

STANDARD PRACTICE INSTRUCTION

DATE IMPLEMENTED: 04 April 2019

SUBJECT: Hearing Conservation

REGULATORY STANDARD: OSHA - 29 CFR 1910.95, 1926.52

BASIS: Approximately 16 million workers are exposed to excessive on-the-job noise levels on an annual basis. In addition to causing hearing loss by destroying the inner ear, noise can put stress on other parts of the body causing fatigue and unnecessary psychological stress. This preventable added burden to the body can result in increased injury rates. This poses a serious problem for exposed workers and their employer. The OSHA Occupational Noise Exposure Standard establishes uniform requirements to make sure that the noise hazards associated with all U.S. workplaces are evaluated, and that the hazards associated with high noise are transmitted to all affected workers so that mitigation measures can be instituted.

GENERAL: Nowland Associates, Inc. will ensure that the noise hazards within our facility and other work areas are evaluated, and that information concerning the hazards is transmitted to all employees. This standard practice instruction is intended to address comprehensively the issues of evaluating the potential hazards of noise, communicating information concerning these hazards, and establishing appropriate protective measures for all employees.

RESPONSIBILITY: The company Safety Officer is solely responsible for all facets of this program and has full authority to make necessary decisions to ensure success of the program. The Safety Officer will develop written detailed instructions covering each of the basic elements in this program, and is the sole person authorized to amend these instructions. This company has expressly authorized the Safety Officer to halt any operation of the company where there is danger of serious personal injury.

Contents of the Hearing Conservation Program

1. **Written Program.**
2. **Audiometric Testing Program.**
3. **Hearing Conservation Program.**
4. **Training Program.**
5. **Recordkeeping.**
6. **Appendices.**
7. **Definitions.**

Nowland Associates, Inc. Hearing Conservation Program

1. Written Program. This standard practice instruction will be reviewed on an annual basis and updated as changes in company occur, or as changes are noted to 29 CFR 1910.95 which require revision of this document. Effective implementation of this program requires support from all levels of management within this company. This written program will be communicated to all personnel that are affected by it. It encompasses the total workplace, regardless of the number of workers employed or the number of work shifts. It is designed to establish clear goals, and objectives.

2. Audiometric Testing Program. This company will maintain an audiometric testing program in accordance with the following guidelines.

2.1 Nowland Associates, Inc. will establish and maintain an audiometric testing program free of charge for employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels.

2.2 Audiometric tests will 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. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.

2.3 All audiograms obtained pursuant to this standard practice instruction will meet the requirements of 29 CFR 1910.95, Appendix C: Audiometric Measuring Instruments.

2.4 Nowland Associates, Inc. will provide protection against the effects of noise exposure when the sound levels within our facility exceed those shown in Table 2.1, when measured on the A scale of a standard sound level meter at slow response.

Table 2.1 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
0 1/2	110
1/4 or less	115

2.2 When noise levels are determined by octave band analysis, the equivalent A-weighted sound level will be determined by using the appropriate table from 29 CFR 1910.95, appendix 1., equivalent sound level contours. Octave band sound pressure levels may be converted to the equivalent A-weighted sound level by plotting them on the graph shown as Figure G-9, 29 CFR 1910.95 (included as an appendix to this instruction) and noting the 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, will be used to determine exposure limits from Table 1-1 of this instruction.

2.3 When employees are subjected to sound exceeding those listed in Table 1-1, this company will administer or have administered by qualified personnel, audiometric examinations, obtain valid audiograms, and ensure proper controls are reviewed and implemented where feasible. If such controls fail to reduce sound levels within the levels of Table 1.1, personal protective equipment will be provided and used to reduce sound levels within the levels of the table.

2.4 If the variations in noise level involve intervals of 1 second or less, it will be considered to be continuous. When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect will be considered, rather than the individual effect of each.

2.5 Exposure to impulsive or impact noise will not exceed 140 dB peak sound pressure level.

3. Hearing Conservation Program. Nowland Associates, Inc. is dedicated to providing a safe and healthful working environment. We believe that safety in all operations and activities is of primary importance. Ultimately however, it is the employee's responsibility to seek assistance when required, and to carry out the job in a safe manner. Nowland Associates, Inc. will administer a continuing, effective hearing conservation program, as described in the following paragraphs, whenever employee noise exposures equal or exceed an 8 hour time weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the hearing conservation program, employee noise exposures will be computed without regard to any attenuation provided by the use of personal protective equipment.

3.1 An 8 hour time weighted average of 85 decibels or a dose of fifty percent will also be referred to as the action level.

3.2 **Monitoring.** When information indicates that any employee's exposure may equal or exceed an 8-hour time weighted average of 85 decibels, this company will implement this monitoring program.

3.2.1 The company will conduct sampling on an “as needed” basis. It will be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.

3.2.2 Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring generally inappropriate, this company will use representative personal sampling to comply with the monitoring requirements of this instruction unless it can be shown that area sampling produces equivalent results.

3.2.3 All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels will be integrated into the noise measurements.

3.2.3.1 Instruments used to measure employee noise exposure will have been calibrated to ensure measurement accuracy.

3.2.4 Monitoring will be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:

3.2.4.1 Additional employees may be exposed at or above the action level.

3.2.4.2 The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of 29 CFR 1910.95.

3.2.5 **Employee Notification.** This company will notify each employee exposed at or above an 8 hour time weighted average of 85 decibels of the results of the monitoring.

3.2.6 **Observation of Monitoring.** This company will provide affected employees or their representatives with an opportunity to observe any noise measurements conducted.

3.2.7 **Baseline Audiogram.** Within 6 months of an employee's first exposure at or above the action level, this company will establish a valid baseline audiogram against which subsequent audiograms can be compared. The company will 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 will wear hearing protectors for any period exceeding six months after first exposure until the baseline audiogram is obtained.

3.2.7.1 Testing to establish a baseline audiogram will be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise.

3.2.7.2 This employer will notify employees of the need to avoid high levels of non-occupational noise exposure during the 14 hour period immediately preceding the audiometric examination.

3.2.8 Annual Audiogram. At least annually after obtaining the baseline audiogram, this employer will obtain a new audiogram for each employee exposed at or above an 8 hour time weighted average of 85 decibels.

3.2.9 Evaluation of Audiogram. Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. This comparison may be done by an individual trained to technician level. If the annual audiogram shows that an employee has suffered a standard threshold shift, a retest will be accomplished within 30 days and the results considered as the annual audiogram.

3.2.10 Problem Audiograms. This employer will ensure that an audiologist, otolaryngologist, or physician review problem audiograms and determine whether there is a need for further evaluation. The reviewer will be provided the following information:

3.2.10.1 The baseline audiogram and most recent audiogram of the employee to be evaluated.

3.2.10.2 Measurements of background sound pressure levels in the audiometric test room, (if the testing was not conducted at the reviewers facility).

3.2.10.3 Records of audiometer calibrations, (if the testing was not conducted at the reviewers facility).

3.2.11 Follow-up Procedures. If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift has occurred, the employee will be informed of this fact in writing, within 21 days of the determination.

3.2.12 Standard Threshold Shift. A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear. 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 correcting the annual audiogram according to the procedure described in Appendix F, 29 CFR 1910.95: Calculation and Application of Age Correction to Audiograms. Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, this employer will ensure that the following steps are taken when a standard threshold shift occurs:

3.2.12.1 Employees exposed or potentially exposed to high noise will be fitted with hearing protectors, trained in their use and care, and required to use them. For known high noise job assignments employees will be fitted and trained prior to job assignment.

3.2.12.2 Employees already using hearing protectors will be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

3.2.12.3 Employees will be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if it is suspected that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.

3.2.12.4 Employees will be informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.

3.2.12.5 If subsequent audiometric testing of an employee whose exposure to noise is less than an 8 hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, this employer:

3.2.12.5.1 Will inform the employee of the new audiometric interpretation.

3.2.12.5.2 May discontinue the required use of hearing protectors for that employee.

3.2.13 **Revised Baseline.** 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 determine that:

3.2.13.1 The standard threshold shift revealed by the audiogram is persistent.

3.2.13.2 The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

3.2.14 Audiometric Test Requirements. Audiometric tests conducted on employees of this company will be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency will be taken separately for each ear.

3.2.14.1 Audiometric tests will be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969.

3.2.14.2 Pulsed-tone and self-recording audiometers, if used, will meet the requirements specified in Appendix C, 29 CFR 1910.95: Audiometric Measuring Instruments.

3.2.14.3 Audiometric examinations will be administered in a room meeting the requirements listed in Appendix D, 29 CFR 1910.95: Audiometric Test Rooms.

3.2.14.4 Audiometer calibration. The functional operation of the audiometer will 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 10 decibels or greater require an acoustic calibration.

3.2.14.5 Audiometer calibration will be checked acoustically at least annually in accordance with Appendix E: Acoustic Calibration of Audiometers. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 decibels or greater require an exhaustive calibration.

3.2.14.6 An exhaustive calibration will be performed at least every two years in accordance with 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 Standard Specification for Audiometers, S3.6-1969. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.

3.3 Hearing Protectors. This employer will make hearing protectors available to all employees exposed to an 8-hour time weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors will be replaced at no cost as necessary.

3.3.1 This employer will ensure that hearing protectors are worn:

3.3.1.1 By any employee who is required by previous testing to wear personal protective equipment.

3.3.1.2 By any employee who is exposed to an 8 hour time weighted average of 85 decibels or greater, and who: has not yet had a baseline audiogram established, or has experienced a standard threshold shift.

3.3.2 Employees will be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided.

3.3.3 This employer will provide training in the use and care of all hearing protectors provided to employees.

3.3.4 This employer will ensure proper initial fitting and supervise the correct use of all hearing protectors.

3.4 Hearing Protector Attenuation. This employer will evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. One of the evaluation methods described in Appendix B: Methods for Estimating the Adequacy of Hearing Protection Attenuation will be used.

3.4.1 Selected hearing protectors will attenuate employee exposure at least to an 8 hour time weighted average of 90 decibels.

3.4.2 For employees who have experienced a standard threshold shift, selected hearing protectors must attenuate their exposure to an 8 hour time weighted average of 85 decibels or below.

3.4.3 The adequacy of hearing protector attenuation will be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. More effective hearing protectors will be provided where necessary.

4. Training Program. This employer will institute a training program for all employees who are exposed to noise at or above an 8-hour time weighted average of 85 decibels, and will ensure employee participation in such program.

4.1 The training program will be repeated annually for each employee included in the hearing conservation program. Information provided in the training program will be updated to be consistent with changes in protective equipment and work processes. Each employee will be informed of the following:

4.1.1 The effects of noise on hearing.

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

4.1.3 The purpose of audiometric testing, and an explanation of the test procedures.

4.2 Access To Information And Training Materials. This employer will make available to affected employees or their representatives copies of this standard practice instruction and 29 CFR 1910.95, and will also post a copy in the workplace.

4.2.1 This employer will provide to affected employees any informational materials pertaining to 29 CFR 1910.95 that are supplied by OSHA.

5. Recordkeeping. Exposure measurements. This employer will maintain an accurate record of all employee exposure measurements.

5.1 Audiometric Tests. This employer will retain all employee audiometric test records. This record will include as a minimum:

5.1.1 Name and job classification of the employee.

5.1.2 Date of the audiogram.

5.1.3 The examiner's name.

5.1.4 Date of the last acoustic or exhaustive calibration of the audiometer.

5.1.5 Employee's most recent noise exposure assessment.

5.1.6 This employer will maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

5.2 Record Retention. This employer will retain audiometric and related records for at least the following periods.

5.2.1 Noise exposure measurement records will be retained for two years.

5.2.2 Audiometric test records will be retained for the duration of the affected employee's employment.

5.3 Access to Records. All records cited in this standard practice instruction will be provided upon request to employees, former employees, representatives designated by the individual employee, and representatives of OSHA. The provisions of 29 CFR 1910.20 apply to access to records under this section.

5.4 Transfer of Records. If this employer ceases to do business, the records will be transferred to the successor employer and maintained by the successor employer. Should the company cease to function entirely the records will be provided to the respective employees, or as required by current law.

6. Appendices.

6.1 Appendix A, 29 CFR 1910.95 Noise Exposure Computation

6.1.2 Computation of Employee Noise Exposure

6.1.2.1 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 day, in hours, and T is the reference duration corresponding to the measured sound level, L, as given in Table G-16a below or by the formula shown as a footnote to that table.

6.1.2.2 When the work-shift noise exposure is composed of two or more periods of noise at different levels, the total noise dose over the work day is given by:

$$D = 100 (C_1/T_1 + C_2/T_2 + \dots + C_n/T_n),$$

Note: Where C_n indicates the total time of exposure at a specific noise level, and T_n indicates the reference duration for that level as given by Table G-16a. The eight hour time weighted average sound level (TWA), in decibels, may be computed from the dose, in percent, by means of the formula: $TWA = 16.61 \log_{10} (D/100) + 90$. For an 8-hour work-shift with the noise level constant over the entire shift, the TWA is equal to the measured sound level.

Table G-16a

A-weighted sound level, L (decibel)	Reference duration, T (hour)
80	32.0
81	27.9
82	24.3
83	21.1
84	18.4
85	16.0
86	13.9
87	12.1
88	10.6
89	9.2

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

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

$$T = \frac{8}{2(L-90)/5}$$

L is the measured A-weighted sound level.

6.1.3 Conversion Between "Dose" and "8-Hour Time-Weighted Average" Sound Level.

6.1.3.1 Compliance will be determined by the amount of exposure to noise in the workplace. The amount of such exposure will usually be measured with a dosimeter which gives a readout in terms of "dose." Dosimeter readings can be converted to an "8 hour time weighted average sound level." (TWA).

6.1.3.2 In order to convert the reading of a dosimeter into TWA, see Table A-1, below. This table applies to dosimeters that are set by the manufacturer to calculate dose or percent exposure according to the relationships in Table G-16a. So, for example, a dose of 91 percent over an eight hour day results in a TWA of 89.3 dB, and, a dose of 50 percent corresponds to a TWA of 85 dB.

6.1.3.3 If the dose as read on the dosimeter is less than or greater than the values found in Table A-1, the TWA may be calculated by using the formula: $TWA = 16.61 \log_{10} (D/100) + 90$ where TWA = 8 hour time weighted average sound level and D = accumulated dose in percent exposure.

Table A-1

Conversion From "Percent Noise Exposure" or "Dose" to "8-Hour Time-Weighted Average Sound Level" (TWA)

Dose or percent noise exposure	TWA
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
81	88.5
82	88.6
83	88.7
84	88.7
85	88.8
86	88.9
87	89.0
88	89.1
89	89.2
90	89.2
91	89.3
92	89.4
93	89.5
94	89.6
95	89.6
96	89.7
97	89.8
98	89.9
99	89.9
100	90.0
101	90.1
102	90.1
103	90.2
104	90.3
105	90.4
106	90.4
107	90.5
108	90.6
109	90.6
110	90.7
111	90.8
112	90.8
113	90.9
114	90.9
115	91.1
116	91.1
117	91.1
118	91.2
119	91.3

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

6.2 Appendix B, 29 CFR 1910.95 Estimating the Adequacy of Hearing Protector Attenuation.

6.2.2 For employees who have experienced a significant threshold shift, hearing protection provided will have an attenuation that is sufficient to reduce employee exposure to a TWA of 85 dB. The following method will be used to estimate the adequacy of hearing protector attenuation.

6.2.2.1 The Noise Reduction Rating (NRR) developed by the Environmental Protection Agency (EPA) will be used. Only approved hearing protection equipment showing the NRR on the hearing protector package will be used by employees of this company. The NRR will be related to an individual employee's noise environment in order to assess the adequacy of the attenuation of a given hearing protector. When using the NRR to assess hearing protector adequacy, one of the following methods will be used:

1. Dosimeter (C-weighted):

A. Obtain the employee's C-weighted dose for the entire work-shift, and convert to TWA .

B. Subtract the NRR from the C-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

2. Dosimeter (not capable of C-weighted measurements):

A. Convert the A-weighted dose to TWA.

B. Subtract 7 dB from the NRR.

C. Subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

3. Sound level meter (set to the A-weighting network):

A. Obtain the employee's A-weighted TWA.

- B. Subtract 7 dB from the NRR, and subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.
4. Sound level meter (set to the C-weighting network):
- A. Obtain a representative sample of the C-weighted sound levels in the employee's environment.
- B. Subtract the NRR from the C-weighted average sound level to obtain the estimated A-weighted TWA under the ear protector.
5. When using area monitoring procedures and a sound level meter set to the A-weighting network.
- A. Obtain a representative sound level for the area in question.
- B. Subtract 7 dB from the NRR and subtract the remainder from the A-weighted sound level for that area.
6. When using area monitoring procedures and a sound level meter set to the C-weighting network:
- A. Obtain a representative sound level for the area in question.
- B. Subtract the NRR from the C-weighted sound level for that area.

6.2.2.2 Age Correction Values in Decibels for Males and Females.

Table F-1

Age Correction Values in Decibels for Males

Audiometric test frequency (Hz)

Years	1000	2000	3000	4000	6000
20 or younger	5	3	4	5	8
21	5	3	4	5	8
22	5	3	4	5	8
23	5	3	4	6	9
24	5	3	5	6	9
25	5	3	5	7	10
26	5	4	5	7	10
27	5	4	6	7	11
28	6	4	6	8	11
29	6	4	6	8	12
30	6	4	6	9	12

31	6	4	7	9	13
32	6	5	7	10	14
33	6	5	7	10	14
34	6	5	8	11	15
35	7	5	8	11	15
36	7	5	9	12	16
37	7	6	9	12	17
38	7	6	9	13	17
39	7	6	10	14	18
40	7	6	10	14	19
41	7	6	10	14	20
42	8	7	11	16	20
43	8	7	12	16	21
44	8	7	12	17	22
45	8	7	13	18	23
46	8	8	13	19	24
47	8	8	14	19	24
48	9	8	14	20	25
49	9	9	15	21	26
50	9	9	16	22	27
51	9	9	16	23	28
52	9	10	17	24	29
53	9	10	18	25	30
54	10	10	18	26	31
55	10	11	19	27	32
56	10	11	20	28	34
57	10	11	21	29	35
58	10	12	22	31	36
59	11	12	22	32	37
60 or older	11	13	23	33	38

Table F-2

Age Correction Values in Decibels for Females

Audiometric test frequency (Hz)

Years	1000	2000	3000	4000	6000
20 or younger	7	4	3	3	6
21	7	4	4	3	6
22	7	4	4	4	6
23	7	5	4	4	7
24	7	5	4	4	7
25	8	5	4	4	7
26	8	5	5	4	8
27	8	5	5	5	8
28	8	5	5	5	8
29	8	5	5	5	9

30	8	6	5	5	9
31	8	6	6	5	9
32	9	6	6	6	10
33	9	6	6	6	10
34	9	6	6	6	10
35	9	6	7	7	11
36	9	7	7	7	11
37	9	7	7	7	12
38	10	7	7	7	12
39	10	7	8	8	12
40	10	7	8	8	13
41	10	8	8	8	13
42	10	8	9	9	13
43	11	8	9	9	14
44	11	8	9	9	14
45	11	8	10	10	15
46	11	9	10	10	15
47	11	9	10	11	16
48	12	9	11	11	16
49	12	9	11	11	16
50	12	10	11	12	17
51	12	10	12	12	17
52	12	10	12	13	18
53	13	10	13	13	18
54	13	11	13	14	19
55	13	11	14	14	19
56	13	11	14	15	20
57	13	11	15	15	20
58	14	12	15	16	21
59	14	12	16	16	21
60 or older	14	12	16	17	22

6.1.2.3 Example to determine Age Correction Values in Decibels for Males and Females.

Audiometric test frequency (Hz)

Employee's age	1000	2000	3000	4000	6000
Age 32	6	5	7	10	14
Age 27	5	4	6	7	11
Difference	1	1	1	3	3

Note: The difference represents the amount of hearing loss that may be attributed to aging in the time period between the baseline audiogram and the most recent audiogram. In this example, the difference at 4000 Hz is 3 dB. This value is subtracted from the hearing level at 4000 Hz, which in the most recent audiogram is 25, yielding 22 after adjustment. Then the hearing threshold in the baseline audiogram at 4000 Hz (5) is subtracted from the adjusted annual audiogram hearing threshold at 4000 Hz (22). Thus, the age-corrected threshold shift would be 17 dB (as opposed to a threshold shift of 20 dB without age correction).

7. Definitions. Definitions commonly found in the OSHA Occupational Noise Exposure Standard or that relate to the contents of the standard practice instruction.

Action level--An 8-hour time weighted average of 85 decibels measured on the A-scale, slow response, or equivalently, a dose of fifty percent.

Audiogram--A chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

Audiologist--A professional, specializing in the study and rehabilitation of hearing, who is certified by the American Speech-Language-Hearing Association or licensed by a state board of examiners.

Baseline audiogram--The audiogram against which future audiograms are compared.

Criterion sound level--A sound level of 90 decibels.

Decibel (dB)--Unit of measurement of sound level.

Hertz (Hz)--Unit of measurement of frequency, numerically equal to cycles per second.

Medical pathology--A disorder or disease. For purposes of this instruction, a condition or disease affecting the ear, which should be treated by a physician specialist.

Noise dose--The ratio, expressed as a percentage, of (1) 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 (2) 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).

Noise dosimeter--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.

Otolaryngologist--A physician specializing in diagnosis and treatment of disorders of the ear, nose and throat.

Representative exposure--Measurements of an employee's noise dose or 8-hour time weighted average sound level that the employers deem to be representative of the exposures of other employees in the workplace.

Sound level--Ten 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. Unit: decibels (dB). For use with this instruction, SLOW time response, in accordance with ANSI S1.4-1971 (R1976), is required.

Sound level meter--An instrument for the measurement of sound level.

Time weighted average sound level--That sound level, which if constant over an 8 hour exposure, would result in the same noise dose as is measured.