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Protective clothing - Static protective clothing

防护服装 防静电服

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Protective clothing - Static protective clothing

1 Scope

This Standard specifies the technical requirements, test methods, inspection rules, identification, etc. of static protective clothing.

This Standard applies to static protective clothing worn in places that may cause electric shock, fire and explosion hazards due to static electricity.

This Standard does not apply to non-woven static protective clothing and static protective clothing for power supply voltage protection.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 1335.1 Standard sizing systems for garments - Men

GB/T 1335.2 Standard sizing systems for garments - Women

GB/T 2912.1 Textiles - Determination of formaldehyde - Part 1: Free and hydrolyzed formaldehyde (water extraction method)

GB/T 3917.3 Textiles - Tear properties of fabrics - Part 3: Determination of tear force of trapezoid-shaped test specimens

GB/T 3920 Textiles - Tests for colour fastness - Colour fastness to rubbing

GB/T 3921-2008 Textiles - Tests for colour fastness - Colour fastness to washing with soap or soap and soda

GB/T 3922 Textiles - Tests for colour fastness - Colour fastness to perspiration

GB/T 3923.1 Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method

GB/T 4802.3 Textiles - Determination of fabric propensity to surface fuzzing and to pilling - Part 3: Pilling box method

GB/T 5453 Textiles - Determination of permeability of fabrics to air

GB/T 7568.5 Textiles - Tests for colour fastness - Specification for acrylic adjacent fabric

GB/T 7573 Textiles - Determination of pH of aqueous extract

GB/T 7742.1 Textiles - Bursting properties of fabrics - Part 1: Hydraulic method for determination of bursting strength and bursting distension

GB/T 8427 Textiles - Tests for color fastness - Color fastness to artificial light: Xenon arc

GB/T 8628 Textiles - Preparation, marking and measuring of fabric specimens and garments in tests for determination of dimensional change

GB/T 8629 Textiles - Domestic washing and drying procedures for textile testing

GB/T 8630 Textiles - Determination of dimensional change in washing and drying

GB/T 17592 Textiles - Determination of the banned azo colourants

GB 18401 National general safety technical code for textile products

GB/T 20097-2006 Protective clothing - General requirements

GB/T 23344 Textiles - Determination of 4-aminoazobenzene

FZ/T 70007 Method of test for determining the underarm seam strength of knitted garments

FZ/T 80012-2012 Cleanroom garment - Test method of point-to-point resistance

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1

static protective clothing

Work clothing that are made of static protective fabric and according to the specified style and structure to reduce the accumulation of static electricity on the clothing.

[GB/T 5708-2001, definition 2.1]

3.8

woven fabric

It is usually a fabric made of a set of warp yarns and a set of weft yarns that are perpendicular to each other, which are interwoven according to a certain rule on the loom.

[GB/T 8683-2009, definition 2.1]

3.9

shoulder strap

The strap-like structure or strap-like part of the sweater shoulder.

3.10

groundable point

Point on clothing, used to connect clothing to the ground or grounding wire in an appropriate manner.

NOTE: The available forms include connection points such as cuffs close to the wearer's skin, or buttons specifically for grounding on clothing.

4 Technical requirements

4.1 Fabric

4.1.1 Appearance quality

Test according to the method specified in 5.1, the fabric shall be free of damage, spots, dirt or other defects that affect the performance of the fabric.

4.1.2 Physical and chemical properties of woven fabrics

The physical and chemical properties of woven fabrics shall meet the requirements of Table 1. For clothing with lining, the formaldehyde content, pH value and decomposable carcinogenic aromatic amine dyes of the lining shall meet the requirements of Table 1.

5.3 SELECT samples from different parts of the fabric and clothing lining, and TEST the pH value according to the method specified in GB/T 7573.

5.4 SELECT samples from different parts of the fabric and clothing lining, and TEST the decomposable carcinogenic aromatic amine dyes according to the methods specified in GB/T 17592 and GB/T 23344. Generally, test according to GB/T 17592 first; when aniline and/or 1,4-phenylenediamine is detected, then test according to GB/T 23344. For the list of decomposable carcinogenic aromatic amine dyes, see GB 18401, the limit value is ≤ 20 mg/kg.

5.5 The smell is tested according to the method specified in GB 18401.

5.6 The dimensional change rate and relaxed dimensional change rate of the fabric are carried out according to the provisions of GB/T 8628 and GB/T 8630. Use the 4N procedures in GB/T 8629 to wash; woven fabrics are dried by hanging and drying, and knitted fabrics are dried by flat drying.

5.7 SELECT 10 samples from different parts of the fabric or clothing, and TEST the air permeability according to the method specified in GB/T 5453.

5.8 The color fastness to washing of fabrics is tested according to the method A (1) specified in Table 2 of GB/T 3921-2008.

5.9 The color fastness to rubbing of the fabric is tested according to the method specified in GB/T 3920.

5.10 The color fastness to light of the fabric is tested according to the method specified in GB/T 8427.

5.11 The color fastness to perspiration of the fabric is tested according to the method specified in GB/T 3922.

5.12 The breaking strength of the fabric is tested according to the method specified in GB/T 3923.1.

5.13 The tear strength of the fabric is tested according to the method specified in GB/T 3917.3.

5.14 The bursting strength of the fabric is tested according to the method specified in GB/T 7742.1.

5.15 The pilling of the fabric is tested according to the method specified in GB/T 4802.3.

5.16 The tester wears clothing of suitable size and performs the following actions:

a) Stand upright and raise knees until thighs are parallel to the ground;

a) The correct way of wearing and using static protective clothing.

b) It is forbidden to wear or take off static protective clothing in fire and explosion hazardous locations.

c) An oxygen-enriched environment may reduce the minimum ignition energy of flammable and explosive gases. Therefore, static protective clothing worn in this environment shall be used after evaluation by professionals.

d) Information on the correct wearing, washing and storage of clothing.

e) The antistatic performance of clothing may be affected by factors such as washing, staining, abrasion, etc. during use.

f) It is forbidden to attach or wear any exposed metal objects to the static protective clothing worn in fire and explosion hazardous locations.

g) The outer layer of clothing shall completely cover the inner layer of non-static-protective clothing.

h) Static protective clothing shall be used in conjunction with appropriate protective equipment to ensure that the personnel are well grounded, and the personnel's resistance to ground shall not be greater than 100 MΩ.

i) Other content that needs to be explained.

8 Packaging and storage

According to the customer's requirements, the product packaging shall be neat, firm, undamaged, the product quantity shall be accurate, and the inner and outer packaging shall be provided with a moisture-proof layer. The packaging inspection form of the manufacturing factory shall be placed in the box. The packaging inspection form shall include the product name, size designation, batch number, quantity, inspector and inspection date. The outside of the box shall indicate the product name, quantity, production date, manufacturing factory's name and factory address.

A.3.2 Humidity control

After washing, the sample is dried at (60 ± 10) °C for 1 h, and then placed in the test environment for 6 h.

A.4 Sample

The test sample is the sample after washing and conditioning in A.3, which can be fabric or clothing.

A.5 Test conditions

The test environment conditions are temperature (20 ± 5) °C, relative humidity (35 ± 5) %.

NOTE: Most static protective materials have obvious dependence on environmental humidity. Generally speaking, the higher the environmental humidity, the better the antistatic performance of the material. If the humidity requirement of the environment where the static protective clothing is used is significantly lower than that of this Standard (relative humidity ≤ 25 %), it should be tested in the required environment, and the environmental temperature and humidity condition shall be indicated in the report.

A.6 Test procedure

A.6.1 Cleaning

WIPE the bottom surface of the electrodes and the top surface of the insulating table with a paper towel moistened with detergent (such as propylene glycol or ethanol), and DRY them in the air.

NOTE: Propylene glycol or ethanol is flammable and toxic. Take care to avoid splashing on the skin, eyes and clothing and inhaling its vapor.

A.6.2 Point-to-point resistance test for fabrics

A.6.2.1 Test process

PLACE the test sample on the insulating table, with the front side up or the actual use side up, avoiding sample wrinkles or stacking. PLACE the test electrode set on the sample, with a distance of 30 cm between the center points of the electrodes. During the test process, it shall ensure that the electrode set is placed along the direction of the conductive wire. If there is no obvious conductive wire on the sample surface, the test direction shall be the warp direction.

APPLY a DC voltage (100 ± 5) V between the two test electrodes, and READ the value after the display is stable. The minimum test time is 15 s. If the resistance is less than 10^5 Ω, the voltage shall be reduced to 10 V for test.

the test environment for 6 h.

B.5 Test conditions

The requirements for the test environment are the same as those in Annex A.

B.6 Test procedure

B.6.1 PUT the sample in the drum friction machine and RUN for 15 min.

B.6.2 TRANSFER the sample directly from the drum friction machine (or wear insulating gloves with an insulation resistance above 10^{12} Ω, take it out directly and put immediately it into) into the Faraday cylinder. At this time, it shall be noted that the sample is more than 300 mm away from the human body, metal and other objects. The arbitration inspection shall use the automatic transfer method.

B.6.3 READ the reading of the electrostatic charge tester in microcoulomb (μC).

B.6.4 REPEAT the test 5 times according to the procedures specified in B.6.1 ~ B.6.3. Between each test, there is an interval of 10 min. Before each test, the sample and the drum lining standard cloth shall be dissipated.

B.7 Test results

Take the arithmetic average of 5 tests as the final measured value, and round off the result to 0.01 μC/set. Work clothing with lining shall turn the lining outwards, repeat the above test steps, and record the results in the report. Cold-proof clothing shall be tested with facing and lining after removing the liner.

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