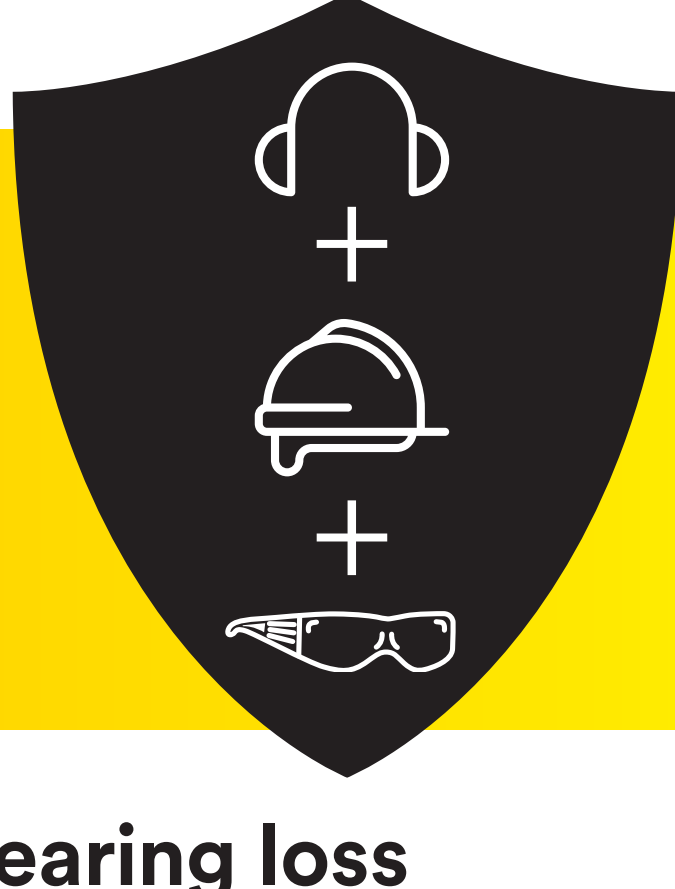


# Working together: The importance of integrated protection



## Occupational noise exposure and hearing loss

Occupational noise exposure and noise induced hearing loss (NIHL) are significant workplace problems globally.



1/3 of Europe's workforce is exposed to high levels of workplace noise, **25% of the time**.<sup>1</sup>



Hearing loss caused by hazardous noise affects **~5% of population worldwide** – about **380 million people**.<sup>2</sup>

## Why does PPE compatibility matter?

For hearing protection devices (HPDs) to provide adequate protection, they must fit properly and be comfortable to wear for a whole work shift. Many activities require using HPDs together with other personal protective equipment (PPE) such as protective eyewear. If not compatible, protection may be affected.

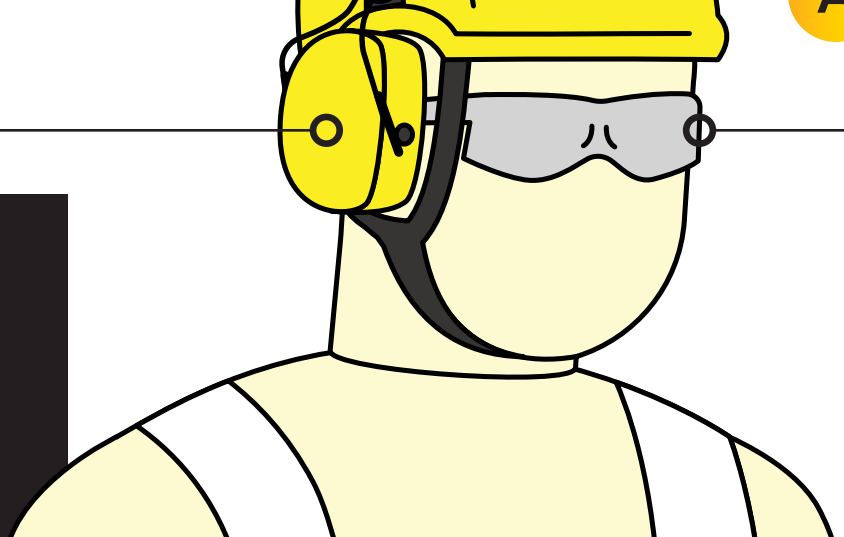
When PPE overlaps, how can you help minimise points of interference?

**Q** Can protective eyewear affect the seal of earmuff cushions?

**A** Yes – and without a proper seal, external noise may bypass hearing protection.

### PPE Compatibility:

- ✓ Fit
- ✓ Form
- ✓ Function



A flexible, flat temple design can help minimise interference. That's why it's so important to choose protective eyewear that is compatible with your hearing protection.

## Scientific study: Attenuation characteristics with the combined use of 3M™ PELTOR™ Earmuffs and 3M™ Protective Eyewear

**Personal Attenuation Rating (PAR)** measurements were taken with the 3M™ E-A-Rfit™ Dual-Ear Validation System and used to assess attenuation levels. A PAR is achieved through hearing protector fit testing which measures the amount of noise reduction, or attenuation, of a selected hearing protection device while it is worn by a specific individual.

**30 volunteers** (with a wide range of head and face sizes) underwent hearing protection fit testing while wearing various styles of 3M™ Protective Eyewear in combination with various 3M™ PELTOR™ Earmuffs (both headband and mounted models). Each volunteer was tested with **42 combinations** (which extends to 160 possible combinations) of earmuffs with and without protective eyewear in a random order.

### Product lines tested

The protective eyewear, earmuffs and helmets tested are representative of additional models of 3M PPE. Download the full study for details.



6

Models of 3M™ Protective Eyewear



6

Models of 3M™ PELTOR™ Earmuffs



+

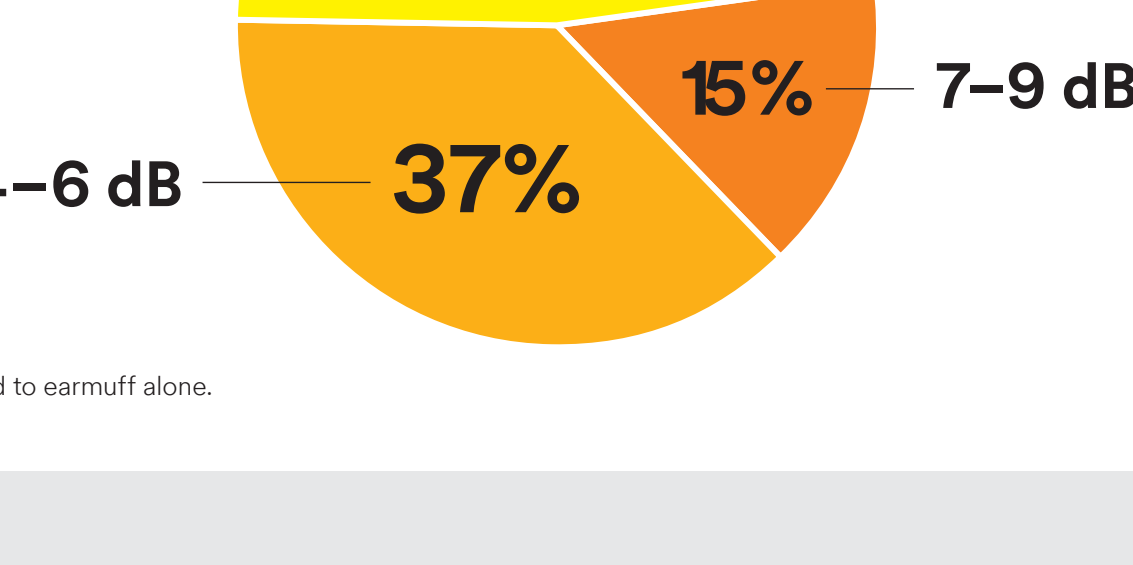
3M™ SecureFit™ Safety Helmet X5000 Series

## Results

The results showed a decrease in PAR ranging from **2dB to 9dB** depending on the product combinations,\* based on approximately **1300 measured PAR values**. Loss of attenuation was indicated by decreasing PAR values:

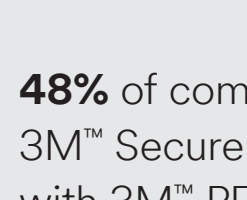
85%

of the tested combinations resulted in an attenuation loss of 6 dB or less.



\*All earmuff/eyewear combinations revealed a decrease in PAR when compared to earmuff alone.

### Highlights



≤3 dB

48% of combinations of 3M™ SecureFit™ Protective Eyewear with 3M™ PELTOR™ Earmuffs showed a smaller loss of attenuation (≤3 dB) than other combinations.

These eye protection products feature proprietary **3M™ Pressure Diffusion Temple Technology**:

- € Flexible, flat temple design
- € Minimises interference with the earmuff cushion seal



4-9 dB

Other combinations show a higher attenuation loss (4-9 dB).

Some of these eye protection products offer **high end feature technology**, providing increased comfort, fit and performance and may be the optimal product selection based on the specific hazards and environment.

- € Lens tilt ratchet
- € 3M™ Scotchgard™ Protector Anti-Fog Coating\*\*
- € Cord control system
- € Foam gasket\*\*



\*\*Available on certain models; contact your 3M representative for details.

## Select the appropriate combination for integrated protection:

Decrease in PAR for combinations of earmuffs worn together with protective eyewear compared to earmuff alone	3M™ PELTOR™ Earmuffs (X Series and Optime)									
	X1A X2A	H510A H510B H510F	H6A H6B H6F	X4A X4B	X5A X5B	H520P3E <sup>a</sup>	H9P3E <sup>a</sup>	X2P3E <sup>a</sup> X2P5E <sup>a</sup> X3P3E <sup>a</sup> X3P5E <sup>a</sup>	X4P3E <sup>a</sup> X4P5E <sup>a</sup>	X5P3E <sup>a</sup> X5P5E <sup>a</sup>
3M™ Protective Eyewear										
SF100										
SF200										
SF300										
SF400										
SF400X										
SF600										
Virtua										
Solus 2000										
Virtua AP										
SF500										
SF3700										
Solus 1000										
Privo										
Solus CCS										
Virtua CCS										
SF3700 with readers <sup>b</sup>										

<sup>a</sup> Tested on 3M™ SecureFit™ Safety Helmet X5000 Series. This helmet also represents 3M™ SecureFit™ Safety Helmet X5500 Series, 3M™ SecureFit™ Hard Hat H-700/H-700T Series and 3M™ Safety Helmet G3000/G3501 Series.

<sup>b</sup> 3M™ SecureFit™ Protective Eyewear 3700 Series was tested with standard reading glasses, intended to be representative of prescription eyewear. Results will likely change depending on the temple thickness and design of the prescription eyeglasses.

<sup>c</sup> The results in the table cannot be subtracted from labelled attenuation values such as Noise Reduction Rating (NRR) and Single Number Rating (SNR).

## Take-aways

- € It is important to conduct fit testing for personal hearing protectors, particularly when used in combination with other PPE such as protective eyewear or safety helmets.
- € Conduct the fit test while the user is wearing both earmuffs and protective eyewear and compare the PAR to the user's workplace noise exposure.
- € If the PAR is sufficient, the result will be less than the targeted exposure limit. If the PAR is insufficient, then additional options should be tried to obtain more attenuation.
- € The key is to select a combination of products that delivers both proper hearing and eye protection to meet your worker's needs. The chart above can be used to estimate attenuation loss, to help you evaluate the suitability of the desired combination for your noise exposure environment.
- € For minimal loss of attenuation, choose protective eyewear with flat and flexible temple design, such as **3M™ SecureFit™ Protective Eyewear**.

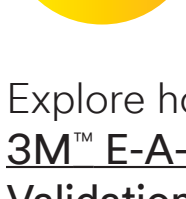


<sup>1</sup> World Health Organization, World Report on Hearing, 2021.

<sup>2</sup> Natarajan, N., Batts, S. and Stankovic, K.M. Noise-Induced Hearing Loss. Journal of Clinical Medicine, 2023, 12, 2347. 2 3

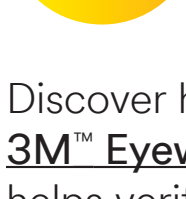
## Integrated protection: Fit testing with combined PPE

Contact your 3M rep to discuss your fit testing needs.



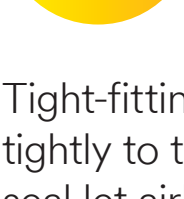
**Hearing protection fit testing**

Explore how the **3M™ E-A-Rfit™ Dual-Ear Validation System** can help validate hearing protection fit and desired noise reduction.



**Protective eyewear fit evaluation**

Discover how the **3M™ Eyewear Fit System** helps verify proper eyewear fit using a standardised protocol for safety and comfort.



**Respiratory fit evaluation**

Tight-fitting respirators need to seal tightly to the face. Gaps in this face seal let airborne contaminants leak inside the respirator. Explore our **Focus on Fit** website to find out more.

## Learn more



[Download the full study](#)



Scan to learn more about hearing protection fit testing or to request a demonstration.

