DEPARTMENT OF CONSUMER AND INDUSTRY SERVICES

BUREAU OF SAFETY AND REGULATION

OCCUPATIONAL HEALTH STANDARDS COMMISSION

OCCUPATIONAL NOISE EXPOSURE

(By authority conferred on the occupational health standards commission by section 24 of Act No. 154 of the Public Acts of 1974, as amended, being S408.1024 of the Michigan Compiled Laws)

R 325.60101 Applicability.

Rule 1. (1) These rules do not apply to the following types of employment:

(a) Domestic.

(b) Mining.

(c) Agriculture.

(d) Construction.

(2) R 325.60107 to R 325.60128 do not apply to employment in oil and gas well drilling and servicing operations.

History: 1986 AACS.

R 325.60102 Definitions.

Rule 2. As used in these rules:

(a) "Action level" means an 8-hour, time-weighted average noise exposure of 85 decibels measured on the A-scale, slow response, or equivalently, a dose of 50%.

(b) "Audiogram" means a chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

(c) "Audiologist" means a professional who specializes in the study and rehabilitation of hearing and who is certified by the American speech, hearing, and language association or licensed by a state board of examiners.

(d) "Baseline audiogram" means the audiogram against which future audiograms are compared.

(e) "Decibel" or "dB" means a unit of measurement of sound pressure level.

(f) "Hertz" or "Hz" means a unit of measurement of frequency and is numerically equal to cycles per second.

(g) "Medical pathology" means a condition or disease affecting the ear which should be treated by a physician specialist.

(h) "Noise dose" means the ratio, expressed as a percentage, of the time integral, over a stated time or event, of the 0.6 power of the measured, slow, exponential time-averaged, squared A-weighted sound pressure and the product of the criterion duration (8 hours) and the 0.6 power of the squared sound pressure corresponding to the criterion sound level (90 dB).

(i) "Noise dosimeter" means an instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicates a noise dose.

(j) "Otolaryngologist" means a licensed physician specializing in the diagnosis and treatment of disorders of the ear, nose, and throat.

(k) "Representative exposure" means the measurement of an employee's noise dose or 8-hour, time-weighted average noise exposure that the employer deems to be typically equivalent of the exposures of other employees in the workplace.

(l) "Sound level" means 10 times the common logarithm of the ratio of the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micropascals and is expressed in units of dBA.

(m) "Sound level meter" means an instrument for the measurement of sound level.

(n) "Standard threshold shift" means a change in the hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.

(o) "Time-weighted average sound level" means that sound level which, if constant over an 8-hour exposure, would result in the same noise dose as is measured.

(p) "TWA" means time-weighted average.

History: 1986 AACS.

R 325.60103 Protection from noise exposure.

Rule 3. (1) Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in table 1 of R 325.60104 when measured on the A scale of a standard sound level meter at slow response. If noise levels are determined by octave band analysis, the equivalent A-weighted sound level may be determined as shown in figure A.

(2) Figure A reads as follows:

FIGURE A

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Equivalent sound level contours. Octave band sound pressure levels may be converted to the equivalent A-weighted sound level corresponding to the point of highest penetration into the sound level contours. This equivalent A-weighted sound level, which may differ from the actual A-weighted sound level of the noise, is used to determine exposure limits from table 1 of R 325.60104.

History: 1986 AACS.

R 325.60104 Permissible noise exposure; noise controls.

Rule 4. (1) If employees are subjected to sound exceeding the levels listed in table 1, feasible administrative or engineering controls shall be utilized. If the controls fail to reduce sound levels within the levels listed in table 1, personal protective equipment shall be provided and used to reduce employee noise exposure within those levels listed in table 1.

(2) Table 1 reads as follows:

TABLE 1

Permissible Noise Exposures1

Duration Per Day, Hours	Sound Level dBA, Slow Response
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110

1/4 or less	115

1When the daily noise exposure is composed of 2 or more periods of noise exposure of different levels, their combined effect shall be considered, rather than the individual effect of each. If the sum of C1/T1 + C2/T2 . . . Cn/Tn exceeds unity, then the mixed exposure shall be considered to exceed the limit value. C indicates the total time of exposure at a specified noise level, and T indicates the total time of exposure permitted at that level.

History: 1986 AACS.

R 325.60105 Determination of permitted daily exposure time.

Rule 5. (1) If a noise level is between 2 listed permissible noise levels prescribed by table 1 of R 325.60104(2), chart A shall be used to determine the permitted daily exposure time. In applying chart A, measured noise levels shall be taken to the nearest whole number.

(2) Chart A reads as follows:

CHART A

NOISE EXPOSURE CHART

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Measured Noise Level, dBA, Slow Response

History: 1986 AACS.

R 325.60106 Impact or impulse noise.

Rule 6. (1) The maximum permissible level for impact or impulse noise shall be 140 dB as measured with a sound level meter capable of indicating an instantaneous peak noise level.

(2) Impact and impulse noise are those peaks or maxima of sound level, above the continuous background level, which have separation intervals greater than 1 second. If peaks are 1 second or less apart, the noise shall be considered to be continuous.

History: 1986 AACS.

R 325.60107 Hearing conservation program.

Rule 7. (1) The employer shall administer a continuing, effective hearing conservation program, as described in R 325.60108 to R 325.60127, when employee noise exposures equal or exceed the action level.

(2) For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with the provisions of R 325.60110 and table 2 and without regard to any attenuation provided by the use of personal protective equipment.

History: 1986 AACS.

R 325.60108 Noise monitoring program.

Rule 8. (1) When information indicates that any employee's exposure may equal or exceed the action level, the employer shall develop and implement a noise monitoring program with all of the following characteristics:

(a) The noise monitoring strategy shall be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors, if required.

(b) Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse or impact noise make area monitoring generally inappropriate, the employer shall use representative personal monitoring to comply with the monitoring requirements of this rule, unless the employer can show that area monitoring produces equivalent results.

(c) All continuous, intermittent, and impulse or impact sound levels from 80 dBA to 130 dBA shall be integrated into the noise measurements.

(d) Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.

(2) Noise monitoring shall be repeated when a change in production, process, equipment, or controls increases noise exposure to the extent that additional employees may be exposed at or above the action level or to the extent that the attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of R 325.60122.

History: 1986 AACS.

R 325.60109 Employee observation and notification.

Rule 9. (1) The employer shall provide affected employees or their representatives an opportunity to observe any noise measurements conducted pursuant to the provisions of R 325.60108.

(2) The employer shall notify each employee exposed at or above the action level of the results of the monitoring pertaining to that employee.

History: 1986 AACS.

R 325.60110 Noise exposure determination.

Rule 10. (1) Exposure measurements shall accurately reflect employee exposure.

(2) All continuous, intermittent, and impulsive sound levels from 80 dBA to 130 dBA shall be integrated into the computation.

(3) An employee's noise dose shall be computed using table 2 as follows:

(a) When the sound level, L, is constant over the entire work shift, the noise dose, D, in percent, is given by: D = 100 C/T; where C is the total length of the work period in hours, and T is the reference duration corresponding to the measured sound level, L, as given in table 2, or by the formula shown as a footnote to that table.

(b) When the work shift noise exposure is composed of 2 or more periods of noise at different levels, the total noise dose for the workday is given by:

$$D = 100(C1/T1 + C2/T2 + \ldots + Cn/Tn),$$

where C is the actual total time of exposure at a measured noise level, L, and T is the reference duration for that level as given in table 2.

(4) Table 2 reads as follows:

TABLE 2

A-weighted Sound Level L (decibel)	Reference Duration, T (hour)	A-weighted Sound Level L (decibel)	Reference Duration, T (hour)

80	32.0	106	0.87
81	27.9	107	0.76
82	24.3	108	0.66
83	21.1	109	0.57
84	18.4	110	0.5
85	16.0	111	0.44
86	13.9	112	0.38
87	12.1	113	0.33
88	10.6	114	0.29
89	9.2	115	0.25
90	8.0	116	0.22
91	7.0	117	0.19
92	6.1	118	0.16
93	5.3	119	0.14
94	4.6	120	0.125
95	4.0	121	0.11
96	3.5	122	0.095
97	3.0	123	0.082
98	2.6	124	0.072
99	2.3	125	0.063
100	2.0	126	0.054
101	1.7	127	0.047
102	1.5	128	0.041
103	1.3	129	0.036
104	1.1	130	0.031
105	1.0		

In the above table, the reference duration, T, is computed by:

$$T = \frac{8}{2^{\left(\frac{L-90}{5}\right)}}$$

where L is the measured A-weighted sound level.

History: 1986 AACS.

R 325.60111 Determining TWA sound levels.

Rule 11. (1) Time-weighted average (TWA) sound levels may be computed from the measured or calculated dose by means of the formula:

$$TWA = 16.61 \log_{10}\left(\frac{D}{12.5T}\right) + 90,$$

where D is the dose in percentage, and T is the time in hours over which the dose was determined.

(2) An 8-hour TWA sound level can be calculated from the formula in subrule (1) of this rule by letting T equal 8. Thus,

$$TWA = 16.61 \log_{10}\left(\frac{D}{100}\right) + 90.$$

Table 3 gives the 8-hour, TWA sound level values for a wide range of dose values.

(3) Table 3 reads as follows:

TABLE 3

Eight-hour TWA Sound Levels

Dose (in percent)	TWA Sound Level (in dBA)
10	73.4
15	76.3
20	78.4
25	80.0
30	81.3
35	82.4
40	83.4
45	84.2
50	85.0
55	85.7
60	86.3
65	86.9
70	87.4
75	87.9
80	88.4
85	88.8
90	89.2
95	89.6
100	90.0
105	90.4
110	90.7
115	91.1
120	91.3
125	91.6
130	91.9
135	92.2
140	92.4
145	92.7
150	92.9
155	93.2
160	93.4
165	93.6
170	93.8
175	94.0
180	94.2
185	94.4
190	94.6
195	94.8
200	95.0
210	95.4
220	95.7
230	96.0
240	96.3
250	96.6
260	96.9
270	97.2

280	97.4
290	97.7
300	97.9
310	98.2
320	98.4
330	98.6
340	98.8
350	99.0
360	99.2
370	99.4
380	99.6
390	99.8
400	100.0
410	100.2
420	100.4
430	100.5
440	100.7
450	100.8
460	101.0
470	101.2
480	101.3
490	101.5
500	101.6
510	101.8
520	101.9
530	102.0
540	102.2
550	102.3
560	102.4
570	102.6
580	102.7
590	102.8
600	102.9
610	103.0
620	103.2
630	103.3
640	103.4
650	103.5
660	103.6
670	103.7
680	103.8
690	103.9
700	104.0
710	104.1
720	104.2
730	104.3
740	104.4
750	104.5
760	104.6
770	104.7
780	104.8
790	104.9
800	105.0
810	105.1
820	105.2
830	105.3

840	105.4
850	105.4
860	105.5
870	105.6
880	105.7
890	105.8
900	105.8
910	105.9
920	106.0
930	106.1
940	106.2
950	106.2
960	106.3
970	106.4
980	106.5
990	106.5
999	106.6
1000	106.6

History: 1986 AACS.

R 325.60112 Audiometric testing program.

Rule 12. (1) The employer shall establish and maintain an audiometric testing program as provided in this rule by making audiometric testing available to all employees whose exposures equal or exceed the action level.

(2) The program shall be provided at no cost to employees.

(3) Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the council of accreditation in occupational hearing conservation or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining, and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests shall be responsible to an audiologist, otolaryngologist, or physician.

(4) All audiograms obtained pursuant to the provisions of R 325.60113 and R 325.60114 shall meet the applicable requirements of R 325.60119.

History: 1986 AACS.

R 325.60113 Baseline audiogram.

Rule 13. (1) Within 6 months of an employee's first exposure at or above the action level, the employer shall establish a valid baseline audiogram against which subsequent audiograms can be compared.

(2) Where mobile test vans are used to meet the audiometric testing requirement, the employer shall obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the action level. Where baseline audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, employees shall wear hearing protectors for any period exceeding 6 months after first exposure until the baseline audiogram is obtained.

(3) Testing to establish a baseline audiogram shall be preceded by a period of not less than 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement of 14 hours without exposure to workplace noise.

(4) The employer shall notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

History: 1986 AACS.

R 325.60114 Annual audiogram.

Rule 14. At least annually after obtaining the baseline audiogram, the employer shall obtain a new audiogram for each employee exposed at or above the action level.

History: 1986 AACS.

R 325.60115 Evaluation of audiogram.

Rule 15. (1) Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift, as defined by R 325.60102(n), has occurred. This comparison may be done by a technician.

(2) If the annual audiogram shows that the employee has suffered a standard threshold shift, the employer may obtain a retest within 30 days and consider the results of the retest as the annual audiogram.

(3) An audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. The employer shall provide all of the following information to the person who performs the review:

(a) A copy of the requirements for hearing conservation as set forth in this rule, R 325.60107 to R 325.60114, and R 325.60116 to R 325.60127.

(b) The baseline audiogram and most recent audiogram of the employee to be evaluated.

(c) Measurements of background sound pressure levels in the audiometric test room as required pursuant to the provisions of R 325.60119(5).

(d) Records of audiometer calibrations required pursuant to the provisions of R 325.60120.

History: 1986 AACS; 1993 AACS.

R 325.60116 Follow-up procedures.

Rule 16. (1) If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift has occurred, the employee shall be informed of this fact, in writing, within 21 days of the determination.

(2) Unless a physician determines that the standard threshold shift is not work-related or aggravated by occupational noise exposure, the employer shall ensure that all of the following steps are taken when a standard threshold shift occurs:

(a) Employees not using hearing protectors shall be fitted with hearing protectors meeting the attenuation standards as outlined in R 325.60122, trained in their use and care, and required to use them.

(b) Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

(c) The employee shall be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if the employer suspects that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.

(d) The employee is informed of the need for an otological examination if the medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.

(3) If subsequent audiometric testing of an employee whose noise exposure is less than the permissible 8-hour, TWA of 90 dB indicates that a standard threshold shift is not persistent, the employer shall inform the employee of the new audiometric interpretations and may discontinue the required use of hearing protectors for that employee.

History: 1986 AACS.

R 325.60117 Revised baseline audiograms.

Rule 17. An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist, or physician who is evaluating the audiogram, the standard threshold shift revealed by the audiogram is persistent or the hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

History: 1986 AACS.

R 325.60118 Standard threshold shift determination.

Rule 18. (1) In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by adjusting the most recent audiogram. If the adjustment is made, the employer shall, for each audiometric test frequency, do the following:

(a) Determine from table 4 the age correction values for the employee as follows:

(i) Find the age at which the most recent audiogram was taken and record the corresponding values of age corrections at 1000 Hz to 6000 Hz.

(ii) Find the age at which the baseline audiogram was taken and record the corresponding values of age corrections at 1000 Hz to 6000 Hz.

(b) Subtract the values found in subdivision (a)(ii) from the values found in subdivision (a)(i). The differences represent that portion of the change in hearing that may be due to aging.

(2) Table 4 reads as follows:

TABLE 4

Age Correction Values in Decibels

	Males					Females					
Age	1000 Hz.	2000 Hz.	3000 Hz.	4000 Hz.	6000 Hz.	1000 Hz.	2000 Hz.	3000 Hz.	4000 Hz.	6000 Hz.	Age
20 or less	5	3	4	5	8	7	4	3	3	6	20 or less
21	5	3	4	5	8	7	4	4	3	6	21
22	5	3	4	5	8	7	4	4	4	6	22
23	5	4	3	6	9	7	5	4	4	7	23
24	5	3	5	6	9	7	5	4	4	7	24
25	5	3	5	7	10	8	5	4	4	7	25
26	5	4	5	7	10	8	5	5	4	8	26
27	5	4	6	7	11	8	5	5	5	8	27
28	6	4	6	8	11	8	5	5	5	8	28
29	6	4	6	8	12	8	5	5	5	9	29
30	6	4	6	9	12	8	6	5	5	9	30
31	6	4	7	9	13	8	6	6	5	9	31
32	6	5	7	10	14	9	6	6	6	10	32
33	6	5	7	10	14	9	6	6	6	10	33
34	6	5	8	11	15	9	6	6	6	10	34
35	7	5	8	11	15	9	6	7	7	11	35
36	7	5	9	12	16	9	7	7	7	11	36
37	7	6	9	12	17	9	7	7	7	12	37
38	7	6	9	13	17	10	7	7	7	12	38
39	7	6	10	14	18	10	7	8	8	12	39
40	7	6	10	14	19	10	7	8	8	13	40
41	7	6	10	14	20	10	8	8	8	13	41
42	8	7	11	16	20	10	8	9	9	13	42
43	8	7	12	16	21	11	8	9	9	14	43
44	8	7	12	17	22	11	8	9	9	14	44
45	8	7	13	18	23	11	8	10	10	15	45
46	8	8	13	19	24	11	9	10	10	15	46
47	8	8	14	19	24	11	9	10	11	16	47
48	9	8	14	20	25	12	9	11	11	16	48
49	9	9	15	21	26	12	9	11	11	16	49

50	9	9	16	22	27	12	10	11	12	17	50
51	9	9	16	23	28	12	10	12	12	17	51
52	9	10	17	24	29	12	10	12	13	18	52
53	9	10	18	25	30	13	10	13	13	18	53
54	10	10	18	26	31	13	11	13	14	19	54
55	10	11	19	27	32	13	11	14	14	19	55
56	10	11	20	28	34	13	11	14	15	20	56
57	10	11	21	29	35	13	11	15	15	20	57
58	10	12	22	31	36	14	12	15	16	21	58
59	11	12	22	32	37	14	12	16	16	21	59
60 or older	11	13	23	33	38	14	12	16	17	22	60 or older

History: 1986 AACS.

R 325.60119 Audiometric test requirements.

Rule 19. (1) Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies that include, at a minimum, 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.

(2) Audiometric tests shall be conducted with audiometers that meet the specifications of, and are maintained and used in accordance with, the American national standards institute's specification for audiometers, S3.6-1989, which is adopted in these rules by reference. S3.6-1989 is available for purchase from the Michigan Department of Public Health, Division of Occupational Health, P.O. Box 30195, Lansing, Michigan 48909, or from the American National Standards Institute Incorporated, 1430 Broadway, New York, New York 10018, at a cost as of the time of adoption of these rules of $45.00.

(3) Pulsed-tone audiometers, if used, shall have a tone on-time of not less than 200 milliseconds.

(4) Self-recording audiometers, if used, shall be in compliance with all of the following requirements:

(a) The chart upon which the audiogram is traced shall have lines at positions that correspond to all multiples of 10 dB hearing level within the intensity range spanned by the audiometer. The lines shall be equally spaced and shall be separated by not less than 1/4 of an inch. Additional increments are optional. The audiogram pen tracings shall not be more than 2 dB in width.

(b) It shall be possible to set the stylus manually at the 10 dB increment lines for calibration purposes.

(c) The slewing rate for the audiometer attenuator shall not be more than 6 dB/second, except that an initial slewing rate of more than 6 dB/second is permitted at the beginning of each new test frequency, but only until the second subject response.

(d) The audiometer shall remain at each required test frequency for 30 seconds plus or minus 3 seconds. The audiogram shall be clearly marked at each change of frequency, and the actual frequency change of the audiometer shall not deviate from the frequency boundaries marked on the audiogram by more than plus or minus 3 seconds.

(e) It shall be possible at each test frequency to place a horizontal line segment parallel to the time axis on the audiogram so that the audiometric tracing crosses the line segment not less than 6 times at that test frequency. At each test frequency, the threshold shall be the average of the midpoints of the tracing excursions.

(5) Audiometric examinations shall be administered in a room or booth that has sound pressure levels that do not exceed any of the following:

(a) 40 dB at 500 Hz center frequency.

(b) 40 dB at 1000 Hz center frequency.

(c) 47 dB at 2000 Hz center frequency.

(d) 57 dB at 4000 Hz center frequency.

(e) 62 dB at 8000 Hz center frequency.

Sound levels will be determined by a type 1 or type 2 sound level meter and octave-band filter as specified by the requirements of American national specifications for sound level meters, Sl.4-1983, and for octave-band and fractional octave-band analog and digital filters, Sl.11-1986. Both of these American national standards are adopted in these rules by reference and are available from the Michigan Department of Public Health, Division of Occupational Health, P.O. Box 30195, Lansing, Michigan

48909, or from the American National Standards Institute, 1430 Broadway, New York, New York 10018, at a cost as of the time of adoption of these rules of $44.00 for S1.4-1983 and $60.00 for S1.11-1986.

History: 1986 AACS; 1993 AACS.

R 325.60120 Audiometer calibration.

Rule 20. (1) The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing thresholds and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Deviations of more than 10 dB shall require an acoustic calibration.

(2) Audiometer calibration shall be checked acoustically at least annually in accordance with all of the following procedures and instructions:

(a) The equipment that is necessary to perform these measurements is a sound level meter, octave-band filter set, and a national bureau of standards 9A coupler. In making these measurements, the accuracy of the calibrating equipment shall be sufficient to determine that the audiometer is within the tolerances permitted by the American national standards institute specification for audiometers, S3.6-1989, which is adopted by reference in R 325.60119.

(b) Sound pressure output check procedures are as follows:

(i) Place the earphone coupler over the microphone of the sound level meter and place the earphone on the coupler.

(ii) Set the audiometer's hearing threshold level (HTL) dial to 70 dB.

(iii) Measure the sound pressure level of the tones at each test frequency from 500 Hz to 6000 Hz for each earphone.

(iv) At each frequency, the readout on the sound level meter shall correspond to the levels in table 5 or table 6, as appropriate for the type of earphone, in the column entitled "Sound level meter reading."

(c) Linearity check procedures are as follows:

(i) With the earphone in place, set the frequency to 1000 Hz and the HTL dial on the audiometer to 70 dB.

(ii) Measure the sound levels in the coupler at each 10-dB decrement from 70 dB to 10 dB, noting the sound level meter reading at each setting.

(iii) For each 10-dB decrement on the audiometer, the sound level meter shall indicate a corresponding 10-dB decrease.

(iv) This measurement may be made electrically with a voltmeter that is connected to the earphone terminals.

(d) If a measured sound level deviates from a level in table 5 or table 6 by plus or minus 3 dB at any test frequency between 500 and 3000 Hz, plus or minus 4 dB at 4000 Hz, or plus or minus 5 dB at 6000 Hz, an exhaustive calibration is advised. An exhaustive calibration is required if the deviation is 10 dB or more at any test frequency.

(e) Table 5 reads as follows:

TABLE 5
Reference Threshold Levels for Telephonics - TDH-39 Earphones

Frequency, Hz	Reference threshold level for TDH-39 earphones, dB	Sound level meter reading, dB
500	11.5	81.5
1000	7	77
2000	9	79
3000	10	80
4000	9.5	79.5
6000	15.5	85.5

(f) Table 6 reads as follows:

TABLE 6
Reference Threshold Levels for Telephonics - TDH-49 Earphones

Frequency, Hz	Reference threshold level for TDH-49 earphones, dB	Sound level meter reading, dB
500 .....13.5	83.5	
1000 .....7.5	77.5	
2000 11	81.0	
3000 .....9.5	79.5	
4000 .....10.5	80.5	
6000 .....13.5	83.5	

Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. A deviation of 15 dB or more requires an exhaustive calibration.

(3) An exhaustive calibration shall be performed at least once every 2years in accordance with the provisions of sections 4.1.2, 4.1.3, 4.1.4.3,4.2, 4.4.1, 4.4.2, 4.4.3, and 4.5 of the American national standards institute's specifications for audiometers, S3.6-1969, which are adopted

by reference in R 325.60119. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.

History: 1986 AACS; 1993 AACS.

R 325.60121 Hearing protectors.

Rule 21. (1) Employers shall, at no cost to the employees, make hearing protectors available to all employees who are exposed to noise at or above the action level. Hearing protectors shall be replaced as necessary.

(2) Employers shall ensure that hearing protectors are worn by the following persons:

(a) Employees who are exposed above the permissible level and are required to be protected in accordance with the provisions of R 325.60103(1) and R 325.60104(1).

(b) Employees who are exposed at or above the action level, but less than the permissible level, and who have not yet had a baseline audiogram taken pursuant to the provisions of R 325.60113(2) or who have experienced a standard threshold shift.

(3) Employees shall be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors that are provided by the employers.

(4) An employer shall provide training in the use and care of all hearing protectors that are provided to employees.

(5) An employer shall ensure proper initial fitting and supervise the correct use of all hearing protectors.

History: 1986 AACS; 1993 AACS.

R 325.60122 Hearing protector attenuation.

Rule 22. (1) An employer shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used in accordance with the procedures specified in appendix A to these

rules. Appendix A is a copy of appendix B to 29 C.F.R. S1910.95, March 8, 1983, which is adopted in these rules by reference. This appendix may be obtained, without cost, from the Michigan Department of Public Health, Division of Occupational Health, P.O. Box 30195, Lansing, Michigan 48909, or from the Superintendent of Documents, United States Government Printing Office, Washington, DC 20402, at a cost at the time of adoption of these rules of $29.00.

(2) Hearing protectors shall attenuate employee exposure at least to a time-weighted average of 90 decibels as required by the provisions of R 325.60103 and R 325.60104.

(3) For employees who have experienced a standard threshold shift, hearing protectors shall attenuate employee exposures to or below the action level.

(4) The adequacy of hearing protector attenuation shall be reevaluated where employee noise exposures increase to the extent that the hearing protectors provided might no longer provide adequate attenuation. The employer shall provide more effective hearing protectors where necessary.

History: 1986 AACS; 1993 AACS.

R 325.60123 Employee training program.

Rule 23. (1) The employer shall institute a training program for all employees who are exposed to noise at or above the action level and shall ensure employee participation in such program.

(2) The training program shall be repeated annually for each employee included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

(3) The employer shall ensure that each employee is informed of all of the following:

(a) The effects of noise on hearing. (See appendix B)

(b) The purpose of hearing protectors; the advantages, disadvantages, and attenuation of various types of hearing protectors; and instructions on the selection, fitting, use, and care of hearing protectors.

(c) The purpose of audiometric testing, and an explanation of the test procedures.

History: 1986 AACS.

R 325.60124 Access to information and training materials.

Rule 24. (1) The employer shall make copies of these rules available to affected employees or their representatives and shall also post a copy in the workplace.

(2) The employer shall provide to affected employees any informational materials pertaining to these rules that are supplied to the employer by the Michigan occupational safety and health program (MIOSHA).

(3) The employer shall provide, upon request to a MIOSHA official, all materials related to the employer's training and education program pertaining to these rules.

History: 1986 AACS.

R 325.60125 Recordkeeping.

Rule 25. (1) An employer shall maintain an accurate record of all employee exposure measurements required by the provisions of R 325.60108 to R 325.60111.

(2) An employer shall retain all employee audiograms that are obtained pursuant to the provisions of R 325.60112 to R 325.60114. These records shall include all of the following information:

(a) Name and job classification of the employee.

(b) Date of the audiogram.

(c) Examiner's name.

(d) Date of last acoustic or exhaustive calibration of the audiometer.

(e) Employee's most recent noise exposure assessment.

(3) An employer shall maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms required by the provisions of R 325.60119(5).

History: 1986 AACS; 1993 AACS.

R 325.60126 Records; retention; provision; access; transfer.

Rule 26. (1) The employer shall retain records required in R 325.60125 for at least the following periods:

(a) Noise exposure measurement records shall be retained for 2 years.

(b) Audiometric test records shall be retained for the duration of the affected employee's employment.

(2) All records required by the provisions of R 325.60125 shall be provided, upon request, to employees, former employees, representatives designated by the individual employee, and MIOSHA officials. The provisions of R 325.3451 to R 325.3476, entitled "Employee Medical Records and Trade Secrets," apply to access to records under this rule.

(3) If the employer ceases to do business, the employer shall transfer to the successor employer all records required to be maintained by this rule, and the successor employer shall retain them for the remainder of the period or periods prescribed in subrule (1) of this rule.

History: 1986 AACS.

R 325.60127 Appendices.

Rule 27. (1) Appendix A of these rules is a copy of appendix B of 29 C.F.R. S1910.95, entitled methods for estimating the adequacy of hearing protector attenuation, which is adopted by reference in R 325.60122.

(2) Appendices B, C, and D are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

History: 1986 AACS; 1993 AACS.

R 325.60128 Availability of documents; permission to reprint.

Rule 28. (1) A copy of these rules and related appendices are available to employers and employees at no cost from the Michigan Department of Public Health, Division of Occupational Health, Post Office Box 30195, Lansing, Michigan 48909.

(2) Permission to reproduce these rules and their appendices in full is granted by the director.

History: 1986 AACS; 1993 AACS.

R 325.60131 Noise exposure; conservation program.

Rule 1. (1) An employer shall ensure that protection against the effects of noise exposure is provided when the sound levels exceed those shown in Table D-2 of this rule when measured on the A-scale of a standard sound level meter at slow response. [1926.52(a)]

(2) An employer shall utilize feasible administrative or engineering controls if employees are subjected to sound levels exceeding those listed in Table D-2 of this rule. If the controls fail to reduce sound levels within the levels of the table, then an employer shall ensure that personal protective equipment is provided and used to reduce sound levels within the levels of the table. [1926.52(b)]

(a) An employer shall ensure that ear protective devices inserted in the ear are fitted or determined individually by competent persons. [1926.101(b)]

(b) An employer shall ensure that plain cotton is not used as a protective device. [1926.101(c)]

(3) If the variations in noise level involve maxima at intervals of 1 second or less, then it is to be considered continuous. [1926.52(c)]

(4) An employer shall implement a continuous and effective hearing conservation program if sound levels exceed the values shown in Table D-2. [1926.52(d)(1)]

TABLE D-2--PERMISSIBLE NOISE EXPOSURES

Duration per day, hours:	Sound Level dBA Slow Response

8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

(a) If the daily noise exposure is composed of 2 or more periods of noise exposure of different levels, then an employer shall consider their combined effect rather than the individual effect of each. An employer shall compute exposure to different levels for various periods of time according to the formula set forth in subdivision (b) of this subrule. [1926.52(d)(2)(i)]

(b) $Fe = \frac{T1}{L1} + \frac{T2}{L2} + \ldots + \frac{Tn}{Ln}$

where:

Fe = The equivalent noise exposure factor.

T = The period of noise exposure at any essentially constant level.

L = The duration of the permissible noise exposure at the constant level (from Table D-2).

If the value of Fe exceeds unity (1), then the exposure exceeds permissible levels. [1926.52(d)(2)(ii)]

(c) A sample computation showing an application of the formula in subdivision (b) of this subrule is as follows. An employee is exposed at these levels for these periods:

110 dBA for 1/4 hour.

100 dBA for 1/2 hour.

90 dBA for 1 1/2 hours.

$Fe = \frac{1/4}{1/2} + \frac{1/2}{2} + \frac{1\ 1/2}{8}$

$Fe = 0.500 + 0.25 + 0.188$

$Fe = 0.938$

Since the value of Fe does not exceed unity, the exposure is within permissible limits. [1926.52(d)(2)(iii)]

(5) An employer shall ensure that exposure to impulsive or impact noise is not more than 140 dB peak sound pressure level. [1926.52(e)]

(6) This rule rescinds and replaces occupational health construction rule 6501(2)(a) to (c) and rule 6260.

History: 1998-2000 AACS.