

APPROVAL

FOR ESD PROTECTIVE PRODUCTS ACCORDING TO IEC 61340-5-1

Validity of the approval

Until 2021-10-29.

Holder of the approval

Fristads AB, Borås, Sweden

Category of product

Protective clothing

Products

Manufacturer/ supplier	Type designation	Description
Fristads AB	120955	Coats made of polyester (67 %), cotton (31 %) and carbon fibres (2 %).
Fristads AB	120954	Trousers made of polyester (67 %), cotton (31 %) and carbon fibres (2 %).

Washed 45 times in 60 °C.

Documentation for approval

Test report 8F024575.

The ESD-approval does not include any requirements regarding electrical safety properties. If work will be performed close to live voltages, requirements according to national regulations shall be obeyed.

Conditions for approval

General conditions, according to SP-Method 2472, for approval and registration of approved products with regard to ESD-protection qualities.

RISE Research Institutes of Sweden AB

Electronics - Product Safety



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Test of garments regarding electrostatic protective properties (1 appendix)

Test objects

Coats and trousers manufactured by Fristads AB.



Model 120955

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Summary

The garments fulfilled the requirements according to IEC 61340-5-1: 2016.

1 Commission

Tests according to IEC 61340-5-1: 2016 and IEC 61340-4-9:2016.

2 Client

Fristads AB, Borås, Sweden

3 Test objects

Garments manufactured by Fristads AB.

Three black coats (size L) with art. No. 120955.

Three black trousers (size C54) with art. No. 120954.

The garments were made of polyester (67 %), cotton (31 %) and carbon fibres (2 %).

Three garments of each type arrived at SP 2018-05-22.

4 Performance and result

Measurements were performed according to IEC 61340-5-1:2016 and IEC 61340-4-9:2016 (SP-method 2472, issue 7 with appendix 12, issue 4).

Before the tests all garments were washed 45 times in 60 °C and conditioned during more than 72 h in 23 ±2 °C and 12 ±3 % RH.

The measurements were performed in the same atmosphere.

Testing was carried out by Sven Byheden 2018-10-29.

The test results apply to the tested items only.

4.1 Point to point resistance

Two conductive electrodes (2.5 kg; Ø 65 mm) were placed on different panels of the test objects.

The electrode assembly was energized at 100 VDC and the resistance values were recorded after 15 s ± 2 s.

The measurement was repeated between all panels of the garments.

All garments were tested.

Instrument: RISE inv. No. 502589

Result

Tested garment	Panels tested	Point-to-point resistance [Ω]		
		#1	#2	#3
Coats	Back (panel 1) to left arm (panel 1)	1.2×10^6	2.9×10^6	8.9×10^5
	Back (panel 1) to left arm (panel 2)	1.6×10^6	3.1×10^6	8.6×10^5
	Back (panel 1) to left cuff	2.1×10^6	3.1×10^6	1.3×10^6
	Back (panel 1) to right arm (panel 1)	7.6×10^5	1.2×10^6	1.6×10^6
	Back (panel 1) to right arm (panel 2)	9.7×10^5	1.5×10^6	1.6×10^6
	Back (panel 1) to right cuff	1.6×10^6	1.6×10^6	1.7×10^6
	Back (panel 1) to left front	1.0×10^6	4.4×10^5	4.4×10^5
	Back (panel 1) to right front	7.9×10^5	9.3×10^5	1.2×10^6
	Back (panel 1) to left shoulder	6.0×10^5	4.6×10^5	3.3×10^5
	Back (panel 1) to right shoulder	9.2×10^5	1.1×10^6	1.0×10^6
	Back (panel 1) to back (panel 2)	7.2×10^5	7.2×10^5	1.1×10^6
Trousers	Left leg (panel 1) to left leg (panel 2)	3.1×10^5	2.5×10^5	2.8×10^5
	Left leg (panel 1) to right leg (panel 1)	1.1×10^6	1.8×10^6	8.5×10^5
	Left leg (panel 1) to right leg (panel 2)	1.1×10^6	1.7×10^6	7.8×10^5

The requirement was fulfilled. All resistance values were less than $10^9 \Omega$.

4.2 Cuff-to-cuff resistance

Two conductive electrodes (2.5 kg; \varnothing 65 mm) were placed on the inside of the cuffs. The electrode assembly was energized at 100 VDC and the resistance values were recorded after $15 \text{ s} \pm 2 \text{ s}$. All coats were tested.

Instrument: RISE inv. No. 502589

Result

Tested garment	Panels tested	Point-to-point resistance [Ω]		
		#1	#2	#3
Coats	Left cuff (inside) to right cuff (inside)	3.7×10^6	3.8×10^6	3.7×10^6

The requirement was fulfilled. All resistance values were less than $10^9 \Omega$.

4.3 Electrostatic potentials

Tests according to SP-method 2472, issue 7, section 7.3.

Electrostatic potentials were additionally measured in close vicinity of parts having a resistance to ground higher than $10^9 \Omega$. The potentials were measured 2 s after a slight touch with the hand or cloth of the tested part. The measurements were performed at a distance of 20 mm with a metal plate (\varnothing 15 mm, 2 pF).

Instrument RISE inv. No. 501781 (instrument uncertainty less than $\pm 1\%$).

Result, all coats: Maximum measured electrostatic potential was 26 V.

Result, all trousers: Maximum measured electrostatic potential was 43 V.

The requirement was fulfilled. All measured electrostatic potentials were less than 100 V.

4.4 Marking

The garments were marked with manufacturers name, type designation and ESD-symbol.

Requirements were fulfilled.

Appendix

Appendix 1: Photographs

Appendix 1



Model 120955



Model 120954