APPROVAL

FOR ESD PROTECTIVE PRODUCTS ACCORDING TO IEC 61340

Validity of the approval
Until 2019-03-29.

Holder of the approval
Fristads Kansas Sverige AB, Fristad, Sweden

Category of product
Protective clothing

Products

Manufacturer/ supplier	Type designation	Description
Fristads Kansas Sverige AB	120956	Polo shirts made of cotton (48 %), polyester (48 %) and conductive fibres (4 %).
Fristads Kansas Sverige AB	120958	Long sleeve t-shirts made of cotton (48 %), polyester (48 %) and conductive fibres (4 %).
Fristads Kansas Sverige AB	120959	T-shirts made of cotton (48 %), polyester (48 %) and conductive fibres (4 %).
Fristads Kansas Sverige AB	121675	Sweat shirt jackets made of cotton (48 %), polyester (48 %) and conductive fibres (4 %).

Washed 45 times in 60 °C.

Documentation for approval
Test report 6F000047.
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.

SP Technical Research Institute of Sweden
Electronics – Product Safety

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REPORT

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Date 2016-03-29 Reference 6F000047

Fristads Kansas Sverige AB
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Test of garments regarding ESD-protective properties
(1 appendix)

Test objects

Polo shirt, art. No. 120956.
Long sleeve T-shirt, art. No. 120958.
Sweat shirt jacket, art. No. 121675.

Polo shirt, art. No. 120956

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Summary

The garments fulfilled the requirements according to IEC 61340-5-1, edition 1.0, 2007.

1 Commission

Tests for ESD-approval according to IEC 61340.

2 Client

Fristads Kansas Sverige AB, Borås, Sweden

3 Test objects

Garments manufactured by Fristads Kansas Sverige AB.

Polo shirt, art. No. 120956.
T-shirt, long sleeve, art. No. 120958.
Sweat shirt, art. No. 121675.

The garments were made of cotton (48 %), polyester (48 %), and condictive fibres (4 %).

Three garments of each type arrived at SP 2016-03-14.

4 Performance and result

Measurements were performed according to ANSI/ESD STM 2.1 and NT ELEC 037, 2006 (SP-method 2472, issue 6 with appendix 12, issue 3).

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 2016-03-20.

The test results apply to the tested items only.

4.1 Point to point resistance (ANSI/ESD STM 2.1)

Two conductive electrodes (2.5 kg; Ø 63.5 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.

Result, polo shirts: All measured values were in the range 2.6×10^8 Ω to 4.8×10^8 Ω.
Result, T-shirts: All measured values were in the range 6.3×10^7 Ω to 8.2×10^7 Ω.
Result, sweat shirt jackets: All measured values were in the range 3.1×10^7 Ω to 7.4×10^7 Ω.

The requirement was fulfilled. All resistance values were less than 10^9 Ω.

4.2 Discharge time measurement, worn garment (NT ELEC 037)

The test person wore the garments and was grounded with a wrist strap. A capacitor (1000 pF) was charged to 550 V and was discharged to a clip connected to the garments. The test was repeated with the clip connected to different parts of the garments.

Discharge time from 500 V to 100 V was measured.

Result, polo shirts: Maximum measured value was 400 ms.
Result, T-shirts: Maximum measured value was 110 ms.
Result, sweat shirt jackets: Maximum measured value was 40 ms.

The requirement was fulfilled. All discharge times were less than 20 s.

4.3 Electrostatic potentials (IEC 61340)

Tests according to SP-method 2472, issue 6, section 7.3.

Electrostatic potentials were additionally measured in close vicinity of parts having a resistance to ground higher than 10^9 Ω. 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 (Ø 15 mm, 2 pF).
Instrument SP inv. No. 501781 (instrument uncertainty less than ± 1%).

Result, polo shirts: Maximum measured electrostatic potential was 48 V.
Result, T-shirts: Maximum measured electrostatic potential was 20 V.
Result, sweat shirt jackets: Maximum measured electrostatic potential was 28 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

Polo shirt, art. No. 120956.

Long sleeve T-shirt, art. No. 120958.

Appendix 1

Sweat shirt jacket, art. No. 121675.