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ISO/DIS 11999-9

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PPE for firefighters — Test methods and requirements for PPE used by firefighters who are at risk of exposure to high levels of heat and/or flame while fighting fires occurring in structures —

Part 9: Fire hoods

Équipement de protection personnelle pour pompiers — Méthodes d'essai et exigences pour les équipements de protection personnelle utilisés par les pompiers qui sont à risque d'une exposition à des niveaux élevés de chaleur et/ou de flamme quand la lutte contre les incendies survient dans les structures —

Partie 9: Hottes de feu

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

ISO 11999-9 was prepared by Technical Committee ISO/TC 94, *Personal safety -- Protective clothing and equipment*, Subcommittee SC 14, *Fire-fighters' personal equipment*.

ISO 11999 consists of the following parts, under the general title *PPE for Firefighters — Test methods and requirements for PPE used by firefighters who are at risk of exposure to high levels of heat and/or flame while fighting fires occurring in structures*:

— *Part 1: General*

— *(TS) Part 2: Compatibility*

— *Part 3: Clothing*

— *Part 4: Gloves*

— *Part 5: Helmets*

— *Part 6: Footwear:*

— *Part 7:Face and Eye Protection*

— *Part 8: Hearing Protection*

— *Part 9: Fire hoods*

— *Part 10:Respiratory Protection*

Introduction

PPE for Firefighters — Test methods and requirements for PPE used by firefighters who are at risk of exposure to high levels of heat and/or flame while fighting fires occurring in structures — Part 9: Fire hoods

1 Scope

This part of ISO 11999 specifies the minimum design and performance requirements for fire hood as part of personal protective equipment (PPE) to be used by firefighters, primarily but not solely to protect against exposure to flame and high thermal loads.

2 References

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

ISO 3146:2000, *Plastics — Determination of melting behaviour (melting temperature or melting range) of semi-crystalline polymers by capillary tube and polarizing-microscope methods*

ISO 3175-1, *Textiles -- Professional care, drycleaning and wetcleaning of fabrics and garments -- Part 1: Assessment of performance after cleaning and finishing*

ISO 5077:2007, *Textiles - Determination of dimensional change in washing and drying*

ISO 6330:2012, *Textiles — Domestic washing and drying procedures for textile testing*

ISO 6942:2002*, Clothing for protection against heat and fire — Evaluation of thermal behaviour of materials and material assemblies when exposed to a source of radiant heat*

ISO 9151:1995*, Protective clothing against heat and flame — Determination of heat transmission on exposure to flame*

ISO 11999-1, *PPE for firefighters — Test methods and requirements for PPE used by firefighters who are at risk of exposure to high levels of heat and/or flame while fighting fires occurring in structures — Part 1 General*

ISO TS 11999-2*, PPE for firefighters — Test methods and requirements for PPE used by firefighters who are at risk of exposure to high levels of heat and/or flame while fighting fires occurring in structures — Part 2: Compatibility*

ISO 13938-2:1999, *Textiles - Bursting properties of fabrics - Part 2: Pneumatic method for determination of bursting strength and bursting distension*

ISO 15025:2000*, Protection against heat and flame — Method of test for limited flame spread*

ISO 17492:2003*, Clothing for protection against heat and flame — Determination of heat transmission on*

exposure to both flame and radiant heat

ISO 17493:2000, *Clothing and equipment protection against heat — Test method for convective heat resistance using a hot air circulating oven*

EN 960:2006*, Headforms for use in the testing of protective helmets*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11999-1 apply.

4 General design requirements

Fire hoods shall be classified as Class 2 or Class 3, following the requirements specified in Clauses 5 through 7. The fire hood shall be close fitting and able to be worn without discomfort or significant restriction to head movement.

NOTE Overstretching will reduce the heat protective performance of the hood and should be avoided by design.

Where the helmet with shikoro provides coverage to the neck, ears, chin and facial area not protected by a face shield, the use of a fire hood is not required.

4.1 Facial opening

The fire hood shall have a facial opening creating an interface with the breathing apparatus facemask.

4.2 Yoke interface area

The fire hood shall have a yoke creating an interface with the protective garment.

4.3 Sizing

The fire hood shall fit 5 – 95% of the intended user population in accordance with ISO/TS 169761:2007 table 2, by being available in one or more sizes.

4.4 Flexibility

The fire hood shall have flexibility to take up the shape of the wearer's head without discomfort and shall not restrict head movement.

4.5 Seam construction

Seams shall be constructed to give the minimum loss of strength and protection and to maintain the temperature resistance and integrity of the hood.

5 Sampling and pretreatment

5.1 The number and size of specimens for the different tests shall be in accordance with the respective standard.

5.2 Where specified, test samples shall be subjected to 5 cleaning cycles in a front loading horizontal drum machine using 1 g/L IEC detergent in soft water in accordance with the procedures of ISO 6330. Washing shall be carried out by procedure 2A at 60°C ± 3 °C and drying by procedure E (tumble drying) unless otherwise specified in the care labeling.

Materials that are labeled as dry cleanable only, shall be dry cleaned five times in accordance with ISO 3175-1.

A laundry bag shall not be used.

5.3 Unless otherwise specified in the specific test methods, all specimens shall be conditioned for a minimum of 24 hours by exposure to a temperature of 20°C ± 2 °C and a relative humidity of 65 ± 5% prior to testing.

6 Performance requirements

Performance requirements are as specified in Table 1.

Table 1 — Fire hood performance requirements

Performance Property	Class 2	Class 3
Flame resistance	6.2	6.3
Heat resistance	6.4	6.4
Heat transfer (flame)	6.5 or 6.7	6.5 or 6.7
Heat transfer (radiant)	6.6 or 6.7	6.6 or 6.7
Residual strength after radiant heat exposure	6.8	6.8
Seam burst strength	6.9	6.9
Opening size retention	6.10	6.10
Dimensional change	6.11	6.11
Thread heat resistance	6.12	6.12

6.1 Sampling and pre-treatment

The performance requirements shall be met after sampling and pretreatment according to 5.

6.2 Flame resistance (surface ignition) for Class 2 Fire hoods

Flame resistance of the test specimen shall be tested in accordance with ISO 15025 Procedure A, and shall satisfy the following requirements:

a) No specimen shall give flaming to top or either side edge;
b) No specimen shall give flaming or molten debris;
c) The mean value of after flame time shall be ≤ 2 s;
d) Any afterglow shall not spread from the carbonized area to the undamaged area after the cessation of flaming.
e) No specimen shall give hole formation in any layer.

6.3 Flame resistance (bottom edge ignition) for Class 3 Fire hoods

Flame resistance of the bottom edge of the test specimen shall be tested in accordance with ISO 15025 Procedure B, both before and after pretreatment by laundering as specified in Clause 5.2, and shall satisfy the