

## Appendix A

This Appendix is Mandatory

### I. Computation of Employee Noise Exposure

(1) Noise dose is computed using Table G-16a as follows:

(i) 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 or by the formula shown as a footnote to that table.

(ii) When the workshift 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:

$$D = 100 (C(1)/T(1) + C(2)/T(2) + \dots + C(n)/T(n)),$$

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.

(2) 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 eight-hour workshift with the noise level constant over the entire shift, the TWA is equal to the measured sound level.

(3) A table relating dose and TWA is given in Section II.

TABLE G-16A

A-weighted sound level, L (decibel)	Reference duration, T (hour)
80.....	32
81.....	27.9
82.....	24.3
83.....	21.1
84.....	18.4
85.....	16
86.....	13.9
87.....	12.1
88.....	10.6
89.....	9.2
90.....	8
91.....	7.0
92.....	6.1
93.....	5.3
94.....	4.6
95.....	4
96.....	3.5
97.....	3.0
98.....	2.6

99.....	2.3
100.....	2
101.....	1.7
102.....	1.5
103.....	1.3
104.....	1.1
105.....	1
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

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

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

where L is the measured A-weighted sound level.

## II. Conversion Between "Dose" and "8-Hour Time-Weighted Average"

### Sound Level

Compliance with paragraphs (c)-(r) of this regulation is determined by the amount of exposure to noise in the workplace. The amount of such exposure is usually measured with an audiodosimeter which gives a readout in terms of "dose." In order to better understand the requirements of the amendment, dosimeter readings can be converted to an "8-hour time-weighted average sound level." (TWA).

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.

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

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