

Testing of Hearing Protectors

Test item(s): **AK5850BS / AK5850B Mounted Earmuffs Attached to Head Protection Carriers:**

- 3M SecureFit X5500V
- Auboueix IRIS 2
- MSA V-GARD 520
- Petzl VERTEX
- Sundström SR 580

Type: **Head Protection Carriers as Supplementary Combination**

Customer: **A-Kabel AS
Nedre Hagaveg 15 C
2150 Arnes
Norway**

Applied method(s): **EN 352-3:2020, EN 13819-1:2020**


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1. Description and identification of test item(s)

Following samples were submitted and identified by the customer as:

Tested items: AK5850BS / AK5850B mounted earmuffs attached to head protection carriers:

- 3M SecureFit X5500V
- Auboueix IRIS 2
- MSA V-GARD 520
- Petzl VERTEX
- Sundström SR 580



Pictures 1 and 2: AK5850BS mounted earmuffs attached to carrier 3M SecureFit X5500V



Pictures 3 and 4: AK5850BS mounted earmuffs attached to carrier Auboueix IRIS 2



Pictures 5 and 6: AK5850BS mounted earmuffs attached to carrier MSA V-GARD 520



Pictures 7 and 8: AK5850BS mounted earmuffs attached to carrier Petzl VERTEX



Pictures 9 and 10: AK5850BS mounted earmuffs attached to carrier Sundström SR 580

2. Scope of testing

Testing date/s: 2022-01-11 - 2022-02-18

Tests were performed at the PPE laboratory of SGS Fimko Oy under accreditation scope.

All tests were performed at Topeliuksenkatu 41b, 00250 Helsinki, Finland

Table 1: Following tests were requested by the customer:

Requirement		Test method
Sizing and adjustability	EN 352-3:2020 4.3.2	EN 13819-1:2020 4.2
Cup Rotation	EN 352-3:2020 4.3.3	EN 13819-1:2020 4.3
Headband force of the supplementary combinations	EN 352-3:2020 4.3.4	EN 13819-1:2020 4.4
Cushion pressure	EN 352-3:2020 4.3.5	EN 13819-1:2020 4.5

2.1 Sampling and conditioning

Receiving dates: 2021-08-26 and 2021-12-28

Condition: Intact

Sampling method: The customer supplied all samples.

3. Test results

3.1 Sizing and Adjustability

Six specimens with each carrier were measured for small (S), medium (M) and large (L) head dimensions:

Table 2: Test dimensions – adjustability (mounted earmuffs)

Test Height (mm)	Width (mm)		
	125	145	155
115	S	S	-
130	M	M	M
140	-	M	L

Table 3: Sizing and adjustability from specimens attached to 3M SecureFit X5500V carrier:

Test height (mm)	Width (mm)		
	125	145	155
115	ok	ok	-
130	ok	ok	ok
140	-	ok	ok

Table 4: Sizing and adjustability from specimens attached to Auboueix IRIS 2 carrier:

Test height (mm)	Width (mm)		
	125	145	155
115	fail	ok	-
130	ok	ok	ok
140	-	ok	ok

Table 5: Sizing and adjustability from specimens attached to MSA V-GARD 520 carrier:

Test height (mm)	Width (mm)		
	125	145	155
115	fail	fail	-
130	fail	ok	ok
140	-	ok	ok

Table 6: Sizing and adjustability from specimens attached to Petzl VERTEX carrier:

Test height (mm)	Width (mm)		
	125	145	155
115	fail	ok	-
130	fail	ok	ok
140	-	ok	ok

Table 7: Sizing and adjustability from specimens attached to Sundström SR 580 carrier:

Test height (mm)	Width (mm)		
	125	145	155
115	ok	ok	-
130	ok	ok	ok
140	-	ok	ok

Table 8: Summary of the mounted earmuffs for sizing and adjustability

Carrier model	Small size	Medium size	Large size
3M SecureFit X5500V	pass	pass	pass
Auboueix IRIS 2	fail	pass	pass
MSA V-GARD 520	fail	fail	pass
Petzi VERTEX	fail	fail	pass
Sundström SR 580	pass	pass	pass

3.2 Cup Rotation

The ability of the cups to accommodate a range of angular movements was tested from six specimens with each carrier for small, medium and large dimensions.

Table 9: Summary of the mounted earmuffs for cup rotation

Carrier model	Small size	Medium size	Large size
3M Securefit X5500V	pass	pass	pass
IRIS 2	NA	pass	pass
MSA V-GARD 520	NA	NA	pass
Petzi Vertex	NA	NA	pass
Sundström	pass	pass	pass

3.3 Headband force of the basic combination

Headband forces for the supplementary combinations were compared to that of the basic combination with carrier 3M G3000 with hearing protectors AK5850BS / AK5850B mounted earmuffs (for more details, see SGS test report 401742T02):

For each supplementary combination set conditions i) and ii) shall be met:

i) The mean value of headband force of the specimens of the supplementary combination set shall not be less than 8 N.

ii) Second condition depends on the headband force of the basic combination set:

- A) If the mean value of headband force of the specimens of the basic combination set is 11 N or more, headband force of the supplementary combination shall be not less than the 20 % of the value of the basic combination set (Table 10).
- B) B) If the mean value of headband force of the specimens of the basic combination set is less than 11 N, headband force of the supplementary combination shall be not less than value S_{min} (calculation method defined in EN 325-3:2020, Clause 4.3.4: c).

The headband force shall not exceed 14 N.

Table 10: Mean value of headband force of the specimens of the basic combination set and supplementary combination set S_{min} .

	Small	Size Medium	Large
Force of the basic combination set (N)	11,6	12,1	12,2
S_{min} (N)	9,28	9,68	9,76

3.4 Headband force of the supplementary combinations

Headband forces were measured from six specimen with each carrier:

Table 11: Headband force from specimens attached to 3M SecureFit X5500V carrier:

Specimen number	Headband force (N)		
	Small	Medium	Large
1	12,4	11,8	11,3
2	12,5	12,5	12,1
3	12,2	12,1	11,4
4	13,9	12,6	12,1
5	10,3	10,9	10,5
6	10,6	10,8	10,4
Mean	12,0	11,8	11,3

Table 12: Headband force from specimens attached to Auboueix IRIS 2 carrier:

Specimen number	Headband force (N)		
	Small	Medium	Large
1	NA	11,4	10,7
2	NA	11,3	10,6
3	NA	10,9	10,5
4	NA	11,7	11,1
5	NA	11,5	10,6
6	NA	11,4	10,8
Mean	NA	11,4	10,7

Table 13: Headband force from specimens attached to MSA V-GARD 520 carrier:

Specimen number	Headband force (N)		
	Small	Medium	Large
1	NA	NA	12,0
2	NA	NA	11,7
3	NA	NA	11,1
4	NA	NA	12,6
5	NA	NA	11,9
6	NA	NA	11,8
Mean	NA	NA	11,8

Table 14: Headband force from specimens attached to Petzl VERTEX carrier:

Specimen number	Headband force (N)		
	Small	Medium	Large
1	NA	NA	11,0
2	NA	NA	11,2
3	NA	NA	11,0
4	NA	NA	11,3
5	NA	NA	10,8
6	NA	NA	9,8
Mean	NA	NA	10,8

Table 15: Headband force from specimens attached to Sundström SR 580 carrier:

Specimen number	Headband force (N)		
	Small	Medium	Large
1	9,3	10,1	8,7
2	8,1	9,7	8,8
3	8,3	10,3	8,9
4	8,5	9,5	8,1
5	8,8	10,1	8,4
6	9,5	10,2	8,5
Mean	8,7	10,0	8,6

Table 16: Summary of the mounted earmuffs for supplementary combinations

Carrier model	Small size	Medium size	Large size
3M SecureFit X5500V	pass	pass	pass
Auboueix IRIS 2	NA	pass	pass
MSA V-GARD 520	NA	NA	pass
Petzl VERTEX	NA	NA	pass
Sundström SR 580	fail	pass	fail

The headband force shall not exceed 14 N.

3.5 Cushion pressure

Cushion pressure was measured from six specimens with each carrier.

Table 17: Mounted earmuffs cushion pressure

Carrier model	Pressure (Pa)		
	Small size	Medium size	Large size
3M SecureFit X5500V	3962	3912	3901
Auboueix IRIS 2	NA	3940	3851
MSA V-GARD 520	NA	NA	3759
Petzl VERTEX	NA	NA	3896
Sundström SR 580	3484	3755	3222

The cushion pressure shall not exceed 4500 Pa.

Table 18: Summary of the mounted earmuffs for cushion pressure

Carrier model	Small size	Medium size	Large size
3M SecureFit X5500V	pass	pass	pass
Auboueix IRIS 2	NA	pass	pass
MSA V-GARD 520	NA	NA	pass
Petzl VERTEX	NA	NA	pass
Sundström SR 580	pass	pass	pass

4. Summary

Test	Acceptance criteria according to	Comments
Sizing and adjustability	EN 352-3:2020 4.3.2	Mounted earmuffs meet the requirements for sizes mentioned in table 8.
Cup Rotation	EN 352-3:2020 4.3.3	Mounted earmuffs meet the requirements for sizes mentioned in table 9.
Headband force of the supplementary combinations	EN 352-3:2020 4.3.4	Mounted earmuffs meet the requirements for sizes mentioned in table 16.
Cushion pressure	EN 352-3:2020 4.3.5	Mounted earmuffs meet the requirements for sizes mentioned in table 18.

The statement of conformity in this test report is only based on measured values by the laboratory and does not take their uncertainties into consideration. The relevant uncertainty value is obtainable upon request from the laboratory.

End of test report