

Table D-1 - Reference Threshold Levels for Telephonics TDH-39 Earphones

Frequency, Hz	Reference Threshold Level for TDH-39 Hz 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

Table D-2 - Reference Threshold Levels for Telephonics TDH-49 Earphones

Frequency, Hz	Reference Threshold Level for TDH-49 Hz 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

§5100 Appendix E Methods for Estimating the Adequacy of Hearing Protector Attenuation

I. For employees who have experienced a standard threshold shift, hearing protector attenuation must be sufficient to reduce employee exposure to a TWA of 85 dB. Employers must select one of the following methods by which to estimate the adequacy of hearing protection attenuation.

II. The most convenient method is the Noise Reduction Rating (NRR) developed by the Environmental Protection Agency (EPA). According to EPA regulation, the NRR must be shown on the hearing protector package. The NRR is then related to an individual worker's noise environment in order to assess the adequacy of the attenuation of a given hearing protector. This Appendix describes four methods of using the NRR to determine whether a particular hearing protector provides adequate protection within a given exposure environment. Selection among the four procedures is dependent upon the employer's noise measuring instruments.

III. Instead of using the NRR, employers may evaluate the adequacy of hearing protector attenuation by using one of the three methods developed by the National Institute for Occupational Safety and Health (NIOSH), which are described in the "List of Personal Hearing Protectors and Attenuation Data," HEW Publication No. 76-120, 1975, pages 21-37. These methods are known as NIOSH methods #1, #2 and #3. The NRR described below is a simplification of NIOSH method #2. The most complex method is NIOSH method #1, which is probably the most accurate method since it uses the largest amount of spectral information from the individual employee's noise environment. As in the case of the NRR method described below, if one of the NIOSH methods is used, the selected method must be applied to an individual's noise environment to assess the adequacy of the attenuation. Employers should be careful to take a sufficient number of measurements in order to achieve a representative sample for each time segment.

NOTE: The employer must remember that calculated attenuation values reflect realistic values only to the extent that the protectors are properly fitted and worn.

IV. When using the NRR to assess hearing protector adequacy, one of the following methods must be used:

- (a) When using a dosimete that is capable** of C-weighted measurements:
 - (1) Obtain the employee's C-weighted dose for the entire workshift, and convert to TWA (see Appendix A).
 - (2) Subtract the NRR from the C-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.
- (b) When using a dosimeter that is not capable** of C-weighted measurements, the following method may be used:
 - (1) Convert the A-weighted dose to TWA (see Appendix A).
 - (2) Subtract 7 dB from the NRR.
 - (3) Subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.
- (c) When using a sound level meter set to the A-weighting network:**
 - (1) Obtain the employee's A-weighted TWA.

- (2) 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.

- (d) When using a sound level meter set on the C-weighting network:**
 - (1) Obtain a representative sample of the C-weighted sound levels in the employee's environment.
 - (2) Subtract the NRR from the C-weighted average sound level to obtain the estimated A-weighted TWA under the ear protector.

§5100 Appendix F Determination and Application of Age Corrections to Audiograms

As permitted by Section 5097(d)(9), increases in an employee's hearing thresholds, as evidenced by an audiogram taken subsequent to a baseline audiogram, may be adjusted (lowered) for presbycusis (hearing loss due to aging). The applicable correction values at various ages and sound frequencies are included in Table F. If the employer chooses to adjust an employee's audiogram pursuant to Section 5097(d)(9), the employer shall follow the procedure described below.

- (a) Obtain from Table F the age correction values** at each audiometric test frequency of interest (the hearing losses at 2000, 3000, and 4000Hz are relevant to the determination of whether a standard threshold shift, as defined by Section 5097(d)(8), may exist) for the employee by:
 - (1) Finding the age at which the most recent audiogram was taken and recording the corresponding age correction values; and
 - (2) Finding the age at which the baseline audiogram was taken and recording the corresponding age correction values.
- (b) Subtract the values found in (a)(2) from those found in (a)(1).** (The remainders from these subtractions represent the values (in decibels) which may be attributed to aging and are the values by which the most recent audiogram may be adjusted at the respective audiometric test frequencies.)
- (c) Subtract the values found in (b)** from the hearing threshold values of the most recent audiogram.

When the adjustment of an audiogram for hearing loss due to aging is performed for the purpose of determining whether a standard threshold shift has occurred, the above-described calculations may be restricted to the 2000, 3000, and 4000 Hz frequencies. If the average of the hearing threshold values at 2000, 3000, and 4000 Hz found in step (c), above, is equal to or greater than 10, then the employee has exhibited a standard threshold shift, and the employer must comply with various provisions of Section 5097(d) as well as certain other requirements such as Sections 5098(a)(2)(B)2 and (b)(3).

Table F - Age Correction Values in Decibels for Males (M) and Females (F)

Age	Audiometric Test Frequencies (Hz)									
	1000		2000		3000		4000		6000	
	M	F	M	F	M	F	M	F	M	F
20 or Younger	5	7	3	4	4	3	5	3	8	6
21	5	7	3	4	4	4	5	3	8	6
22	5	7	3	4	4	4	5	4	8	6
23	5	7	3	5	4	4	6	4	9	7
24	5	7	3	5	5	4	6	4	9	7
25	5	8	3	5	5	4	7	4	10	7
26	5	8	4	5	5	5	7	4	10	8
27	5	8	4	5	6	5	7	5	11	8
28	6	8	4	5	6	5	8	5	11	8
29	6	8	4	5	6	5	8	5	12	9
30	6	8	4	6	6	5	9	5	12	9
31	6	8	4	6	7	6	9	5	13	9
32	6	9	5	6	7	6	10	6	14	10
33	6	9	5	6	7	6	10	6	14	10
34	6	9	5	6	8	6	11	6	15	10
35	7	9	5	6	8	7	11	7	15	11
36	7	9	5	7	9	7	12	7	16	11
37	7	9	6	7	9	7	12	7	17	12
38	7	10	6	7	9	7	13	7	17	12
39	7	10	6	7	10	8	14	8	18	12
40	7	10	6	7	10	8	14	8	19	13
41	7	10	6	8	10	8	14	8	20	13
42	8	10	7	8	11	9	16	9	20	13