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3M Personal Safety Division

3M™ SecureFit™ Series – Ideal team players.

Comparative study to assess the compatibility of 3M™ SecureFit™, 3M™ Maxim Ballistic and 3M™ Solus eyewear when worn in combination with 3M™ X Series Ear Muffs.

Introduction

A 3M internal study to assess the compatibility of the 3M™ Peltor™ X Series ear muffs with a selection of 3M eyewear was carried out to determine, if there would be any change in the sound attenuation offered by the ear muff when worn on their own and in combination with the eyewear. Two different models of X Series ear muffs and 3 types of eyewear were selected for the study.

Test method:

A half-panel subjective test was carried out in accordance with the European Standard EN24869-1 at 3M Varnamo acoustic laboratory. The following combinations of Eyewear and Ear muffs were tested:

- › 3M™ Peltor X2A & 3M™ Peltor X4A (as a baseline)
- › 3M™ SecureFit™ SF200 with 3M™ Peltor X2A
- › 3M™ SecureFit™ SF400 with 3M™ Peltor X2A & 4A
- › 3M™ SecureFit™ SF600 (with & without Foam insert) with 3M™ Peltor X2A & 4A
- › 3M™ Maxim Ballistic with 3M™ Peltor X2A
- › 3M™ Solus with 3M™ Peltor X2A

Attenuation Values (dB)

Solus and X2A	SNR	H	M	L
X2A	30.2	35.5	28.1	17.6
X2A with Solus	23.1	28.4	21.2	10.8
Difference	7.2	7.1	6.9	6.8

Maxim Ballistic and X2A	SNR	H	M	L
X2A	31.5	34.1	29.5	19.7
X2A with Maxim Ballistic	28.9	33.6	26.5	17.2
Difference	2.6	0.7	3.0	2.5

SecureFit SF200 and X2A	SNR	H	M	L
X2A	31.4	36.5	28.9	19.3
X2A with Eyewear SecureFit SF200	29.2	33.4	26.9	17.7
Difference	2.2	3.1	2.0	1.6



SecureFit SF400 and X2A	SNR	H	M	L
X2A	31.4	36.5	28.9	19.3
X2A with Eyewear SecureFit SF400	29.9	34.4	27.7	18.1
Difference	1.5	2.1	1.2	1.2

SecureFit SF400 and X4A	SNR	H	M	L
X4A	33.1	37.5	30.3	22.3
X4A with Eyewear SecureFit SF400	31.8	36.5	29.1	21.2
Difference	1.3	1.0	1.2	1.1

SecureFit SF600 with Foam Insert and X2A	SNR	H	M	L
X2A	31.6	36.0	29.2	19.7
X2A with Eyewear SecureFit SF600	29.7	36.5	27.2	17.3
Difference	1.9	0.2	2.0	2.4

SecureFit SF600 and X2A	SNR	H	M	L
X2A	31.6	36.0	29.2	19.7
X2A with Eyewear SecureFit SF600	30.0	35.6	27.5	18.1
Difference	1.6	0.4	1.7	1.6

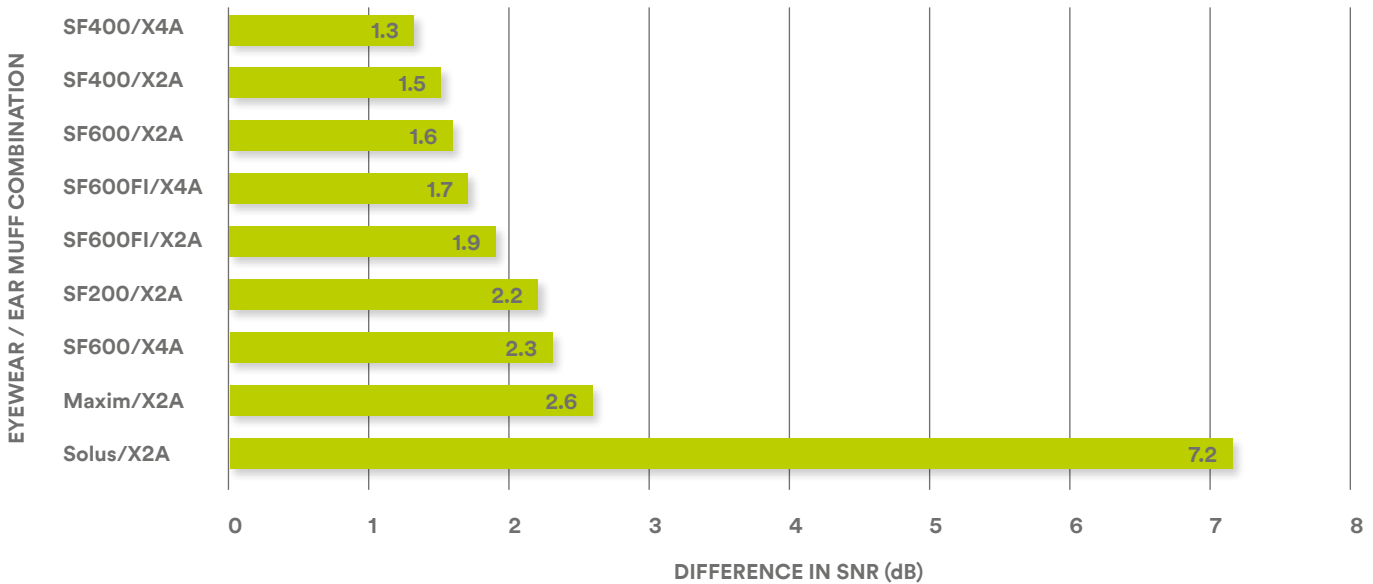
SecureFit SF600 with Foam Insert and X4A	SNR	H	M	L
X4A	34.2	38.5	31.7	22.9
X4A with Eyewear SecureFit SF600	32.5	37.7	29.7	21.5
Difference	1.7	0.8	2.0	1.4

SecureFit SF600 and X4A	SNR	H	M	L
X4A	34.2	38.5	31.7	22.9
X4A with Eyewear SecureFit SF600	31.9	37.3	29.1	20.6
Difference	2.3	1.2	2.6	2.3

Key:

- > **SNR** Single Number Rating
- > **H** High Frequency
- > **M** Medium Frequency
- > **L** Low Frequency

Difference in SNR of X2 & X4 Ear Muffs when worn in combination with eyewear



Conclusion

The study showed there is very good compatibility of 3M™ SecureFit™ 400 eyewear with 3M™ X Series™ Ear Muffs with minimal loss in attenuation (≤ 1.5 dB). The study showed that for the SecureFit 600 eyewear there was a small attenuation loss but still within the acceptable range of repeatability and reproducibility of sound attenuation measurement. The Maxim Ballistic eyewear also demonstrated good compatibility with the X2A ear muffs with a loss of 2.6 dB in attenuation, which is within the uncertainty of measurement for the test method. The highest loss of attenuation (>3 dB) was seen with the Solus and X2A combination.

The study highlights the importance of selecting the right eyewear to wear in combination with ear muffs to reduce the loss of sound attenuation offered by the hearing protector.

In this case, the 3M™ SecureFit Series offers the best eyewear compatibility with the 3M™ X Series ear muffs.