

By Standard Number / 1910.95 App F - Calculations and application of age corrections to audiograms

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 - **Part Number Title:** Occupational Safety and Health Standards
 - **Subpart:** 1910 Subpart G
 - **Subpart Title:** Occupational Health and Environmental Control
 - **Standard Number:** 1910.95 App F
 - **Title:** Calculations and application of age corrections to audiograms
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This Appendix Is Non-Mandatory

In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging to the change in hearing level by adjusting the most recent audiogram. If the employer chooses to adjust the audiogram, the employer shall follow the procedure described below. This procedure and the age correction tables were developed by the National Institute for Occupational Safety and Health in the criteria document entitled "Criteria for a Recommended Standard . . . Occupational Exposure to Noise," ((HSM)-11001).

For each audiometric test frequency;

(i) Determine from Tables F-1 or F-2 the age correction values for the employee by:

(A) Finding the age at which the most recent audiogram was taken and recording the corresponding values of age corrections at 1000 Hz through 6000 Hz;

(B) Finding the age at which the baseline audiogram was taken and recording the corresponding values of age corrections at 1000 Hz through 6000 Hz.

(ii) Subtract the values found in step (i)(B) from the value found in step (i)(A).

(iii) The differences calculated in step (ii) represented that portion of the change in hearing that may be due to aging.

EXAMPLE: Employee is a 32-year-old male. The audiometric history for his right ear is shown in decibels below.

| Employee's age | Audiometric test frequency (Hz) | | | | |
|----------------|---------------------------------|------|------|------|------|
| | 1000 | 2000 | 3000 | 4000 | 6000 |
| 26..... | 10 | 5 | 5 | 10 | 5 |
| *27..... | 0 | 0 | 0 | 5 | 5 |
| 28..... | 0 | 0 | 0 | 10 | 5 |
| 29..... | 5 | 0 | 5 | 15 | 5 |
| 30..... | 0 | 5 | 10 | 20 | 10 |
| 31..... | 5 | 10 | 20 | 15 | 15 |
| *32..... | 5 | 10 | 10 | 25 | 20 |

The audiogram at age 27 is considered the baseline since it shows the best hearing threshold levels. Asterisks have been used to identify the baseline and most recent audiogram. A threshold shift of 20 dB exists at 4000 Hz between the audiograms taken at ages 27 and 32.

(The threshold shift is computed by subtracting the hearing threshold at age 27, which was 5, from the hearing threshold at age 32, which is 25). A retest audiogram has confirmed this shift. The contribution of aging to this change in hearing may be estimated in the following manner:

Go to Table F-1 and find the age correction values (in dB) for 4000 Hz at age 27 and age 32.

| | Frequency (Hz) | | | | |
|-------------|----------------|------|------|------|------|
| | 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 |

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).

TABLE F-1 - AGE CORRECTION VALUES IN DECIBELS FOR MALES

| Years | Audiometric Test Frequency (Hz) | | | | |
|--------------------|---------------------------------|------|------|------|------|
| | 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

| Years | Audiometric Test Frequency (Hz) | | | | |
|--------------------|---------------------------------|------|------|------|------|
| | 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 |

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