum permissible level of exposure to noise standardised for weekly exposure ($L_{EX,w}$) on the basis of the above-mentioned level of exposure to noise for an 8-hour working day, shall be determined by the sum of the basic level of acoustic pressure (A 85 dB) and the corrections relative to the type of activity practiced as indicated in Annex 2 to this Decree. The maximum permissible workplace level of exposure to noise for a working shift ($A_{EA,8h}$) for a Group VI type of activity, according to Annex 2 to this Decree, shall be 3,640 Pa²s.
- (3) Evaluation based on average weekly exposure to noise (standardised on the basis of the 8-hour working day) shall only be applied at workplaces where the working hours are not evenly distributed within the working week or where workplace noise varies considerably in the course of the week.

Article 4

Noise with Pronounced Tonal Components

- (1) Workplace noise with pronounced tonal components shall be expressed and evaluated in the same manner as sustained and variable noise.
- (2) The maximum permissible acoustic pressure levels, however, shall be reduced by 5 dB if the noise is tonal in character, which is detectable by a frequency analysis in the one-third octave bands. Should the tonal nature of the noise be detectable by means of

a narrow-band analysis of frequency bands at 6 per cent or subjectively, the maximum permissible values shall be reduced by 2 dB.

Article 5 **Impulse Noise**

- (1) Workplace impulse noise levels shall be expressed by the maximum acoustic pressure values C , by the maximum acoustic pressure levels C and the equivalent levels of acoustic pressure at the time parameter I $L_{Aeq,T}$.
- (2) The maximum permissible acoustic pressure value C shall be 200 Pa; the maximum permissible acoustic pressure level C shall be 140 dB.
- (3) If workplace noise is not generated exclusively by impulse noise but consists of a combination of impulse noise and sustained or variable noise with detectable impulse noise components for quantities equivalent to the level of acoustic pressure A $L_{Aeq,T}$ (i.e. $L_{Aeq,T} - L_{Aeq,T} > 2.0$ dB), noise shall be expressed by the equivalent level of acoustic pressure A at the time parameter I $L_{Aeq,T}$. The noise load produced by such impulse noise shall be expressed by the slope of noise A at the time parameter I $E_{A,T}$.
- (4) If the share of the impulse noise component is not detectable (i.e., $L_{Aeq,T} - L_{Aeq,T} \leq 2.0$ dB), workplace noise shall be evaluated in the manner in which variable noise is evaluated. The noise load shall be evaluated in the same way.
- (5) The maximum permissible equivalent level of acoustic pressure A at the time parameter I standardised for an 8-hour working day shall be determined by the sum of the basic level of acoustic pressure A 85 dB and the corrections relative to the type of activity practiced as indicated in Annex 2 to this Decree. The maximum permissible workplace noise exposure level per working shift (A $E_{A,8h}$) for a Group VI activity type, pursuant to Annex 2 to this Decree, shall be 3,640 Pa²s.

Article 6 **High-Frequency Noise**

- (1) High-frequency workplace noise shall be expressed by acoustic pressure levels L_t in the one-third octave bands of 8-16 kHz average frequency.
- (2) The maximum permissible equivalent acoustic pressure level of high-frequency noise in the one-third octave 8, 10, 12.5 and 16 kHz bands for an 8-hour working period shall, for this type of noise, be determined by the sum of the basic level of acoustic pressure in the one-third octave band $L_{teq,8h} = 70$ dB and activity type related corrections in accordance with Annex 2 to this Decree.
- (3) At the workplaces where the dominant noise frequency is in the 16-29 kHz band, high-frequency noise shall be evaluated on the basis of the equivalent levels of acoustic pressure $L_{ueq,T}$ in the 6 % width frequency bands of (one twelfth of the octave). The maximum permissible equivalent level of acoustic pressure for this frequency range shall be determined by the sum of the basic values of acoustic pressure indicated in Annex 3 to this Decree and the activity type related corrections in accordance with Annex 2 to this Decree.

Article 7 **Ultrasound**

- (1) Workplace ultrasound shall be expressed by acoustic pressure levels L_t in the one-third octave bands of an average frequency from 20 kHz to 40 kHz.

- (2) The maximum permissible equivalent level of ultrasound acoustic pressure in the one-third octave 20, 25, 31.5 and 40 kHz bands for an 8-hour working period shall be determined by the sum of the basic level of ultrasound acoustic pressure in the one-third octave band $L_{teq,8h} = 105$ dB and the activity type related corrections in accordance with Annex 2 to this Decree.

Article 8

Infrasound and Low-Frequency Noise

- (1) Workplace infrasound values shall be expressed by the levels of acoustic pressure G of infrasound L_G or, should it be necessary to determine the frequency composition of infrasound, by the levels of acoustic pressure G in the one-third octave 1-16 Hz frequency bands. The values of low-frequency noise shall be expressed by the levels of acoustic pressure L_t in the one-third octave 20-40 Hz frequency bands.
- (2) The maximum permissible equivalent level of infrasound acoustic pressure G and of low-frequency noise for an 8-hour working period shall be determined by the sum of the basic level of $L_{Geq,8h} = 116$ dB and the activity type related corrections in accordance with Annex 4 to this Decree.
- (3) The maximum permissible equivalent level of infrasound acoustic pressure in the one-third octave 1-16 Hz bands for an 8-hour working period shall be determined by the sum of the basic level of $L_{teq,8h} = 110$ dB and the activity type related corrections in accordance with Annex 4 to this Decree.
- (4) The maximum permissible equivalent level of low-frequency noise acoustic pressure in the one-third octave 20-40 Hz bands for an 8-hour working period shall be determined by the sum of the basic level of $L_{teq,8h} = 105$ dB and the activity type related corrections in accordance with Annex 4 to this Decree.
- (5) In the event of a short-term exposure, the maximum levels of workplace infrasound acoustic pressure in the one-third octave 1-16 Hz bands may not exceed the value of $L_t = 137$ dB. In the one-third octave 20-40 Hz bands, the value of $L_t = 132$ dB may not be exceeded.

Article 9

Maximum Permissible Workplace Noise Levels for Work Periods Other than Eight-Hour Working Days

The maximum permissible noise levels for a working day of a different duration T shall be established by adding the correction K_T to the established maximum permissible noise levels for an 8-hour working day (noise $L_{Aeq,8h}$). The correction K_T shall be determined according to the following equation:

$$K_T = 10 \log (480/T), \text{ /dB/},$$

where T is the working time per shift in a noisy environment calculated in minutes.

Article 10

Personal Protection Devices against Workplace Noise

- (1) Should the hazard arise that personal daily exposure to noise exceeds 85 dB(A), employees shall be provided with personal protection devices against workplace noise.

- (2) Should daily personal exposure to noise exceed 90 dB(A) or the maximum acoustic pressure value exceed 200 Pa, all employees shall use personal noise protection devices providing effective protection in the noise level ranges generated at the workplace.

Article 11

Maximum Permissible Noise Levels in Residential Buildings and Public Facilities Buildings

- (1) Noise levels inside residential buildings and public facilities buildings shall be expressed by the equivalent level of acoustic pressure $A L_{Aeq,T}$ and by the maximum acoustic pressure level $A L_{pAmax}$. These levels shall be established for the eight noisiest hours of the day and for the noisiest hour at night. With respect to noise generated by public road and rail transport and air traffic, noise levels shall be established for the day and night as a whole².
- (2) The maximum permissible acoustic pressure level A inside residential buildings and public facilities buildings shall be established for noise penetrating from the outside as the sum of the basic acoustic pressure level $L_{eq,T} = 40$ dB and the relevant correction for use of space and the daytime correction in accordance with Annex No. 5 to this Decree. Should the noise contain pronounced tonal components or should it have a marked informational character, as in the case of speech or music, another correction of 5 dB shall be added.
- (3) The maximum permissible acoustic pressure level A inside residential buildings and public facilities buildings shall, for noise spreading from sources inside the building itself, be established as the sum of the basic maximum noise level $L_{pAmax} = 40$ dB and the daytime correction and the correction for use of space in accordance with Annex No. 5 to this Decree. Should the noise contain pronounced tonal components or should it have a marked informational character, as in the case of speech or music, another correction of - 5dB shall be added. Noise generated by stationary sources located outside the buildings concerned which penetrates into these in a manner other than through the air, i.e. through the structure or the foundations, shall also be considered as noise generated inside the building. When permitted repairs are carried out inside the building, a correction of +15 dB to the basic maximum acoustic pressure level is permissible for the period from 7h - 21h.
- (4) The duration of reverberations in school rooms (including gymnasiums) and common rooms for pre-school children may not exceed 0.6 s, and in the halls and staircases of school and healthcare buildings, 1.0 s.
- (5) The maximum permissible acoustic pressure level A for the sound of electronically amplified music shall be established at $L_{Aeq,T} = 95$ dB for public entertainment music and at $L_{Aeq,T} = 100$ dB for concerts of electronically amplified music in concert halls for a maximum period of $T = 4$ hours. Compliance with the limits established under paragraph 5 for indoor places of entertainment shall not be automatically equated with

² Article 34, Paragraph 2, of Act No. 258/2000 Coll., on Public Health Protection and on the Amendment of Certain Related Laws.

compliance with the hygienic limits in surrounding protected areas and in ambient space.

Article 12

Maximum Permissible Noise Levels for Ambient Space

- (1) Noise levels for ambient space shall be expressed by the equivalent level of acoustic pressure $A_{L_{Aeq,T}}$. These levels shall be established for the eight noisiest hours of the day and for the noisiest hour at night. With respect to noise generated by public road and rail transport and air traffic, noise levels shall be established for the day and the night as a whole. For the purposes of surface planning, these shall be expressed through the 24-hour long-term equivalent level L_{dvn} and the night-time long-term equivalent level L_n .
- (2) The maximum permissible acoustic pressure level A for ambient space (with the exception of noise generated by air traffic) shall be established as the sum of the basic noise level $L_{Aeq,T} = 50$ dB and the appropriate daytime, night-time and place corrections in accordance with Annex No. 6 to this Decree. For high impulse noise, another correction of -7 dB shall be added.
- (3) The maximum permissible acoustic pressure level A for ambient space shall be established for noise generated by air traffic as the sum of the basic noise level $L_{Aeq,T} = 65$ dB and the appropriate daytime, night-time and place corrections in accordance with Annex No. 7 to this Decree.
- (4) The maximum permissible long-term equivalent levels L_{dvn} and L_n shall be numerically equivalent to the maximum permissible equivalent acoustic pressure daytime and night-time levels $L_{Aeq,T}$.
- (5) In executing permitted construction work, a correction of $+10$ dB to the basic maximum permissible equivalent acoustic pressure level A shall be permissible in the period from 7h-21h, established under Paragraph 2. Noise generated by construction activities shall be calculated in the manner indicated in Annex 6 to this Decree.
- (6) If, after all means of noise protection have been exhausted during construction work, it is proved that it is technically impossible to comply with the provisions of Paragraphs 1-3, the required noise protection may be ensured by means of insulating the site in such a way as to meet the conditions set forth in Article 11. Ventilation shall also be made possible as required.

Article 13

Maximum Permissible Vibration Levels

- (1) Vibrations affecting human beings at the workplace and in buildings used for residential purposes and overall vertical vibrations of a frequency lower than 0.5 Hz shall be expressed through –
 - (a) the weighted level of vibration acceleration L_{aw} in dB or through the weighted effective value of vibration acceleration a_{ew} in $m.s^{-2}$;
 - (b) the vibration acceleration levels in the one-third octave frequency bands L_{at} in dB or through the effective vibration acceleration values in the one-third octave frequency bands a_{et} in $m.s^{-2}$;
 - (c) the total weighted level of vibration acceleration L_{aw} in dB or through the total weighted vibration acceleration value a_{ew} in $m.s^{-2}$ in case of hand-transmitted segment vibrations.

- (2) In the event of general vibrations, construction vibrations, vibrations transmitted in specific ways and vertical vibrations of a frequency lower than 0.5 Hz, the highest permissible values shall apply only to vibrations transmitted in one direction in accordance with the structure of the human body. In case of hand-transmitted vibrations, maximum permissible vibration values shall apply to the overall levels of transmitted vibrations established through the weighted acceleration values in three orthogonal directions in accordance with the structure of the hand and arm.
- (3) The frequency band in which vibrations are to be evaluated in terms of the likelihood of adverse effect on humans (hereinafter referred to as the “frequency band under observation”) and for which the maximum permissible vibration values are established, shall be indicated in accordance with the manner or conditions of the transmission indicated in Annex 8 to this Decree.
- (4) The establishment of the maximum permissible values shall apply to sustained and variable vibrations and concussions (shocks) if the major part of their energy falls in the frequency band under observation.
- (5) Vibration acceleration levels and vibration acceleration effective values are mutually replaceable vibration values.
- (6) The maximum permissible vibration values shall apply to vibrations transmitted from the environment to human beings. The maximum permissible values of overall vertical and horizontal vibrations, of hand-transmitted vibrations, of vibrations transmitted in specific ways, of vibrations in residential and public facilities buildings and the maximum permissible overall vertical vibrations of a frequency lower than 0.5 Hz shall be established in accordance with the manner of their transmission and the surrounding conditions.

Article 14

Maximum Permissible Overall Vertical and Horizontal Vibration Levels

- (1) The maximum permissible levels of acceleration of overall vertical vibrations in the one-third octave frequency bands L_{atp} , valid for an eight-hour working period, shall be given by the sum of the basic values of L_{atp} indicated in Annex 9 to this Decree and the corrections for the type of work and the nature of vibrations under Paragraph 15. The maximum effective value of the acceleration a_{etp} valid for an eight-hour working period shall be given by the sum of the basic values of a_{etp} indicated in Annex 9 to this Decree and the correction factors for the type of work and the nature of vibrations under Paragraph 15.
- (2) The maximum permissible weighted acceleration level of overall vertical vibrations L_{awp} , valid for an eight-hour working period, shall be given by the sum of the basic values of $L_{atp} = 110$ dB and the corrections for the type of work and the nature of vibrations under Paragraph 15. The maximum effective value of the acceleration a_{etp} , valid for an eight-hour working period, shall be given by the sum of the basic values of $a_{etp} = 0.315$ indicated in Annex 9 to this Decree and the correction for the type of work and the nature of vibrations under Paragraph 15.
- (3) The maximum permissible levels of overall horizontal vibrations in the one-third octave frequency bands L_{atp} , valid for an eight-hour working period, shall be given by the sum of the basic values of L_{atp} indicated in Annex 9 to this Decree and the corrections for the type of work and the nature of vibrations under Paragraph 15. The maximum effective value of the acceleration a_{etp} , valid for an eight-hour working period, shall be given by the sum of the basic values of a_{etp} indicated in Annex 9 to this Decree and the correction factors under Paragraph 15.

- (4) The maximum permissible weighted level of acceleration of overall horizontal vibrations L_{atp} , valid for an eight-hour working period, shall be given by the sum of the basic value of $L_{atp} = 107$ dB and the corrections for the type of work and the nature of vibrations under Paragraph 15. The maximum permissible weighted effective value of the acceleration a_{etp} , valid for an eight-hour working period, shall be given by the sum of the basic value of $a_{etp} = 0.22$ m.s⁻² and the correction factors under Paragraph 15.

Article 15

Corrections for the Type of Work and the Nature of Vibrations

- (1) The correction for the type of work and the nature of vibrations K_m and the correction factor k_m , by which the basic effective value of vibration acceleration is multiplied, shall apply with respect to workplaces on mobile machinery. With respect to road machinery (such as, for instance, cranes and cutting-loading machines), the indicated basic levels of overall workplace vibrations acceleration shall be reduced by adding the correction $K_m = -6$ dB and half of the basic effective vibration acceleration value ($k_m = 0.5$).
- (2) With respect to vibrations transmitted at workplaces with stationary machinery or at workplaces without vibration sources, the established basic overall vibration acceleration levels shall be reduced by adding the correction $K_m = -16$ dB which means that the basic effective values of vibration accelerations shall be reduced by 16 % ($k_m = 1.6$).
- (3) With respect to workplaces requiring a high degree of concentration or involving great responsibility, the established basic overall vibration acceleration values shall be reduced by adding the correction $K_m = -20$ dB, which means that the basic effective values of vibration acceleration shall be reduced by 10 % ($k_m = 0.1$).

Article 16

Maximum Permissible Levels of Hand-Transmitted Vibrations

- (1) The maximum permissible overall levels of acceleration of hand-transmitted vibrations for the one-third octave frequency bands L_{atp} or the maximum overall effective acceleration values a_{etp} , valid for an eight-hour working period, are indicated in Annex 9 to this Decree.
- (2) The maximum permissible overall weighted level of acceleration of hand-transmitted vibrations L_{avwp} , valid for an eight-hour working period, shall be 123 dB. The maximum permissible overall weighted value of acceleration of hand transmitted vibrations a_{vwp} , valid for an eight-hour working period, shall be 1.4 m.s⁻².

Article 17

Maximum Permissible Vibration Levels Transmitted in a Specific Manner

The maximum permissible level of acceleration of vibrations transmitted in a specific manner L_{atp} for all one-third octave frequency bands of the monitored frequency area for an eight-hour working period shall be 100 dB.

Article 18

Maximum Permissible Workplace Vibration Levels for Work Days Other than Eight-Hour Ones

- (1) The maximum permissible level of vibrations acceleration for other daily working hours T shall be established by calculating a correction K_T to the established maximum permissible values for an eight-hour working period $L_{a,8hp}$. K_T shall be determined in the following way:

$$K_T = 10 \log (480/T), \text{ /dB/},$$

where T is the working period involving vibrations in minutes per shift.

- (2) During evaluation, the results of the measurement, i.e. the values of the average vibration acceleration levels, shall also be evaluated for the period T .
- (3) The correction K_T shall not be used to evaluate local vibrations transmitted in a specific manner for a period other than the eight-hour period of exposure to vibrations.
- (4) The correction K_T for a period of exposure to all vibrations shorter than 10 minutes per shift shall be equal to the correction for a period of exposure $T = 10$ minutes.
- (5) The correction K_T for a period of exposure to hand-transmitted vibrations shorter than 20 minutes per shift shall be equal to the correction for a period of exposure $T = 20$ minutes.

Article 19

Maximum Permissible Vibration Levels in Residential and Public Facilities Buildings

- (1) The maximum permissible values of vibrations in residential and public facilities buildings shall apply to horizontal and vertical vibrations in places of residence.
- (2) The maximum permissible levels of vibration acceleration in buildings in the one-third octave frequency bands L_{atp} shall be given by the sum of the basic values of vibration acceleration indicated in Annex 10 to this Decree and the corrections for use of premises, daytime and the nature of the vibrations pursuant to Annex 11 to this Decree. The maximum permissible effective vibration acceleration values in the one-third octave bands a_{etp} shall be given by the sum of the basic effective vibration acceleration values indicated in Annex 10 to this Decree and the correction under Annex 11 to this Decree.
- (3) The maximum permissible weighted level of vibration acceleration L_{awp} of the building structures for residential and public facilities buildings shall depend on the type of space, time of the day and the nature of vibrations indicated in Tables 1 and 2 of Annex 12 to this Decree.
- (4) The maximum permissible weighted effective value of vibration acceleration a_{ewp} in residential and public facilities buildings shall depend on the type of space, time of the day and the nature of vibrations indicated in Tables 1 and 2 of Annex 12 to this Decree.

Article 20

Maximum Permissible Vertical Vibration Levels of a Frequency Lower than 0.5 Hz

- (1) The maximum permissible value of vibrations of a frequency lower than 0.5 Hz shall apply to places of residence and especially to workplaces on self-powered machines.

The indicated maximum permissible values must be respected in order to restrict the emergence of kinetoses. These values shall not concern the evaluation of transport vehicles in terms of comfort.

- (2) The maximum permissible vibration acceleration levels L_{atp} and the maximum permissible effective values a_{etp} for vibrations of a frequency lower than 0.5 Hz shall be determined pursuant to Annex 13 to this Decree.
- (3) The maximum permissible weighted levels and vibration acceleration values of a frequency lower than 0.5 Hz are indicated in Annex 14 to this Decree.

Article 21

Measurement and Evaluation of Noise and Vibrations

When measuring and evaluating noise and vibrations, standard methods shall be employed, i.e. methods included in the Czech technical standard whose correct application guarantees the reliability, accuracy and reproductibility of the results. When using methods other than the standard ones, it must be proved that in terms of reliability, accuracy and reproductibility, their results are equal to the results yielded by the standard method.

Article 22

Entry into Force

This Decree shall enter into force on the 1 January 2001.

Head of Government:
Dipl. Eng. **Zeman**

Minister of Health:
Prof. Dr. **Fišer**