



Classified Hearing Protectors

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INTRODUCTION

The information contained in this publication is intended to assist employers and employees to choose hearing protectors that will give suitable protection against excessive noise levels. It is based on AS/NZS 1269:2005 *Occupational Noise Management*.

The Health and Safety in Employment Act 1992 requires employers to take all practicable steps to ensure a safe and healthy place of work, and to identify and appropriately manage significant hazards so that employees and others in the workplace are not harmed.

One of the most significant health hazards in the workplace is exposure to excessive noise. In fact, the number of claims and associated compensation costs for noise-induced hearing loss has doubled in the last five years in New Zealand¹.

The Health and Safety in Employment Regulations 1995 requires that no employee is exposed to noise above the following levels:

- L_{Aeq8h} of 85dB(A); and
- L_{Peak} of 140dB.

L_{Aeq8h} 85dB(A) means the level of daily noise exposure normalised to the average eight-hour working day. Noise level exposure must not exceed the A-weighted sound energy of 85 decibels over an eight-hour period.

A-weighted sound energy measurements ensure that the testing equipment reflects how humans hear noise.

L_{Peak} 140dB is the highest frequency unweighted (pure sound) peak sound pressure level. Any noise, even if it is for a short time, must not exceed 140dB because this can cause instantaneous hearing damage.

Duties of Suppliers

The Health and Safety in Employment Regulations 1995 specify the duties of designers, manufacturers and suppliers of hearing protectors. They must design and manufacture protective clothing and equipment, including hearing protection, so that it will give adequate protection from the harm the clothing or equipment is intended to protect. Manufacturers and suppliers must also provide comprehensive and readily understandable information about:

- what the protective clothing and/or equipment has been designed for;
- and

Between July 2007 and June 2008, ACC received 4,865 new claims for noise-induced hearing loss (NIHL). The sectors with the highest claim rates were:

- agriculture, forestry and fishing (1,145 claims)
- manufacturing (1,109 claims)
- construction (851 claims).

¹ <http://www.acc.co.nz/preventing-injuries/at-work/workplace-health-issues/PI00081>,
http://www.acc.co.nz/PRD_EXT_CSMP/groups/external_communications/documents/reports_results/ba00064.xls

- how to use, wear, clean and maintain it.

Duties of employers

The law requires employers to take all practicable steps to eliminate, isolate or minimise the hazards of excessive noise in the workplace. However, if all practicable measures have been taken and noise still exceeds 85dB(A), employees and others in the workplace exposed to the noise will be required to wear hearing protection.

If the employer has to minimise excessive noise hazards, and determines that hearing protection must be used as part of safe practice, the employer must:

- Supply the hearing protection to employees
- Provide information to employees about how to use the hearing protection, why it is necessary to wear it, how to keep it clean (if reusable, like earmuffs or reusable earplugs), where replacements are located (if disposable, like one-use earplugs), how to assemble or disassemble it (if applicable)
- Monitor employees' exposure to the noise hazards
- Take all practicable steps to obtain consent to monitor employees' exposure to the hazards (e.g. audiometry testing)
- Give results of any monitoring undertaken to exposed employees
- Train and adequately supervise employees in the safe execution of their work, including by wearing hearing protection.

Duties of employees

Employees are legally required to wear or use the protective clothing and equipment that the employer issues to them, including hearing protection.

Employees can also refuse to perform work that is likely to cause serious harm, for example: employees expected to work in an environment known to contain noise in excess of 140dB without having access to hearing protection, could – after trying to work with the employer in good faith to resolve the issue – refuse to do the work. **Note:** the refusal only applies to work that is known to be unsafe and likely to cause serious harm. If other, safer work is available, it must be conducted.

HOW TO USE THIS GUIDE

The hearing protective devices listed in this publication have been tested to the requirements of AS/NZS 1270:2002 *Acoustics – Hearing protectors*, unless indicated otherwise.

Hearing protectors are listed according to hearing protection class. Hearing protection in these classes can be worn in environments with the highest level of noise specified:

Class	$L_{Aeq,8h}$ dB(A)
Class 1	Less than 90
Class 2	90 to less than 95
Class 3	95 to less than 100
Class 4	100 to less than 105
Class 5	105 to less than 110

Table 1: table of hearing protection classes and maximum noise levels related to each class

With each class, hearing protective devices are listed in alphabetical order according to brand name within the following classifications:

- Earplugs
- Earmuffs
- Communication earmuffs
- Ear muff/helmet Combinations.

The attenuation of hearing protectors is measured in accordance with the procedures described in standards such as AS/NZS 1270.

Testing process

Inexperienced test subjects with normal hearing are selected at random (usually sixteen subjects are used for testing earmuffs, twenty subjects for earplugs). Subjects are tested with hearing protectors (called occluded ear testing), and tested again without hearing protectors (called open ear testing), across a range of test frequencies. The difference between the open ear and occluded ear hearing tests provides the **attenuation** of the hearing protector.

The variability in these attenuation measurements among subjects (the “**Standard Deviation**”) is calculated and the attenuation values from all subjects are then averaged to provide the “**Mean Attenuation in dB**” at each frequency. These Mean Attenuation values, as well as the Standard Deviations, appear in the attenuation chart on each box or bulk package of hearing protectors.

Accounting for individual variation

To account for individual variation in fitting hearing protectors out in the real world (since the laboratory only tested twenty subjects, at most), a correction factor of one standard deviation is subtracted from each attenuation value. By

subtracting one standard deviation, the results can be generalised from a small sample of twenty subjects to a larger population: for a population which is properly fitted with the hearing protection device in the same manner as the laboratory subjects, 80% of the population would be expected to achieve these same attenuation values.

Accounting for differences in noise

To account for some differences between the laboratory test sounds and real-world noise, the adjusted attenuation values (mean minus one standard deviation) are subtracted from “hypothetical noise levels” – some standardized noise levels at each frequency band.

Finally, all the adjusted attenuated levels are combined into a single number. Attenuation values are measured in decibels, which are logarithmic numbers. Logarithms cannot just be added mathematically (80 dB plus 80 dB does not equal 160 dB). They are added in a special way that accounts for the exponents, and the result is then subtracted from 100 (the logarithmic sum of the hypothetical noise levels).

The result of this calculation is the SLC_{80} (sound level conversion) – a single-number rating of a hearing protector’s attenuation. The SLC_{80} is significantly lower than the average attenuation across all frequencies because the SLC_{80} contains corrections and cushions to make it applicable to a broader population. While it is not a perfect real-world measure of attenuation, the SLC_{80} is a very useful standardized method for describing a hearing protector’s attenuation in a single number. It estimates the amount of attenuation provided to at least 80% of users in a variety of noise environments, when the protector is properly fitted.

Example:

Octave band centre frequency, Hz	125	250	500	1000	2000	4000	8000
(1) Specified band level dB	71	81	89	93	95	93	86
(2) Mean minus standard deviation (from test results) dB	6.1	8.4	15.1	26	34.2	34.9	24.3
Attenuated level (1) – (2) dB	64.9	72.6	73.9	67	60.8	58.1	61.7

Table 2: example data for calculating SLC_{80}

SLC_{80} value is 100 minus the logarithmic summation of all the attenuated level values.

$$\begin{aligned}
 SLC_{80} &:= 100 - 10 \log \left(10^{\frac{64.9}{10}} + 10^{\frac{72.6}{10}} + 10^{\frac{73.9}{10}} + 10^{\frac{67}{10}} + 10^{\frac{60.8}{10}} + 10^{\frac{58.1}{10}} + 10^{\frac{61.7}{10}} \right) \\
 &= 100 - 77.3 \\
 &= 23 \text{ dB (rounded to nearest decibel)}
 \end{aligned}$$

The hearing protector class is determined from Table 3:

Class	Specified $SLC_{80}dB$
1	10 to 13
2	14 to 17
3	18 to 21
4	22 to 25
5	26 or greater

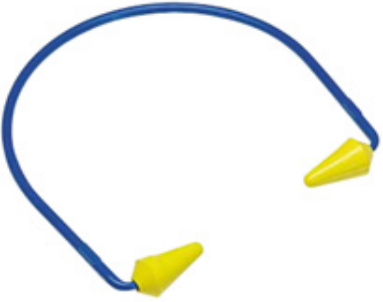

Table 3: Specified SLC_{80} for determination of class (AS/NZS 1270:2002)

In this example, the hearing protector provides a sound level conversion of 23, therefore it is allocated a Class 4 hearing protection factor.



This guide should be read in conjunction with "[Occupational Noise Exposure: Selection and Use of Hearing Protectors](#)" available from the Department of Labour.

Special Note: for helmet-moulded earmuffs, information on the manufacturer(s) and model designations of the helmet tested in conjunction with the earmuffs must appear on the packaging.

CLASS 1 EARPLUGS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R™ Caboflex® Model 600 hearing Protectors 320-2001 (Aearo Company)		Yellow conical shaped pods comprising of a soft foam core and a silicone skin on a thin blue hard plastic neckband.	Mean	9.6	11.2	13.3	17.2	23.1	29.3	29.1
			SD	9.2	10.1	9.2	7.8	7.3	6.9	11.1
			APV	0.4	1.1	4.1	9.4	15.8	22.4	18.0
Peltor™ Hearplug™ – reusable tips (Aearo Company)		Consists of two moulded plugs and a cable to connect to a mobile phone. One plug is a bright yellow soft pre-moulded earplug with three concentric flanges (shown in image). The second pre-moulded plug is white and has a hole extending through it to enable the phone to be connected by a tube (not shown).	Mean	17.0	17.5	17.7	18.8	25.2	24.4	25.9
			SD	11.8	9.9	10.7	9.7	10.9	8.7	10.4
			APV	5.2	7.6	7.0	9.1	14.3	15.7	15.5

Class 1: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R Caps™ Semi Aural Hearing Protector (Aearo Company)		A semi-aural hearing protector with two rounded yellow foam earplugs having a diameter of 17.2 mm and length of 13.5mm. The plugs are fitted over a rounded bollard extension at the outer end of a blue plastic headband.	Mean	15.9	9.6	11.3	12.4	26.3	31.5	35.4
			SD	8.5	4.1	3.8	6.4	6.0	6.0	8.4
			APV	7.4	5.5	7.5	6.0	20.3	25.5	27.0
ELACIN ER FlexComfort individually moulded earplugs with filter ER 15 (ELACIN New Zealand Ltd)		Individually moulded compact clear silicone earplugs, incorporating a proprietary filter (ER15) and external extensions elements to facilitate fitting into the ear canal. The left and right earplugs are colour-coded with permanent red and blue dots.	Mean	15.9	13.2	14.5	13.7	14.6	14.6	18.1
			SD	3.6	3.2	2.8	3.7	3.3	2.5	4.5
			APV	12.3	10.0	11.7	10.0	11.3	12.1	13.6

CLASS 1 EARMUFFS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	



No items are classed in this category.										
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CLASS 1 EAR MUFF/HELMET COMBINATIONS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	

No items are classed in this category.									
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CLASS 2 EARPLUGS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R™flex 28 semi-aural hearing protector (Aearo Company)		Consists of two tapered yellow foam pod on a moulded blue or orange plastic headband.	Mean	21.1	19.9	20.0	22.0	30.1	36.7	31.8
			SD	10.0	10.0	9.4	8.7	10.5	9.0	13.2
			APV	11.1	9.9	10.6	13.3	19.6	27.7	18.6
E-A-R™Flex Foam Tips (Aearo Company)		Consists of yellow foam tipped flared plugs with an overall length 23.3 mm. The plugs are moulded over central flexible plastic pivots, located on the outer ends of a moulded blue headband.	Mean	14.7	12.8	17.0	19.4	27.2	33.1	32.6
			SD	11.5	8.7	7.5	7.9	8.3	6.7	13.1
			APV	3.2	4.1	9.5	11.5	18.9	26.4	19.5

Class 2: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Sonomax Sonocustom™ Custom-fitted, calibrated earplugs- brown filter. (Sound Hearing Ltd)	No image supplied	Custom fitted, calibrated orange medical grade silicone earplugs. Proprietary software selects filters (brown) to ensure optimal protection. A clothing clip connects a 770mm black pliable lanyard to red and blue colour coded inserts in each ear plug.	Mean	11.2	11.7	15.1	18.3	27.3	32.6	35.0
			SD	3.2	3.8	3.9	4.1	4.2	5.0	6.5
			APV	8.0	7.9	11.2	14.2	23.1	27.6	28.5
Sonomax Sonocustom™ Custom-fitted, calibrated earplugs – grey filter (Sound Hearing Ltd)	No image supplied	Custom fitted, calibrated orange medical grade silicone earplugs. Proprietary software selects filters (grey) to ensure optimal protection. A clothing clip connects a 770mm black pliable lanyard to red and blue colour coded inserts in each ear plug.	Mean	8.4	6.9	11.8	17.2	26.8	30.8	30.6
			SD	3.5	3.9	4.1	3.9	4.3	4.5	4.9
			APV	4.9	3.0	7.7	13.3	22.5	26.3	25.7

CLASS 2 EARMUFFS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA												
			Centre Frequency (Hz)												
			125	250	500	1K	2K	4K	8K						

No items are classed in this category.															
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CLASS 2 COMMUNICATION EARMUFFS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	



No items are classed in this category.										
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CLASS 2 EARMUFF/HELMET COMBINATIONS



HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	

No items are classed in this category.										
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CLASS 3 EARPLUGS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
3M™ Disposable Earplugs 1100 (3M New Zealand Ltd)		Soft orange foam disposable earplugs.	Mean	20.3	20.6	23.2	26.5	32.3	37.0	41.1
			SD	8.5	6.9	9.3	9.3	7.1	7.1	8.0
			APV	11.8	13.7	13.8	17.2	25.2	29.9	36.0
3M™ 1290/1291 Earplugs, Reusable (3M New Zealand Ltd)		1290 = uncorded earplugs (not pictured) 1290 = corded earplugs with carrying case (pictured) Multi flanged plugs stay securely in the ear canal. Finger grip stem for easy insertion and to help keep plugs clean. Elastic material does not contain silicone, so they may be used in sensitive work environments, such as automotive painting.	Mean	26.1	26.7	28.2	24.9	29.2	27.3	38.4
			SD	7.5	8.3	6.6	7.5	6.6	7.0	8.6
			APV	18.6	18.4	21.6	17.4	22.6	20.3	31.8



Class 3: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
3M™ 1310 (3M New Zealand Ltd)		Banded hearing protector. Soft orange semi-insert earpieces mounted on a dark blue band.	Mean	19.3	17.5	15.0	19.5	32.0	36.6	38.3
			SD	7.6	5.7	4.6	4.5	7.0	9.1	8.5
			APV	11.6	11.8	10.4	14.9	24.9	26.4	29.7
E-A-R™ Ultrafit™ plug uncorded (Aearo Company)		Yellow soft silicone rubber earplugs (32 mm long) with three stacked mushroom-shaped seals decreasing in diameter towards the tip and a 16 mm long 6 mm diameter cylindrical handle.	Mean	18.4	17.4	20.0	20.6	27.3	30.4	38.3
			SD	8.7	7.4	6.9	6.2	6.3	8.9	12.1
			APV	9.7	10.0	13.1	14.4	21.0	21.5	26.2



Class 3: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R™ Ultrafit™ Plus plug uncorded (Aearo Company, 3M New Zealand Ltd)	Image not supplied	Yellow soft silicone rubber Earplugs (29mm long) with three stacked mushroom shaped seals decreasing in diameter towards the tip, and a 13 mm long plastic paddle shaped handle.	Mean	22.5	22.0	22.9	26.4	30.6	33.3	36.7
			SD	9.5	10.2	9.5	9.3	8.0	11.7	10.5
			APV	13.0	11.8	13.4	17.1	22.6	21.6	26.2
E-A-R™ Ultrafit™ uncorded Earplugs (Aearo Company, 3M New Zealand Ltd)		Yellow soft silicone rubber earplugs (32 mm long) with three stacked mushroom shaped seals (with radial ribs) decreasing in diameter towards the tip, and a 16 mm long 6 mm diameter cylindrical handle.	Mean	19.1	18.9	21.2	20.5	28.9	32.1	36.3
			SD	8.1	8.1	9.3	5.7	6.8	10.6	11.0
			APV	11.0	10.8	11.9	14.8	22.1	21.5	25.3



Class 3: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R™ Express™ Earplug uncorded (Aearo Company, 3M New Zealand Ltd)		Earplug comprising of a hemispherical yellow soft foam tip with coloured flexible plastic paddle handle.	Mean	19.3	19.2	19.6	21.4	30.6	32.3	35.4
			SD	8.3	7.6	8.4	5.0	5.3	4.5	5.0
			APV	11.0	11.6	11.2	16.4	25.3	27.8	30.4
E-A-Rflex™ Pre-moulded Tips (Aearo Company, 3M New Zealand Ltd)		Consisting of pre-moulded yellow coloured plugs each consisting of three concentric flanges and an overall length of 16 mm. These are fitted onto ball jointed plastic spigots located at the ends of a blue plastic headband.	Mean	20.0	16.9	20.9	21.4	26.4	29.0	33.9
			SD	6.6	6.5	8.2	6.8	5.9	9.0	9.3
			APV	13.4	10.4	12.7	14.6	20.5	20.0	24.6

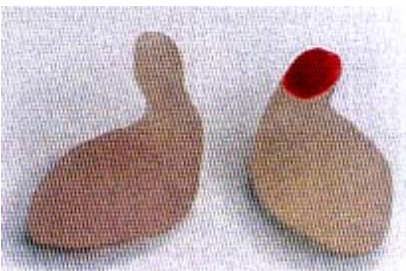
Class 3: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R™ Classic™ Corded Earplugs (Aearo company, 3M New Zealand Ltd)		Consisting of yellow foam cylindrical earplugs with both ends cut flat and a length of 19mm. A pliable blue coloured cord 580 mm in length is thermally moulded into one end of each plug.	Mean	19.0	19.0	25.1	23.9	30.7	37.0	39.3
			SD	6.7	5.1	7.9	7.5	6.9	5.5	9.0
			APV	12.3	13.9	17.2	16.4	23.8	31.5	30.3
E-A-R™ Ultrafit™ Metal Detectable Corded Reusable Earplugs (Aearo company, 3M New Zealand Ltd)		Reusable, metal-detectable earplugs. No roll-down or sizing is required for these premoulded, triple-flange plugs.	Mean	23.5	22.0	23.4	22.2	26.4	34.3	33.4
			SD	6.0	6.7	7.7	7.8	7.4	9.8	10.1
			APV	17.5	17.5	15.7	14.4	19.0	24.5	23.3

Class 3: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Jazz Band® Banded Earplugs (Moldex)		<ul style="list-style-type: none"> • Extra soft tapered foam gently conforms to ear canal • Ideal choice for intermittent usage • Hangs around neck with optional breakaway cord • Greater comfort and fit for increased compliance and convenience. 	Mean	20.7	19.8	20.0	21.1	27.4	33.2	38.9
			SD	8.3	8.3	6.2	6.0	7.6	8.3	8.6
			APV	12.4	11.5	13.8	15.1	19.8	24.9	30.3
Variphone – Variable Personally Moulded Earplugs – Set to 20 (dB) (E-A-R-O-Tec Pty Ltd)		A hard clear acrylic personally moulded variable attenuation earplug. The earpieces are connected (corded) via a plastic cord and the right and left earpiece are fitted with a red and blue marker, respectively. These devices were set to 25 (dB) of attenuation.	Mean	9.4	12.2	16.7	22.5	29.2	29.3	38.8
			SD	2.8	3.4	2.6	2.9	3.1	3.6	5.3
			APV	6.6	8.8	14.1	19.6	26.1	25.7	33.5

Class 3: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Ear Defenders (20) (Paterson Acoustics)		Personally moulded earplugs manufactured from flesh-coloured soft, flexible Audisil 2 material (without helix). Red tip indicates Right ear mould.	Mean	20.5	20.6	22.4	23.8	31.8	35.1	34.9
			SD	8.5	8.8	8.1	6.8	6.0	5.6	10.3
			APV	12.0	11.8	14.3	17.0	25.8	29.5	24.6
Sonomax Sonocustom Custom-fitted, Calibrated Earplugs – Yellow Filter (Sound Hearing Ltd)	Image not supplied	Custom fitted, calibrated orange medical grade silicone earplugs. Proprietary software selects filters (brown) to ensure optimal protection. A clothing clip connects a 770mm black pliable lanyard to red and blue colour coded inserts in each earplug.	Mean	19.9	18.6	18.8	20.7	28.4	34.1	39.8
			SD	4.1	4.3	4.5	4.2	3.5	5.9	6.9
			APV	15.8	14.3	14.3	16.5	24.9	28.2	32.9

Class 3: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Sonomax Sonocustom Custom-fitted, Calibrated Earplugs – Red Filter (Sound Hearing Ltd)	Image not supplied	Custom fitted, calibrated orange medical grade silicone earplugs. Proprietary software selects filters (brown) to ensure optimal protection. A clothing clip connects a 770mm black pliable lanyard to red and blue colour coded inserts in each earplug.	Mean	16.0	16.1	16.8	19.1	27.1	33.5	36.0
			SD	4.6	4.9	4.3	3.8	3.9	4.9	7.0
			APV	11.4	11.2	12.5	15.3	23.2	28.6	29.0

CLASS 3 EARMUFFS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (Where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	

No items are classed in this category.										
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CLASS 3 COMMUNICATION EARMUFFS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	


No items are classed in this category.										
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CLASS 3 EARMUFF/HELMET COMBINATIONS



HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA								
			Centre Frequency (Hz)								
			125	250	500	1K	2K	4K	8K		

No items are classed in this category.											
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CLASS 4 EARPLUGS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R™ Classic™ Superfit™30 Earplug Uncorded (Aearo Company, 3M New Zealand Ltd)		Yellow cylindrical deformable polyurethane foam earplug with orange band to indicate optimum fitting depth.	Mean	19.1	19.1	22.1	22.7	31.5	39.1	37.8
			SD	6.4	4.7	6.0	4.8	4.8	6.3	7.6
			APV	12.7	14.4	16.1	17.9	26.7	32.8	30.2
E-A-RSoft™ Yellow Neons Earplug Uncorded (Aearo Company, 3M New Zealand Ltd)		Fluorescent yellow conical shaped soft polyurethane foam earplugs supplied in regular and large sizes (NAI formula).	Mean	21.9	22.2	24.5	25.7	31.3	42.7	42.5
			SD	8.1	7.4	7.7	6.2	4.8	5.5	7.9
			APV	13.8	14.8	16.8	19.5	26.5	37.2	34.6



Class 4: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Peltor Hearplug-Disposable Tips (Aearo Company)		Consists of two compressible foam plugs and a cable to connect to a mobile phone. One plug is bright yellow 17 mm long by 14 mm in diameter (shown). This plug has a hollow tube in the centre to connect to the phone. The second plug is a standard E.A.R Classic ear plug (not shown).	Mean	22.2	23.2	24.8	25.3	34.0	42.5	43.1
			SD	6.3	4.7	5.8	4.9	3.6	5.3	7.0
			APV	15.9	18.5	19.0	20.4	30.4	37.2	36.1
E-A-R™ Classic™ Platinum Ear plugs (Aearo Company, 3M New Zealand Ltd)		Consists of yellow foam cylindrical ear plugs with both ends cut flat and an effective length of 19.0 mm.	Mean	19.8	20.5	27.0	28.5	30.4	38.1	40.9
			SD	6.3	6.6	8.8	7.9	6.6	5.5	5.6
			APV	13.5	13.9	18.2	20.6	23.8	32.6	35.3


Class 4: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R™ Classic™ Earplugs Uncorded (Aearo company, 3M New Zealand Ltd)		Consists of two yellow foam cylindrical earplugs with ends cut flat and having a length of 19.3 mm.	Mean	19.8	20.6	27.8	27.4	31.0	38.7	41.2
			SD	9.2	8.6	7.3	8.7	6.3	6.1	9.2
			APV	10.6	12.0	20.5	18.7	24.7	32.6	32.0
E-A-R™ Classic™ SuperFit™30 Uncorded Earplugs (Aearo Company, 3M New Zealand Ltd)		Consisting of soft yellow cylindrical foam earplugs with a 5-7 mm wide orange coloured central fitting ring starting at the midpoint of the plug, which has an overall length of 19 mm.	Mean	21.7	22.9	25.2	25.2	31.9	40.6	39.4
			SD	7.8	7.3	7.8	6.5	4.8	5.5	8.9
			APV	13.9	15.6	17.4	18.7	27.1	35.1	30.5


Class 4: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R™ Classic™ SuperFit™30 Corded Earplugs (Aearo Company, 3M New Zealand Ltd)		Consisting of soft yellow cylindrical foam earplugs with a 5-7 mm wide orange coloured central fitting ring starting at the midpoint of the plug, which has an overall length of up to 19 mm. A thermally welded orange cord is fitted into one end of each plug (about 600mm in length).	Mean SD APV	19.4 6.9 12.5	21.2 5.5 15.7	23.6 5.6 18.0	23.6 5.7 17.9	30.9 4.8 26.1	39.4 4.9 34.5	40.3 8.5 31.8
E-A-RSoft™ Yellow Neons™ Corded and Uncorded Earplugs (Aearo Company, 3M New Zealand Ltd)		A soft foam earplug providing maximum comfort with excellent attenuation.	Mean SD APV	21.9 8.1 13.8	22.2 7.4 14.8	24.5 7.7 16.8	25.7 6.2 19.5	31.3 4.8 26.5	42.7 5.5 37.2	42.5 7.9 34.6

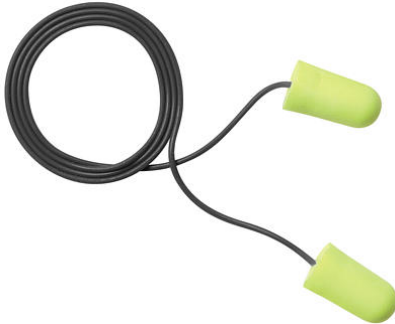

Class 4: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Variphone – Variable Personally Moulded Earplugs – set to 25 (dB) (Ear-O-Tec Pty Ltd)		A hard clear acrylic personally moulded variable attenuation earplug. The earpieces are connected (corded) via a plastic cord and the right and left earpiece are fitted with a red and blue marker, respectively. These devices were set to 25 (dB) of attenuation.	Mean	16.5	18.1	22.2	25.4	31.7	31.4	40.6
	SD	3.2	2.4	2.9	3.1	3.2	3.1	5.4		
	APV	13.3	15.7	19.3	22.3	28.5	28.3	35.2		
Ear Defender (22) (Paterson Acoustics)	No image supplied	Personally moulded earplugs (without helix) manufactured from hard acrylic material. Stem and bead handles attached to the outside surface for insertion and extraction. Red bead indicates Right earplug.	Mean	22.3	23.0	24.2	27.8	33.9	36.3	38.4
	SD	8.4	8.9	9.4	8.1	6.3	6.3	8.4		
	APV	13.9	14.1	14.8	19.7	27.6	30.0	30.0		

Class 4: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
ELACIN ER FlexComfort individually moulded earplugs with filter ML01 (ELACIN New Zealand Ltd)		Individually moulded compact clear silicone earplugs, incorporating a proprietary filter ML01 and external extensions element to facilitate fitting into the ear canal. The left and right earplugs are colour-coded with permanent red and blue filter inserts.	Mean	23.0	18.1	23.3	23.6	29.6	33.4	24.9
SD	4.6	5.3	5.8	5.1	4.9	4.5	7.7			
APV	18.4	12.8	17.5	17.5	24.7	28.9	16.2			
Ear Defender (23) (Paterson Acoustics)	No image supplied	Personally moulded earplugs (without helix) manufactured from soft, flexible S2000 material. Red colour indicates Right earplug and Blue colour indicates Left earplug.	Mean	25.0	25.1	26.2	24.7	33.5	37.3	40.4
SD	8.2	8.8	7.4	6.6	5.2	6.0	5.9			
APV	18.8	16.3	18.8	18.1	28.3	31.3	34.5			



Class 4: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-RSoft™ Metal Detectable Corded Earplugs (Aearo Company, 3M New Zealand Ltd)		Soft, smooth metal detectable earplugs. Both the plug and the cord are metal detectable.	Mean	21.9	23.1	26.3	26.5	28.9	39.6	42.8
			SD	4.5	4.4	6.4	4.5	5.0	4.2	6.1
			APV	17.4	18.7	19.9	22.0	23.9	35.4	36.7
Fusion™ Earplug (Howard Leight)		Soft flange design adjusts perfectly to the ear canal for greater comfort and attenuation.	Mean	24.3	23.3	26.2	28.5	31.6	33.4	40.0
			SD	9.1	9.5	9.2	10.2	6.1	10.8	10.3
			APV	15.2	13.8	17.0	18.3	25.5	22.6	29.7



Class 4: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125 250 500 1K 2K 4K 8K							
Sonomax SonoCustom Corded Reusable Earplug	No image supplied	Custom fitted, calibrated orange medical grade silicone earplugs. Proprietary software selects filters (brown) to ensure optimal protection. A clothing clip connects a 770mm black pliable lanyard to red and blue colour coded inserts in each earplug.	Mean	24.8	23.6	23.7	24.7	34.0	37.2	45.0
			SD	7.6	6.7	6.2	5.0	4.1	4.9	5.3
			APV	17.2	16.9	17.5	19.7	29.9	32.3	39.7


CLASS 4 EARMUFFS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Peltor™ H6A Headband Earmuff (Aearo Company)		Headband earmuff with buff coloured plastic shallow dome shaped ear cups with 5 mm thick grey polyurethane infill, soft black plastic foam filled ear pads, black plastic cylindrical ear cup attachments enabling height/angle adjustment on a twin wire headband with a quilted soft black plastic cushion.	Mean	9.6	9.8	21.1	31.0	27.2	31.6	29.7
	SD	4.2	3.3	3.6	3.1	4.1	2.9	3.8		
	APV	5.4	6.5	17.5	27.9	23.1	28.7	25.9		
Bilsom® 817 NST® Earmuff (Bacou-Dalloz) *tested to ANSI S.3 19-1974		Over the head earmuff consisting of two moulded plastic ear cups attached to a plastic headband. Each cup has a soft foam filled cushion for surrounding the ear.	Mean	16.5	21.7	25.4	24.0	28.1	31.0	32.0
	SD	4.3	4.9	4.6	2.7	5.6	3.7	3.1		
	APV	12.1	16.9	20.8	21.3	22.5	27.3	28.8		

Class 4: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Bilsom® 815 NST® Earmuff (Bacou-Dalloz) *tested to ANSI S.3 19-1974		Over the head earmuff consisting of two moulded plastic ear cups attached to plastic headband. Each cup has a soft foam filled cushion for surrounding the ear.	Mean	15.8	23.6	27.0	23.3	26.6	34.6	31.7
			SD	1.6	3.4	1.7	2.8	2.8	2.8	4.9
			APV	14.2	20.2	25.3	20.5	23.8	31.8	26.8
Peltor™ H6F Folding Headband Earmuff (Aearo Company)		Folding headband earmuff with buff coloured plastic shallow dome shaped ear cups with 5 mm thick grey polyurethane foam infill, soft black plastic foam filled ear pads, black plastic cylindrical ear cup attachments enabling height/angle adjustment on a steel wire frame which can fold into a steel strip headband covered with a thin soft black plastic pad.	Mean	10.0	10.4	22.4	31.8	31.9	31.3	32.0
			SD	3.5	3.6	3.1	3.9	5.2	3.8	3.3
			APV	6.5	6.8	19.3	27.9	26.7	27.5	28.7

Class 4: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Peltor™ H6B Neckband Earmuff (Aearo company)		Neckband earmuff with buff coloured plastic shallow dome shaped ear cups with 5 mm thick grey polyurethane foam infill, soft black plastic foam filled ear pads, black plastic cylindrical ear cup attachments enabling height/angle adjustment on a dual steel wire neckband sheathed in black plastic.	Mean SD APV	10.1 4.0 6.1	10.9 4.2 6.7	20.7 4.1 16.6	30.5 3.6 26.9	29.6 4.5 25.1	32.2 3.5 28.7	30.0 5.0 25.0
Peltor™ TMH10F Folding Headband Earmuff (Aearo Company)	Image not supplied	Folding headband earmuff with yellow coloured plastic ear cups 5 mm thick grey polyurethane foam infill, soft black plastic foam filled ear pads, black plastic cylindrical ear cup attachments enabling height/angle adjustment on a steel wire frame, which can fold into a steel strip headband, covered with a thin soft black plastic pad.	Mean SD APV	11.5 2.9 8.6	13.8 3.3 10.5	24.6 2.9 21.7	34.8 3.4 31.4	32.1 5.5 26.6	31.3 4.0 27.3	30.6 4.0 26.6


Class 4: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
				125	250	500	1K	2K	4K	8K
Peltor™ H10B Neckband Earmuff (Aearo Company)		Neckband earmuff with red-coloured plastic ear cups 5 mm thick grey polyurethane foam infill, soft black plastic foam filled ear pads, black plastic ear cup attachments enabling height/angle adjustment on a dual steel wire neckband sheathed in black plastic.	Mean SD APV	9.6	13.2	23.3	33.3	32.1	31.9	31.8
				3.8	3.4	5.3	5.3	5.3	3.0	3.8
				5.8	9.8	18.0	28.0	26.8	28.9	28.0

Class 4: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Peltor™ H10A Headband Earmuff with modified E-A-R pads and foam infill (Aearo Company)		Headband earmuff with red coloured plastic ear cups approximately 6 mm thick grey polyurethane foam infill, modified foam filled soft black plastic ear pads, black plastic ear cup height/angle adjustment brackets on dual steel wire framed headband with a quilted foam filled soft black plastic cushion.	Mean	8.2	12.8	25.3	33.6	28.9	30.1	32.3
			SD	3.8	3.9	4.1	3.7	3.5	3.1	5.4
			APV	4.4	8.9	21.2	29.9	25.4	27.0	26.9
MSA Sordin Left/RIGHT LOW Headband Earmuff		Ergonomically shaped to best fit, extremely comfortable unique shaped head band.	Mean	10.6	13.4	25.8	33.7	27.7	31.0	33.3
			SD	3.7	3.1	3.1	3.3	1.8	3.0	3.4
			APV	6.9	10.6	22.7	30.4	25.9	28.0	29.9

Class 4: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
				125	250	500	1K	2K	4K	8K
MSA Sordin Left/RIGHT MEDIUM Headband Earmuff		Ergonomically shaped to best fit, extremely comfortable unique shaped head band.	Mean	14.3	20.1	31.7	35.5	33.7	33.7	38.0
			SD	3.1	2.9	3.6	4.5	3.3	2.0	4.3
			APV	11.2	17.2	28.1	31.0	30.4	31.7	33.7


CLASS 4 COMMUNICATION EARMUFFS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
MSA Sordin Left/RIGHT AM/FM		Ergonomically shaped to best fit, extremely comfortable with electronic radio function included.	Mean	11.8	16.7	22.0	25.2	26.6	29.5	31.0
			SD	2.4	2.3	2.6	2.5	3.4	3.9	3.5
			APV	9.4	14.4	19.4	22.7	23.2	25.6	27.5



CLASS 4 EARMUFF/HELMET COMBINATIONS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Peltor™ H6P3E Helmet Mounted Earmuff (Aearo Company)		Helmet-mounted earmuff with buff coloured plastic shallow dome shaped ear cups with 5 mm thick grey polyurethane foam infill, soft black plastic foam filled ear pads, black plastic cylindrical ear cup attachments enabling height/angle adjustment on a dual steel wire framed helmet mounting assembly.	Mean	9.6	10.7	20.2	29.9	32.3	33.1	30.4
			SD	3.4	3.7	4.1	2.6	5.4	3.2	2.9
			APV	6.2	7.0	16.1	27.3	26.9	29.9	27.5
Peltor™ H10P3E Helmet Mounted Earmuff (Aearo Company)		Helmet-mounted earmuff with red coloured plastic ear cups with 5 mm thick grey polyurethane foam infill, soft black plastic foam filled ear pads, black plastic cylindrical ear cup attachments enabling height/angle adjustment on a dual steel wire framed helmet mounting assembly.	Mean	9.9	13.2	23.5	31.3	33.8	31.3	29.6
			SD	2.9	4.2	3.5	3.5	3.5	3.4	4.2
			APV	7.0	9.0	20.0	27.8	30.3	27.9	25.4



Class 4: Earmuff/Helmet Combinations

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
				125	250	500	1K	2K	4K	8K
Moldex M3 Cap-mounted Earmuffs (Moldex Metric Inc)		Earmuff consists of two symmetrical iridescent coloured, moulded plastic ear cups attached to the helmet.	Mean SD APV	8.4	15.9	21.2	28.6	32.8	30.3	31.9
				4.0	3.4	4.3	3.6	4.7	6.5	6.2
				4.4	12.5	16.9	25.0	28.1	23.8	25.7



CLASS 5 EARPLUGS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Bilsom X-treme™ Earplugs (Bacou-Dalloz Australia Pty Ltd)		A urethane foam earplug, conical in shape and with a rounded tip. Coloured bright red.	Mean SD APV	22.5 6.6 15.9	24.0 6.1 17.9	27.1 4.8 22.3	28.5 6.3 22.2	32.6 5.2 27.4	39.8 4.1 35.7	42.9 5.2 37.7
E-A-RSoft™ FX Uncorded Earplug (Aearo Company)		A yellow soft bell shaped earplug. The length of the plug is 25.2 mm. The flat end of the plug flares out to 17.8 mm diameter and has a hollow anterior with a depth of 4.5 mm.	Mean SD APV	28.5 6.5 22.0	27.3 5.3 22.0	28.3 6.7 21.6	28.5 6.8 21.7	36.0 4.8 31.2	45.2 6.5 38.7	46.7 6.4 40.3



Class 5: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Goin' Green® Earplugs Uncorded (Moldex Metric Inc)		Soft foam earplugs giving protection for high noise areas.	Mean	30.4	32.5	33.1	33.6	36.8	44.9	48.0
			SD	8.7	8.2	9.2	7.8	5.5	7.0	4.9
			APV	21.7	24.3	23.9	25.8	31.3	37.9	43.1
Max-1 Super Leight® Uncorded Earplugs (Howard Leight by Sperian)		Pre-shaped foam earplugs. Self-adjusting foam fits ear canal. Bell shape delivers maximum comfort.	Mean	29.4	29.0	30.1	30.2	33.2	42.8	42.7
			SD	9.4	9.7	9.5	7.7	4.7	5.1	6.9
			APV	20.0	19.3	20.6	22.5	28.5	37.7	35.8



Class 5: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
E-A-R™ Push-Ins™ Earplugs with Grip Rings (Aearo Company, 3M New Zealand Ltd)		Ideal for dirty environments. Easy grip handle for quick insertion and removal of ear plugs. Grip ring design holds plugs in place. Shape moulds to ear canal for extra comfort.	Mean	24.4	24.3	25.7	28.6	33.8	37.0	39.8
SD	5.9	5.0	6.0	6.5	3.4	5.7	8.8			
APV	18.5	19.5	19.7	22.1	30.4	31.3	31.0			
Rockets® Corded Earplugs (Moldex Metric Inc)		Easy grip handle lets earplugs easily slip into the ear. Air bubble in tip provides cushioned comfort.	Mean	30.4	32.5	33.1	33.6	36.8	44.9	48.0
SD	8.7	8.2	9.2	7.8	5.5	7.0	4.9			
APV	21.7	24.3	23.9	25.8	31.3	37.9	43.1			


Class 5: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Rockets® Metal Detectable Corded Earplugs (Moldex Metric Inc)		Easy grip handle lets earplugs easily slip into the ear. Air bubble in tip provides cushioned comfort. Metal detectable.	Mean	30.4	32.5	33.1	33.6	36.8	44.9	48.0
SD	8.7	8.2	9.2	7.8	5.5	7.0	4.9			
APV	21.7	24.3	23.9	25.8	31.3	37.9	43.1			
Sparkplugs® Foam Earplugs (Moldex Metric Inc)		Soft foam disposable earplug. Extra low soft pressure foam plug for comfort and fit.	Mean	30.4	32.5	33.1	33.6	36.8	44.9	48.0
SD	8.7	8.2	9.2	7.8	5.5	7.0	4.9			
APV	21.7	24.3	23.9	25.8	31.3	37.9	43.1			

Class 5: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Variphone – Variable Personally Moulded Earplugs – Set to 34(dB) (E-A-R-O-Tec Pty Ltd)		A hard clear acrylic personally moulded variable attenuation earplug. The earpieces are connected (corded) via a plastic cord and the right and left earpiece are fitted with red and blue marker, respectively. These devices are set to 34 (dB), maximum attenuation.	Mean	30.1	30.4	33.8	34.8	35.9	42.6	42.3
SD	4.3	5.1	5.3	5.0	2.8	3.4	4.7			
APV	25.8	25.3	28.5	29.8	33.1	39.2	37.6			
Variphone – Variable Personally Moulded Earplugs – Set to 30 (dB) (E-A-R-O-Tec Pty Ltd)		A hard clear acrylic personally moulded variable attenuation earplug. The earpieces are connected (corded) via a black plastic cord and the right and left earpiece are fitted with red and blue marker, respectively. These devices are set to 30 (dB) of attenuation.	Mean	24.1	25.0	28.4	30.6	34.0	36.2	42.9
SD	3.2	2.9	3.6	4.3	2.5	3.0	5.3			
APV	20.9	22.1	24.8	26.3	31.5	33.2	37.6			

Class 5: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
AIRsoft® Multiple Use Corded Earplugs (Howard Leight by Sperian)		Improved internal air pocket, four flange design plus a firm stem and tapered shape facilitates easy insertion and removal.	Mean	33.0	32.6	32.3	31.9	33.9	35.6	40.6
			SD	8.1	9.3	10.2	9.3	6.5	8.4	6.1
			APV	24.9	23.3	22.1	22.6	27.4	27.3	34.5
ELACIN Compact FlexComfort Custom Earplugs with Solid Inserts	Image not supplied	Custom-moulded soft silicon (FlexFit) Earplugs. A moulded tab with hole allows insertion and removal, a cord can be fixed via the hole. The right and left earpieces are fitted with red and blue solid markers, respectively.	Mean	28.7	28.0	29.4	28.4	34.4	33.1	37.4
			SD	5.3	4.8	6.2	4.7	4.5	6.0	7.1
			APV	23.4	23.2	23.2	23.7	29.9	27.1	30.3

Class 5: Earplugs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
ELACIN Compact FlexComfort Custom Earplugs with ML 01 Filters	Image not supplied	Custom-moulded soft silicon (FlexFit) Earplugs. A moulded tab with hole allows insertion and removal, a cord can be fixed via the hole. The right and left earpieces are fitted with LM 01 black/red and black/blue filters, respectively.	Mean	26.9	27.6	28.7	27.0	34.4	30.7	38.2
			SD	4.1	4.0	6.0	4.0	3.8	6.5	7.1
			APV	22.8	23.6	22.7	23.0	30.6	24.2	31.1

CLASS 5 EARMUFFS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
3M™ Economy Earmuff 1425 (3M New Zealand Ltd)		Black plastic rectangular ear cups, white plastic rim and soft black vinyl cushion. Black plastic headband with soft black vinyl cushion.	Mean	14.2	19.7	30.5	38.6	35.3	32.1	32.3
			SD	6.3	7.6	5.9	4.7	4.5	4.6	3.7
			APV	7.9	12.2	24.5	33.9	30.8	27.5	28.6
3M™ General Purpose Earmuff 1435 (3M New Zealand Ltd)		An orange cup with black cushions fitted to a plastic headband with an adjustable yoke.	Mean	15.4	19.4	28.0	33.8	33.8	37.3	40.1
			SD	3.1	3.0	2.4	5.6	2.0	4.1	4.2
			APV	12.2	16.4	25.6	28.3	31.8	33.1	30.0


Class 5: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
3M™ Premium Earmuff 1440 (3M New Zealand Ltd)		A dark blue cup with black cushions fitted to a padded plastic headband with an adjustable yoke. Clamping force is also adjustable via an adjustable slide.	Mean SD APV	17.4 2.9 14.5	19.6 1.9 17.8	28.7 3.6 25.1	33.1 3.4 29.7	35.1 3.3 31.6	38.9 3.0 35.9	44.6 4.8 40.6
Leightning® Headband Earmuff L1 (Howard Leight by Sperian)		Low profile ear cup featuring Howard Leight's Air Flow Control™ Technology. This provides consistent attenuation, especially at low frequencies. Padded foam headband minimise pressure to the head.	Mean SD APV	20.3 2.5 17.8	22.9 2.8 20.1	28.3 1.7 26.6	32.9 2.9 30.0	32.3 3.8 28.5	39.3 2.8 36.5	35.1 4.0 31.1

Class 5: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Leightning® Folding Earmuff L2F (Howard Leight by Sperian)		Folding earmuff featuring Howard Leight's Air Flow Control™ Technology. Optimal attenuation is delivered across all frequencies with a slim ear cup.	Mean	20.8	24.6	30.0	31.6	32.0	38.9	39.4
			SD	2.9	2.3	2.9	2.9	2.4	2.6	2.9
			APV	17.9	22.3	27.1	28.7	36.5	36.3	36.5
Peltor™ H10A Headband Earmuff (Aearo Company)		Headband twin ear cup earmuff with height adjustable black plastic outer ear cup, red plastic ear cup with high-density foam interlayer. Red plastic spacer with grey polyurethane foam infill. Black foam filled soft plastic ear cushions. Twin wire framed headband with foam filled quilted soft black plastic cushion.	Mean	17.9	23.4	35.1	40.6	35.1	41.8	40.4
			SD	3.2	2.6	2.6	4.5	3.5	3.4	3.7
			APV	14.7	20.8	32.5	36.1	31.6	38.4	36.7

Class 5: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Peltor™ H10B Neckband Earmuff (Aearo Company)		Neckband twin ear cup earmuff with height adjustable black plastic outer ear cup, white plastic inner ear cup with white high-density foam interlayer. Red plastic spacer with grey polyurethane foam infill. Black foam filled soft plastic ear cushions. Twin wire framed neckband.	Mean SD APV	17.0 2.7 14.3	24.0 3.4 20.6	35.2 3.3 31.9	40.1 3.2 36.9	36.4 2.9 33.5	41.1 2.9 38.2	38.6 3.7 34.9
E-A-R™ Muff Model 5000 (Aearo Company)		Consisting of royal blue plastic earmuffs with soft black foam filled cushions. Each ear cup has a central notched bollard providing positive connection to a black plastic adjustable headband. Each cup has grey foam plastic inserts. Weight 150 grams.	Mean SD APV	9.8 3.2 6.6	16.7 2.4 14.3	28.5 3.1 25.4	34.5 2.8 31.7	34.8 2.5 32.3	33.9 1.6 32.3	33.6 5.0 28.6


Class 5: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Moldex M1 Premium Earmuff (Moldex Metric Inc)		An overhead earmuff consisting of two symmetrical iridescent coloured, moulded plastic ear cups attached to a padded head band.	Mean	17.9	23.8	32.3	37.9	38.3	38.0	38.4
			SD	4.6	4.9	5.5	4.0	4.2	4.3	5.6
			APV	13.2	18.9	26.7	33.8	34.1	33.7	32.8
Moldex™ M2 Multi-position Earmuff (Moldex Metric Inc)		An overhead earmuff consisting of two symmetrical iridescent coloured, moulded plastic ear cups attached to a multi-position head band.	Mean	13.5	19.9	26.5	33.9	33.8	37.6	36.8
			SD	4.6	4.4	4.7	4.1	3.5	4.2	7.8
			APV	8.9	15.4	21.8	29.9	30.3	33.4	29.0



Class 5: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
MSA EXC Classic Line Headband Earmuff		Headband style earmuff, soft head band, adjustable clamp force.	Mean	11.2	19.1	25.7	29.2	32.0	36.8	39.0
			SD	3.2	2.2	2.7	3.1	2.3	2.7	3.7
			APV	8.0	16.9	23.0	26.1	29.7	34.1	35.3
MSA Left/RIGHT HIGH Headband Earmuff		Ergonomically shaped to best fit, extremely comfortable unique shaped head band, 32db of protection ideal for high noise zones.	Mean	17.3	24.6	35.7	38.9	34.2	35.7	38.3
			SD	2.6	2.8	4.4	2.7	4.2	2.8	4.2
			APV	14.7	21.8	31.3	36.2	30.0	32.9	34.1

Class 5: Earmuffs

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
MSA Chief Earmuff		Blue cup black adjustable band with 32db of noise reducing capability.	Mean	19.7	22.6	32.1	41.3	36.7	36.2	36.2
			SD	3.9	2.9	2.5	3.4	3.1	4.0	3.9
			APV	15.8	19.7	29.6	37.9	33.6	32.2	32.3

CLASS 5 COMMUNICATION EARMUFFS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Peltor™ Tactical™ XP Headset		Class 5 active listening hearing protector that improves the wearer's opportunity to hear low-level sounds like speech and warning signals, while still providing protection from harmful noises. The equalizer allows the user to hear preferred sounds more clearly by improving or reducing noise on a certain frequency. Ideal for workers with noise-induced hearing loss who may need to increase high frequency sound to provide better hearing.	Mean	13.6	18.2	29.4	32.0	35.3	35.8	37.9
			SD	5.4	4.5	4.2	3.3	2.9	3.1	5.6
			APV	8.2	13.7	25.2	28.7	32.4	32.7	32.3
Peltor™ MT7H79P3E Helmet Mounted Communications Earmuff (Aearo Company)		Helmet-mounted communications earmuff with height adjustable black plastic ear cup, grey polyurethane foam infill. Black foam filled soft plastic ear pads. Twin wire framed helmet-mounting assembly with black plastic mounting bracket. Earmuffs mounted on white Peltor G22 helmet.	Mean	15.4	21.2	31.3	37.6	31.8	32.7	35.3
			SD	3.1	4.7	3.9	3.6	2.8	3.1	3.6
			APV	12.3	16.5	27.4	34.0	29.0	29.6	31.7

CLASS 5 EARMUFF/HELMET COMBINATIONS

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
3M™ Earmuff 1450 (3M New Zealand Ltd)		Helmet-mounted earmuff, can be fitted to: 1 Protector Tuffmaster lite helmet 2 Bicapa Balance AC Safety helmet	Mean	15.2	18.7	26.2	29.4	33.2	37.8	39.9
	SD	2.5	3.5	4.6	3.7	2.9	4.1	6.9		
	APV	12.7	15.2	21.6	25.7	30.3	33.6	33.0		
Peltor™ H10P3E Helmet Mounted Earmuff (Aearo Company)		Helmet-mounted twin ear cup earmuff with height adjustable black plastic outer ear cup, white plastic inner ear cup with white high-density foam interlayer. Red plastic spacer with grey polyurethane foam infill. Black foam filled soft plastic ear pads. Twin wire framed helmet mounting assembly with black plastic mounting bracket.	Mean	17.6	23.5	35.0	40.5	35.0	41.7	41.3
	SD	2.9	3.1	3.9	3.3	2.2	3.1	3.2		
	APV	14.7	20.4	31.1	37.2	32.8	38.6	38.1		

Class 5: Earmuff/Helmet Combinations

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
			125	250	500	1K	2K	4K	8K	
Peltor™ H10P3G Helmet Mounted Earmuff (Aearo Company)		Helmet-mounted twin ear cup earmuff with height adjustable black plastic outer ear cup, white plastic inner ear cup with white high-density foam interlayer. Red plastic spacer with grey polyurethane foam infill. Black foam filled soft plastic ear pads. Twin wire framed helmet- mounting assembly with black plastic mounting bracket.	Mean SD APV	17.4 2.7 14.7	22.9 4.2 18.7	34.1 3.2 30.9	39.8 3.8 36.0	35.3 2.5 32.8	42.7 4.1 38.6	40.0 3.8 36.2
MSA EXC Helmet Mounted Earmuff		Adapted hearing protection for connection to hard hats, moulded inserts for comfort and improved fit.	Mean SD APV	11.1 3.3 7.8	18.1 3.3 14.8	25.1 3.1 22.0	27.0 2.3 24.7	28.6 2.4 26.2	38.6 2.6 36.0	40.2 3.3 36.9

Class 5: Earmuff/Helmet Combinations

HEARING PROTECTOR (Manufacturer or Supplier)	PICTURE (where applicable)	DESCRIPTION	OCTAVE BAND ATTENUATION DATA							
			Centre Frequency (Hz)							
				125	250	500	1K	2K	4K	8K
MSA Left/RIGHT MEDIUM Helmet Mounted Earmuff		Adapted hearing protection for connection to hard hats, Shaped head band and ear cups for improved fit.	Mean	13.5	18.3	29.5	33.8	32.5	33.8	37.8
			SD	3.3	2.2	3.4	3.1	3.7	3.2	3.8
			APV	10.2	16.1	26.1	30.7	28.8	30.6	34

APPENDIX 1: GLOSSARY²

APV	The assumed protective value of a particular protector at a particular frequency. The value is obtained by subtracting one standard deviation from the mean value.
Attenuation	The reduction in strength of sound energy.
Disposable Earplug*	An earplug designed to be worn once.
Ear canal cap*	A hearing protector that covers the ear canal entrance and is held in place by a headband.
Earmuff*	A hearing protector that covers the entire ear and is held in place by a suspension system.
Earplug*	A hearing protector that is inserted into the ear canal.
Hearing protector*	A device worn by a person to reduce the unwanted effects of sound.
Mean	The average attenuation at a particular frequency when measured on a number of people.
Overhead Earmuff	An earmuff worn with the headband over the head.
Pre-moulded Earplug	These are inserted into the ear canal without the need for prior shaping. They are made from a number of materials and are often available in a range of sizes.
SD	The standard deviation of the data obtained from measurements on a number of people. Standard deviation is a statistical value that is a measure of the variation in the results of the measurements.
SLC₈₀	Sound level conversion. This is a single number rating used in Australia and New Zealand to compare the acoustic performance of hearing protectors. "80" indicates that in well-managed hearing protector programmes, the protection provided is expected to equal or exceed the SLC ₈₀ in 80% of protector-wearer noise spectrum combinations.
User formable Earplug*	An earplug that is shaped by the user before insertion into the ear canal.

² *Definitions sourced from Section 1.4: Definitions in AS/NZS 1270:2002 *Acoustics – Hearing Protectors*.



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