3M Science. Applied to Life.™

Hear the difference.

Finding the right hearing protectors through fit testing is critical to protecting your workers from noise-induced hearing loss.

Hearing is a gift.

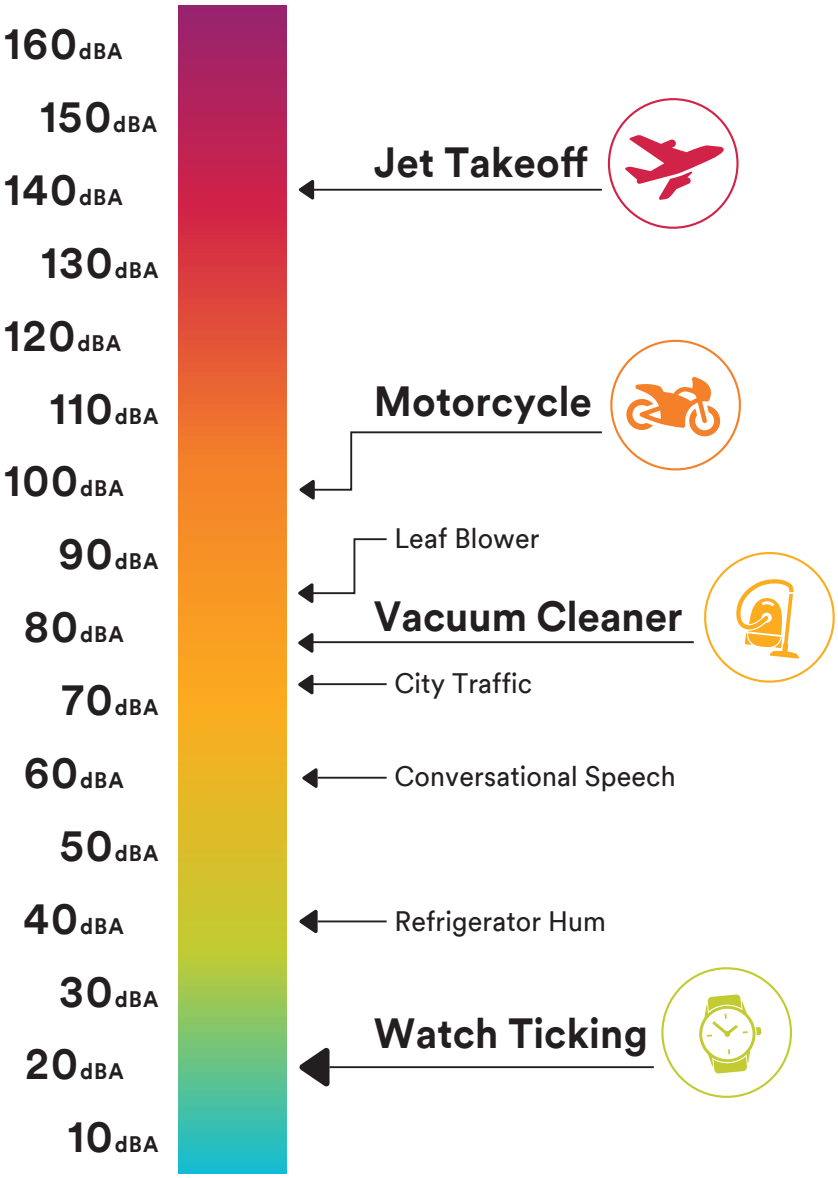
How we communicate with the world and how we experience it is often directly connected to our sense of hearing. We can recognise people and surroundings just by the sounds they make. But as important as our sense of hearing is, it is also very fragile.

Noise is a dangerous hazard.

Did you know that an estimated one million employees in Australia may be exposed to dangerous levels of noise at work? Very often, hearing deterioration goes unnoticed for a long time as humans seemingly adapt to existing noise. It is proven that repeated exposure to loud sounds, can cause permanent hearing loss and tinnitus. Even a short noise impulse, if loud enough, can irreparably damage the hearing.

But noise induced hearing loss is 100% preventable.

Recognise the noise hazard according to many common sounds at work and in everyday life.



Noise-induced hearing loss is 100% preventable

There were 16,500 successful workers' compensation claims for industrial deafness between July 2002 and June 2007

From Safe Work Australia

Hear the difference.

In modern industrial applications, workers face a wide range of noise hazards. But many sounds are still important to hear. Sometimes a conversation or the sound of the machine is vital to the work's progress and the worker's safety. 3M has a range of hearing protection solutions, including products that improve your ability to hear in noisy environments.

Choose the right hearing protection solution.

Discover product options designed for different work environments.

Are Your Workers in Intermittent Noise?

Some workstations mix periods of loud and quieter noise. For those quiet moments, choose a hearing protector that allows you to hear like normal without the need to remove it.

Yes

If your workers prefer an in-ear solution:
- 3M™ E-A-R™ Classic™ Earplugs

If your workers prefer an over the ear solution:
- 3M™ PELTOR™ Earmuffs

No

Are Your Workers in Continuous Noise?

3M earplugs are easy to use and can be effective protection in areas where continuous noise requires constant hearing protection.

No

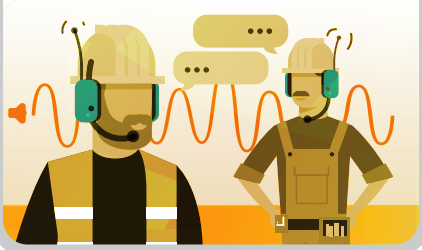
If your workers need protection but communication isn't critical:
- 3M™ E-A-R™ Classic™ Earplugs
- 3M™ E-A-Rsoft™ Yellow Neons™ Earplugs

If your workers need an easy-to-use solution or are in dirty environments:
- 3M™ E-A-R™ Skull Screws™ Earplugs
- 3M™ E-A-R™ Push-Ins™ Earplugs

If your workers require Class 5 hearing protection in high noise environments:
- 3M™ PELTOR™ H Series Earmuffs
- 3M™ PELTOR™ X Series Earmuffs

Do Your Workers Need to Communicate?

Sometimes communication is most critical when you are in the loudest environments. Hearing protection with built-in two-way radio allows workers to communicate clearly in noisy work environments.



Yes

If your workers are exposed to hazardous noise and require situational awareness or critical communications:
- 3M™ PELTOR™ Communications Range

Make a sound choice!

Discover the range of 3M™ Hearing Protection Solutions and hear the difference. These essential hearing protection products provide quick noise attenuation.

Essential hearing protection solutions

When working in loud environments, hearing protection must be quick, convenient and effective. 3M earplugs have a winning combination of comfort and hearing protection.

3M™ E-A-R™ Classic™ Earplugs

3M™ E-A-R™ Classic™ Earplugs set the standard in hearing protection as the world's first foam earplugs. Its low-pressure foam conforms to the shape of the ear canal for enhanced comfort and wearability.

3M™ E-A-Rsoft™ SuperFit™ Earplugs

3M™ E-A-Rsoft™ SuperFit™ Earplugs seal the ear canal with soft, slow-recovery foam for excellent noise reduction and comfort. Orange fitting ring provides a guideline for proper fitting and visual compliance check.

Essential hearing protection

3M™ E-A-R™ Skull Screws™ Earplugs

3M™ Skull Screws™ earplugs sport the tough look of threaded metal and the softness of foam. The push-to-fit style means there is no earplug roll-down required for workers to achieve hearing protection.

3M™ E-A-R™ One Touch™ Earplug Dispenser

Make it easier for workers to get their earplugs with 3M™ One Touch™ Pro Earplug Dispenser. A "No-Waste Funnel" accurately delivers a single earplug with each turn, giving the worker more control with less chance of spillage and waste of earplugs.

Choose advanced hearing protection solutions if you need to communicate more clearly through noise. Hear the difference the right technology can make.

Advanced hearing protection solutions

Protection from loud noise is sometimes just a part of the noise solution. Often workers need to hear critical sounds for safety reasons, or communicate with their colleagues. In some work environments, maintaining the ability to clearly communicate despite the loud noise is crucial. That's when 3M Advanced Hearing Protection Solutions enter the conversation.

Protective hearing solutions

3M™ PELTOR™ H Series Earmuff Range

The H Series earmuffs has been developed for demanding noisy environments with increased low frequency attenuation. The sealing rings are filled with a unique combination of liquid and foam, which provides agreeable comfort even during long-term use.

3M™ PELTOR™ X Series Earmuff Range

This premium range is lightweight and comfortable with a low-profile design. Suitable for use in high-noise exposure environments.

Advanced hearing protection

3M™ PELTOR™ Communication Range

Active control of sounds from your surroundings lets you hear alarm signals and machines, while harmful levels of noise is filtered out by smart electronics. Contact 3M for a solution to suit your needs in both protection and communications.

How do you know your workers are properly protected?

Through hearing protector fit-testing!

The success of your hearing conservation programme requires more than offering earplugs or earmuffs. Each worker needs to wear the most effective hearing protector for the environment and the correct fit for their unique anatomy.

With 3M™ E-A-Rfit™ Dual-Ear Validation System, you can quickly identify how much protection each worker receives from their 3M hearing protectors.

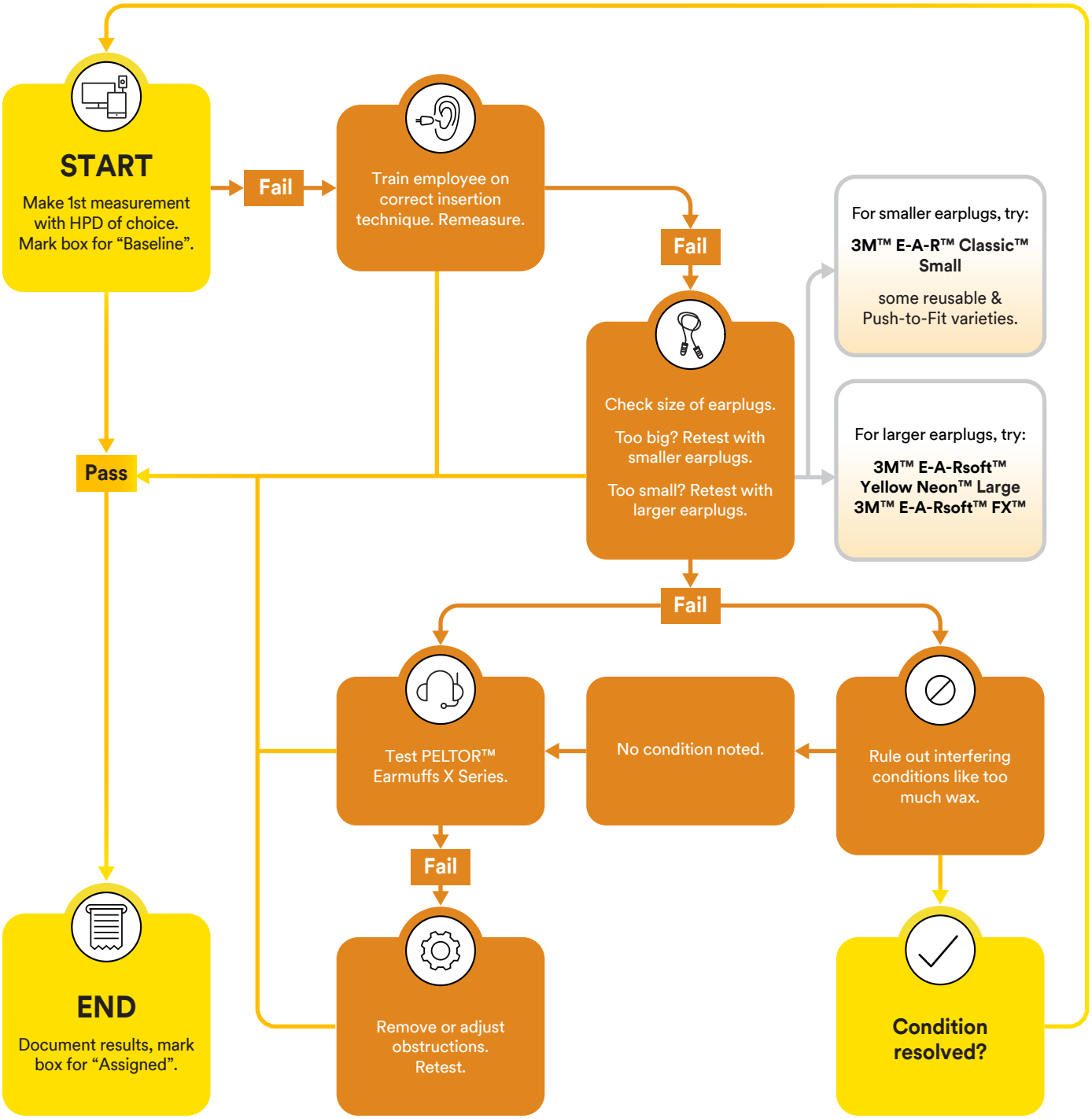
In just five seconds, E-A-Rfit™ can test both ears and give a quantitative measurement for the noise reduction provided by a hearing protector, as it is worn by the worker being tested. Now you can quickly measure how 3M's most popular earplugs and earmuffs perform for each individual worker.

The Technology Behind 3M™ E-A-Rfit™

The 3M™ E-A-Rfit™ Dual-Ear Validation System uses Field Microphone-in-Real Ear (F-MIRE) technology, an objective method for assessing attenuation.

The tester wears a pair of modified 3M™ probed hearing protectors connected to a dual-element microphone. A loudspeaker is placed a metre in front of the tester. When it emits a broadband noise, the dual-element microphone measures the signal in the ear canal and outside the ear plug. In less than five seconds, the difference between the two measurements is calculated and a Personal Attenuation Rating (PAR) is displayed.

How does 3M™ E-A-Rfit™ work?



It Starts with PAR.

The results you get from the 3M™ E-A-Rfit™ is displayed as a PAR. The 3M™ E-A-Rfit™ Validation System puts the worker in the context of their noise environment and helps you understand their level of attenuation.

The PAR is a numerical value that shows the reduction in sound level within the ear when a hearing protector is worn. The resulting PAR, combined with the worker's exposure to noise, is used to determine if a worker is receiving appropriate protection from the noise hazard.

Knowing the PAR lets you identify workers who are inadequately protected, so you can provide real-time intervention and training.

How much protection does each worker need?

Each worker's target PAR depends on the company's exposure limit and the worker's exposure to hazardous noise.

Example:

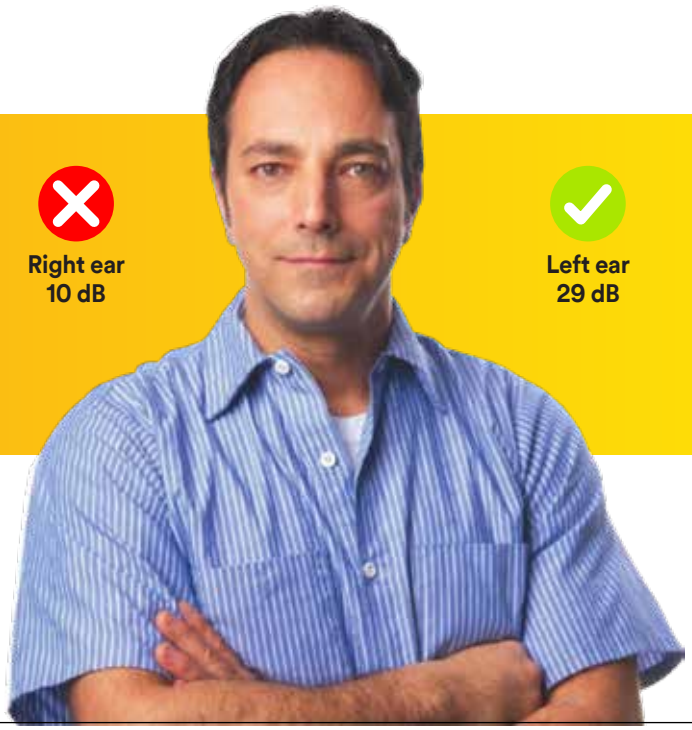
95 dBA	TWA
-80 dBA	Company Exposure Limit
15 dBA	Target Minimum PAR

For example, if Worker A has a time-weighted average (TWA) of 95 dBA and the company exposure limit is 80 dB, then the worker must receive a PAR of at least 15 or above in order to "Pass". If the worker achieved 10-dB PAR, then the measurement will display "Fail".

Fail.

A "fail" result means the hearing protection is either not inserted properly or is the wrong type or size for the worker's ear canal.

Right ear
10 dB



Left ear
29 dB

Pass.

A "pass" result means the hearing protection is inserted properly and provides sufficient protection for the worker's specific job.

NOTE: Finding out each employee's PAR is the first step to a successful conservation programme. Once a worker's PAR is measured, you can determine if they're using the right hearing protection and ensure they're trained on using it properly.

Did you know SLC80 ratings are derived from controlled laboratory environments?

Your workers are in real-life noise environments, and each worker's unique anatomy influences how effective their hearing protector is. That's why PAR is used to measure each worker's level of hearing protection.

Hearing protector ratings such as the sound level conversion (SLC80) are derived from measurements gathered in a carefully-controlled laboratory environment.

These ratings are an accurate measurement of a hearing protector's capabilities under the specific test conditions. However, they may not represent what an individual worker will achieve when the device is worn.

PAR verifies the performance of HPDs without relying on laboratory-derived labels (SLC80 rating), which are intended for groups of employees rather than individual workers.

Figure 1:
Histogram of PAR Minus Uncertainty by SLC80

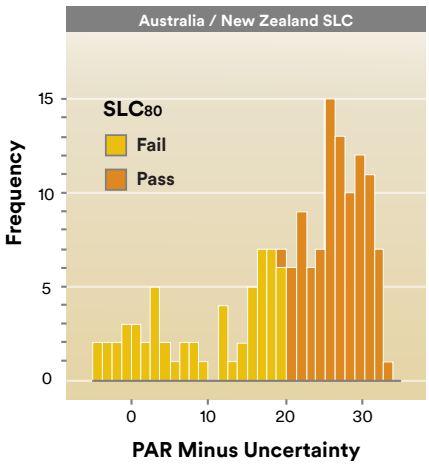
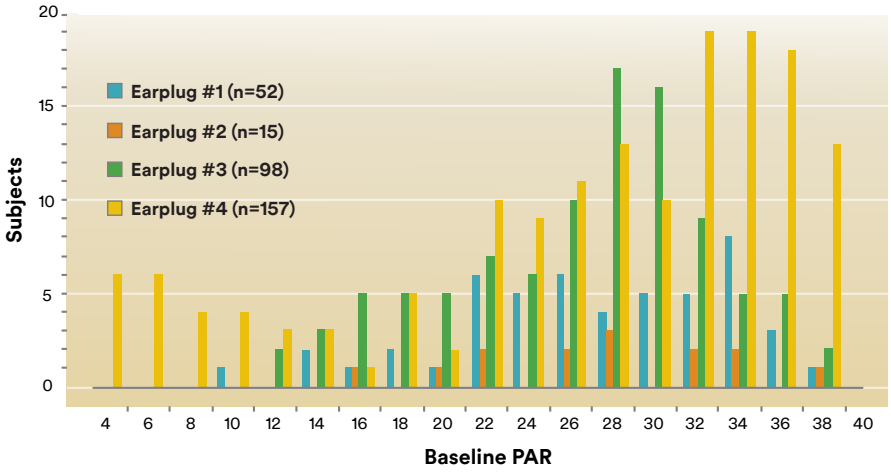


Figure 2:
Baseline PARs for 4 Earplugs



Most employees receive adequate protection, while some may not if they are not using the hearing protector correctly or have not chosen the correct size or style (Figure 1). Note the wide range of PAR values tested on four earplugs considered high attenuating according to their labelled values.

Figure 2 displays PAR values for earplug #4, measured on 157 employees. The green represents the workers with PAR values (minus their uncertainties), who achieved at least the SLC80 value or more. But the PAR values in red indicate the workers would have not met the SLC80 value.

This highlights the importance of using PAR rather than labelled values, to predict user protection.

All workers need fit testing.

Every worker expected to be at risk for noise-induced hearing loss (NIHL) needs fit-testing, especially:

- Workers with a measured temporary threshold shift (TTS) or standard threshold shift (STS)
- Workers who work in the highest noise areas or are required to wear dual hearing protection
- Workers at the margins of inclusion for mandatory hearing protection
- Workers exposed to ototoxic chemicals as well as noise

Newly hired employees unfamiliar with hearing protector use will require careful training along with fit-testing to ensure they are adequately protected against hazardous noise. The results provided by 3M™ E-A-Rfit™ allow you to select and assign hearing protectors based on noise exposure, expected protection levels, and the anatomy of the worker's ear canal.

Hearing protector fit-testing is not a one-time event.

Much like audiometric testing, hearing protector fit-testing needs to be done regularly. This allows you to identify workers with low PARs who are consequently at risk for developing NIHL.

Ideally, all workers in your hearing conservation programme should be fit-tested. Annual fit-testing can provide assurance the hearing protectors are being worn correctly and give additional opportunity for further hearing conservation training.

For those who required extra training, or a new size or style of hearing protection, early follow-up is recommended. 3M™ E-A-Rfit™ provides a useful temporary threshold shift (TTS) follow-up procedure that can be used to determine whether the problem may be related to either the fit or the attenuation capabilities of the hearing protector.

Finally, regular fit testing lets you audit and evaluate overall hearing protection device effectiveness. All test results from 3M™ E-A-Rfit™ are recorded, which provides you with potentially useful documentation to demonstrate hearing loss prevention efforts that go beyond regulatory requirements.

Conducting & managing the fit-test programme.

In general, those responsible for the hearing conservation programme will conduct and manage the fit-test programme. Examples include:

- Occupational hygienists
- Site safety officers
- Occupational health nurses
- Personnel trained by 3M to use and operate the 3M™ E-A-Rfit™ Dual-Ear Validation System
- Authorised service providers

Best practices for fit-testing.

Implementing a successful fit-testing programme is more efficient and effective with the following best practices:

- Choose a fit-test location that is centrally located and easily accessible to workers
- Managers and supervisors must be engaged in the process and can assist in assuring that workers can leave their work stations for quick fit-testing
- A flexible schedule with individual time slots should be employed
- A Fit-Test Support Person should be designated to assist and ensure the efficient flow of workers to be tested
- Educational materials and tools such as Fit Posters should be made available if additional training is required
- A complete set of samples for all hearing protector types used at the plant should be available to give to workers, especially for cases where they have been “reassigned” a different size or style, based on their fit-test results

3M Hearing Protection


Hearing Protection

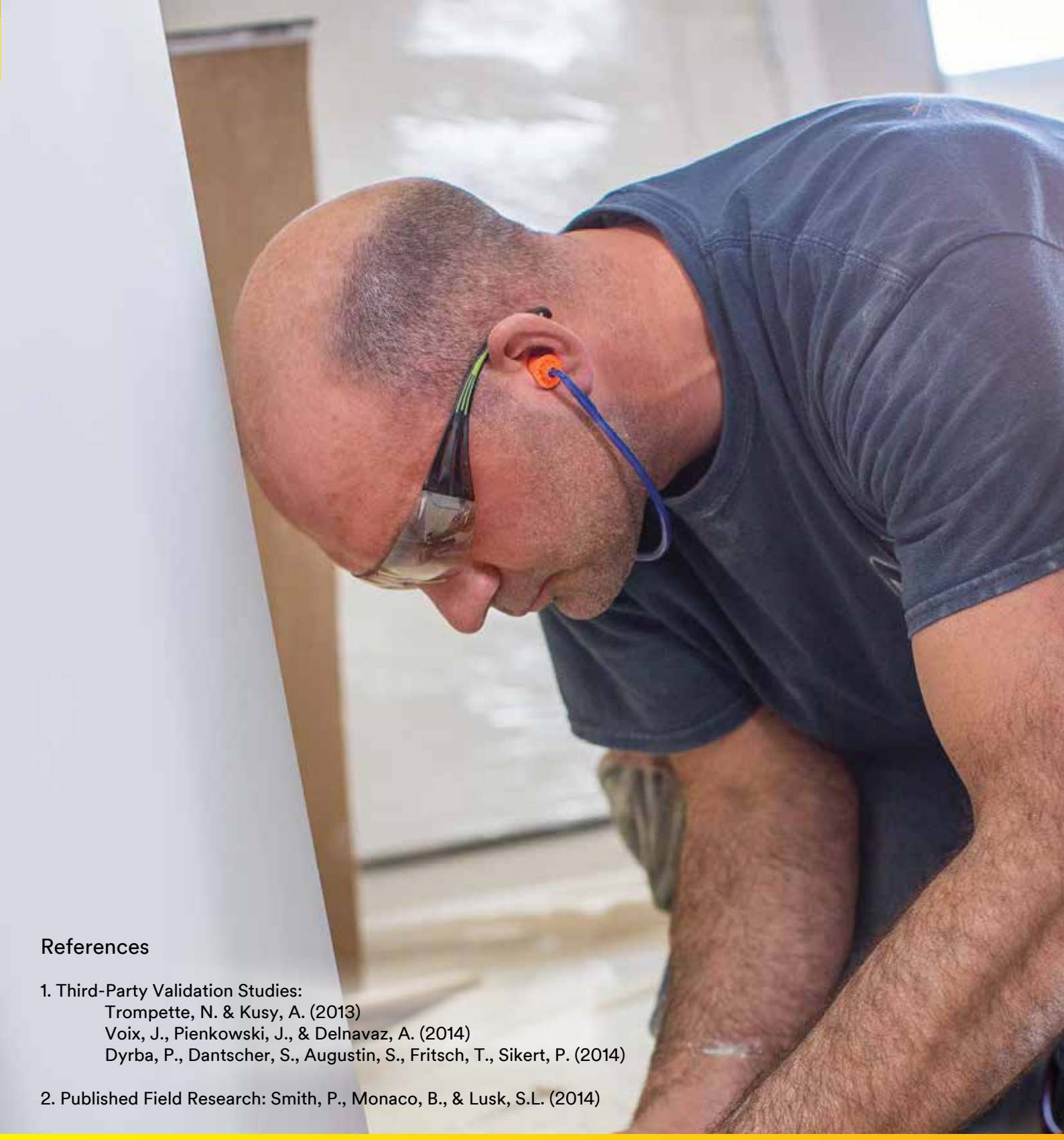

Protective Communications


E-A-Rfit™ Dual-Ear Validation System

We don't just sell hearing protection. We're dedicated to the success of your entire hearing conservation programme. 3M™ E-A-R™ and PELTOR™ Hearing Protection Products are some of the most recognised in the market and are designed to provide protection, comfort and ease of use. Your hearing conservation needs are covered with our broad range of products.

Contact your 3M Personal Safety Specialist to find out more about our 3M™ E-A-Rfit™ Dual-Ear Validation System or for assistance in solving your complex or day-to-day hearing conservation challenges.

Julie Toseski is an Occupational Hygienist and Application Engineer for 3M's Personal Safety Division. Julie works closely with OHS professionals providing training and guidance on different aspects of Occupational Hygiene including respiratory protection, body protection, air monitoring, noise surveys and hearing conservation programmes management. She is actively involved with Standards Australia as a member of the Acoustics Human Effect Committee (AV-003) as well as the Acoustics Community Noise Committee (AV-010) and is a member of the Australian Institute of Occupational Hygienists (AIOH), the British Occupational Hygiene Society (BOHS), the American Industrial Hygiene Association (AIHA) and the National Hearing Conservation Association (NHCA).



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