



Noise exposure level ready-reckoner

(Based on the UK HSE Ready Reckoner)

Tables 1 to 3 comprise a ready-reckoner that provides a simple way of working out a worker's $L_{Aeq,8h}$ (eight-hour equivalent continuous sound pressure level) if you know the noise level and duration of each of the noisy tasks carried out by the worker during the work shift.

From Tables 1 or 2 you read off the number of "noise exposure points" that correspond to a particular task's noise level and exposure duration. Table 1 is for noise levels between 75 and 105 dB(A) and Table 2 is for higher noise levels between 95 and 125 dB(A).

Example: A task producing a noise level at the worker's ear of 93 dB(A) that is done for two lots of 30 minutes in a shift (i.e. 1 h), produces 80 noise exposure points. Another task with a noise level of 120 dB(A) for 1 minute during the shift produces 670 points.

These points can be added (in the normal arithmetic way) to give the total exposure points for the shift. Table 3 is then used to convert the total points to the $L_{Aeq,8h}$

In the example above, if these were the only noisy tasks carried out by the worker, the points total is 750 and (from Table 3, rounding to the nearest whole decibel) the $L_{Aeq,8h}$ for the worker is 94 dB(A).

This calculated $L_{Aeq,8h}$ value can be compared with the exposure standard in the Occupational Safety and Health Regulations – i.e. $L_{Aeq,8h} = 85$ dB(A). Additionally, noise exposure points can be used to prioritise the noise control program, by showing which tasks make the greatest contribution to the total noise exposure.

In the example above the worker's $L_{Aeq,8h}$ is greater than the standard, so noise control action is needed. Although it only lasts for 1 minute, the 120 dB(A) task contributes more than eight times as much as the other task to the total exposure and so should be the first one tackled.

In this scheme the regulatory exposure standard for noise, $L_{Aeq,8h} = 85$ dB(A), is 100 points.

	Duration of exposure per shift							
	15 min	30 min	1 h	2 h	4 h	8 h	10 h*	12 h*
105	320	640	1270	2530	5060	10120	12650	15180
104	250	500	1000	2010	4020	8040	10050	12060
103	200	400	800	1600	3200	6400	8000	9600
102	160	320	640	1270	2540	5070	6340	7600
101	130	250	500	1010	2010	4030	5040	6040
100	100	200	400	800	1600	3200	4000	4800
99	80	160	320	640	1270	2540	3180	3810
98	63	130	250	500	1010	2020	2520	3030
97	50	100	200	400	800	1600	2000	2410
96	40	80	160	320	640	1270	1590	1910
95	32	63	130	250	510	1010	1260	1520
94	25	50	100	200	400	800	1000	1210
93	20	40	80	160	320	640	800	960
92	16	32	63	130	250	510	630	760
91	13	25	50	100	200	400	500	600
90	10	20	40	80	160	320	400	480
89	7.9	16	32	64	130	250	320	380
88	6.3	13	25	50	100	200	250	300
87	5.0	10	20	40	80	160	200	240
86	4.0	8.0	16	32	64	130	160	190
85	3.2	6.3	13	25	50	100	130	150
84	2.5	5.0	10	20	40	80	100	120
83	2.0	4.0	8.0	16	32	64	80	96
82	1.6	3.2	6.3	13	25	51	63	76
81	1.3	2.5	5.0	10	20	40	50	60
80	1.0	2.0	4.0	8.0	16	32	40	48
79	0.8	1.6	3.2	6.4	13	25	32	38
78	0.6	1.3	2.5	5.0	10	20	25	30
77	0.5	1.0	2.0	4.0	8.0	16	20	24
76	0.4	0.8	1.6	3.2	6.4	13	16	19
75	0.3	0.6	1.3	2.5	5.1	10	13	15

Sound Level $L_{Aeq,TdB(A)}$

	Duration of exposure per shift							
	5 sec	10 sec	15 sec	30 sec	1 min	2 min	5 min	10 min
125	180	360	530	1050	2110	4220	10540	21080
124	140	280	420	840	1680	3350	8370	16750
123	110	220	330	670	1330	2660	6650	13300
122	90	180	260	530	1060	2110	5280	10570
121	70	140	210	420	840	1680	4200	8390
120	56	110	170	330	670	1330	3330	6670
119	44	88	130	270	530	1060	2650	5300
118	35	70	110	210	420	840	2100	4210
117	28	56	84	170	330	670	1670	3340
116	22	44	66	130	270	530	1330	2650
115	18	35	53	110	210	420	1050	2110
114	14	28	42	84	170	330	840	1680
113	11	22	33	67	130	270	670	1330
112	8.8	18	26	53	110	210	530	1060
111	7.0	14	21	42	84	170	420	840
110	5.6	11	17	33	67	130	330	670
109	4.4	8.8	13	26	53	110	270	530
108	3.5	7.0	11	21	42	84	210	420
107	2.8	5.6	8.4	17	33	67	170	330
106	2.2	4.4	6.6	13	27	53	130	270
105	1.8	3.5	5.3	11	21	42	110	210
104	1.4	2.8	4.2	8.4	17	33	84	170
103	1.1	2.2	3.3	6.7	13	27	67	130
102	0.9	1.8	2.6	5.3	11	21	53	110
101	0.7	1.4	2.1	4.2	8.4	17	42	84
100	0.6	1.1	1.7	3.3	6.7	13	33	67
99	0.5	0.9	1.3	2.7	5.3	11	27	53
98	0.4	0.7	1.1	2.1	4.2	8.4	21	42
97	0.3	0.6	0.8	1.7	3.3	6.7	17	33
96	0.2	0.5	0.7	1.3	2.7	5.3	13	27
95	0.2	0.4	0.5	1.1	2.1	4.2	11	21

Total exposure points	L_{Aeq,8h} dB(A)
32000	110
25420	109
20190	108
16040	107
12740	106
10120	105
8040	104
6400	103
5070	102
4030	101
3200	100
2540	99
2020	98
1600	97
1270	96
1010	95
800	94
640	93
510	92
400	91
320	90
250	89
200	88
160	87
130	86
100	85
80	84
64	83
51	82
40	81
32	80
25	79
20	78
16	77
13	76
10	75

Notes:

1. If there is only one source of noise exposure, a quick glance at the background colour of the table cell corresponding to the sound level and duration of exposure will tell you if the worker is:
 - (a) above the $L_{Aeq,8h}$ 85 dB(A) exposure standard - **Red**
 - (b) well below the $L_{Aeq,8h}$ 85 dB(A) standard – **Green**
 - (c) marginal (between $L_{Aeq,8h}$ 80 and 85 dB(A)) – **Orange**
2. For durations of exposure not listed in the table, add together the points from two durations that together give the same duration. For example, for 5 hours at 95 dB(A), add together the points for 4 hours at 95 dB(A) and 1 hour at 95 dB(A) – that is 510 + 130, giving a total of 640 points.
3. The tables can be extended to include both higher and lower sound levels. A change of 10 dB(A) results in a tenfold change in the points. For example, one hour exposure at 108 dB(A) will give 10 times the points for one hour at 98 dB(A), that is, 2500 points.
4. *For work shift lengths of 10 hours or more, the following adjustments must be added to the $L_{Aeq,8h}$ obtained from the above tables before comparing with the Exposure Standard for Noise. (Ref: Table 2 of AS/NZS 1269.1).

Adjustments to $L_{Aeq,8h}$ for Extended Workshifts

<i>Shift length, h</i>	Adjustment to $L_{Aeq,8h}$, dB(A)
< 10	+ 0
\geq 10 to < 14	+ 1
\geq 14 to < 20	+ 2
\geq 20 to 24	+ 3

Example 1: Carpenter working a 10.5-hour shift using tools and machines listed below.

Machine/Process	Measured Sound Level $L_{Aeq,T}$ dB(A)	Duration per shift
Circular Saw – cutting hardwood	94	2 h
Planer – planing hardwood	100	3 h
Power Drill – drilling hardwood	87	4 h
Hammering nails into wood	98	10 min
Background	70	1 h 20 min

- a) If you want to just quickly see if the carpenter is exposed above the $L_{Aeq,8h} = 85$ dB(A) noise standard, look up points for 94 dB(A) and 2 h in Table 1. You see that the cell is red, so you know without going any further that the carpenter is exposed to noise above the standard.
- b) If you want to actually work out the carpenter’s 8h-equivalent continuous sound pressure level, $L_{Aeq,8h}$, then use Tables 1, 2 and 3 as below:

Machine/Process	Sound Level $L_{Aeq,T}$ dB(A)	Duration per shift	Points
Circular Saw – cutting hardwood	94	2 h	200
Planer – planing hardwood	100	3 h	2 h 800 1 h 400
Power Drill – drilling hardwood	87	4 h	80
Hammering nails into wood	98	10 min	42
Background	70	1 h 20 min	1 h 0.4 20 m 0.1
		Total 10.5 h	Total 1522.5

From Table 3: $L_{Aeq,8h} = 97$ dB(A), but as shift is 10.5 hours, an adjustment of +1 dB(A) is needed. Hence the adjusted $L_{Aeq,8h} = 98$ dB(A).

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