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**Protective clothing - Ensembles and garments for
protection against cold**

防护服装 冷环境防护服

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Protective clothing - Ensembles and garments for protection against cold

1 Scope

This Standard specifies the technical requirements, test methods, identification and information that is provided by the manufacturer of protective clothing for protection against cold.

This Standard applies to protective clothing that is used in cold.

2 Normative references

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

GB/T 3917.4, Textiles - Tear properties of fabrics - Part 4: Determination of tear force of tongue-shaped test specimens (Double tear test)

GB/T 4744, Textiles - Testing and evaluation for water resistance - Hydrostatic pressure method

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

GB/T 11048-2018, Textiles - Physiological effects - Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test)

GB/T 13640, Size designation of protective clothing

GB/T 18398-2001, Testing method for clothing thermal resistance - Thermal manikin method

GB 18401-2010, National general safety technical code for textile products

GB/T 20097-2006, Protective clothing - General requirements

HG/T 2581.1-2009, Rubber-or plastics-coated fabrics - Determination of tear resistance - Part 1: Constant rate of tear methods

^b Non-final products, natural colors and bleached products that need to be washed and faded are not required; traditional hand-colored products such as tie dye and batik are not required.

4.1.2 Ergonomic technical requirements

The design and production of protective clothing for protection against cold shall comply with the provisions of Chapter 4 of GB/T 20097-2006:

- a) It shall be ensured that the materials and components of the protective clothing do not adversely affect the wearer.
- b) While satisfying the protection requirements, it should make the wearer as comfortable as possible.
- c) Excessive irritation or injury that is caused by rough, sharp angles and protruding parts shall be avoided when protective clothing comes into contact with the wearer's body.
- d) Considering the influence of external factors and the possible movements and postures of the wearer during work, the protective clothing shall be designed to facilitate the correct wearing position and ensure that its position is maintained during the intended use period. Therefore, appropriate methods should be adopted to enable the protective clothing to adapt to the wearer's body shape, such as: suitable adjustment structure and suitable size range.
- e) Without affecting the design strength and effect, minimize the mass of protective clothing.
- f) The design of protective clothing should consider forming a comprehensive protective whole with other series of protective clothing or equipment after wearing. The connection between protective clothing and other protective equipment, such as the connection from sleeves to gloves, trousers to shoes, caps to respirators, should provide the same level of protection.

4.2 Resultant effective thermal insulation

The resultant effective thermal insulation of clothing is divided into 4 grades; the classification is shown in Table 2.

4.6 Tear strength

The tear strength of the outer shell material in the warp and weft directions shall not be less than 25 N.

4.7 Clothing size

The design of clothing size is implemented according to the requirements of GB/T 13640.

5 Test method

5.1 Safety technical requirements

The basic safety technical requirements of clothing are tested in accordance with the methods that are specified in Chapter 6 of GB 18401-2010.

5.2 Resultant effective thermal insulation

The effective thermal insulation of clothing is tested in accordance with the static thermal manikin method that is specified in GB/T 18398-2001; the resultant effective thermal insulation of clothing is calculated according to the resultant effective thermal insulation of clothing by referring to Appendix A. Refer to Appendix B for the reference thermal resistance value of the supporting clothing for the effective thermal resistance test of clothing.

5.3 Air permeability

The air permeability of clothing is tested in accordance with the method that is specified in GB/T 5453.

5.4 Resistance to water penetration

The resistance to water penetration of clothing is tested in accordance with the method that is specified in GB/T 4744.

5.5 Water-vapour resistance

The water-vapour resistance is tested according to the method that is specified in GB/T 11048-2018.

5.6 Tear strength

5.6.1 Fabrics which are not coated with rubber or plastic on the surface are tested in accordance with the method that is specified in GB/T 3917.4.

5.6.2 Fabrics which are coated with rubber or plastic on the surface shall be tested according to the method that is specified in Method A of HG/T 2581.1-2009. The test speed is (100 ± 10) mm/min.

6 Identification

The protective clothing for protection against cold shall have a clear and easily identifiable permanent identification; the identification shall be consistent with the requirements of GB/T 20097-2006. The content shall include at least:

- a) product name and type;
- b) implementation standard;
- c) grade of effective thermal insulation;
- d) grade of air permeability;
- e) grade of resistance to water penetration;
- f) production date;
- g) manufacturer's name, site and production date.

7 Information that is provided by the manufacturer

The instruction book information that is provided by the protective clothing shall be consistent with GB/T 20097-2006; the following information shall also be provided:

- a) product name;
- b) information on wearing, washing, storage that is required during use;
- c) basic information for use, description of typical usage scenarios, such as the use temperature and the detailed information source;
- d) the use of identification information;
- e) If the thermal resistance of the garment is related to the underwear, a detailed description of the underwear (such as a product identification code) is required;
- f) Warnings of misuse are required.

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