INTERNATIONAL STANDARD

ISO 18639-1

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PPE ensembles for firefighters undertaking specific rescue activities —

Part 1: General

Équipements de protection personnelle pour pompiers entreprenant des activités de sauvetage particulières —
Partie 1: Généralités

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

ISO 18639-1 was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 14, *Fire-fighters' personal equipment.*

A list of all the parts in the ISO 18639 series can be found on the ISO website.

Introduction

ISO 18639 series of standards specify requirements of personal protective equipment (PPE) specifically designed to protect firefighters from injury and/or loss of life while engaged in special rescue activities. This document specifies the organisational structure of the ISO 18639 series of standards (see Annex A) with common standard design for easier end user access (see Annex B for ISO 18639-3 onward) and the drafting structure to be used consistently in the individual standards within the ISO 18639 series.

ISO/TS 11999-2 specifies design and performance requirements for the compatibility of the relevant parts of the ISO 18639 series when all or some of the items covered in these parts are worn together, thereby creating an ensemble standard. All items meet the general requirements for marking and manufacturer's instructions detailed in this document, as well as the specific marking and manufacturer's instructions of the respective parts.

Under best practice health and safety procedures, prior to choosing any PPE, a risk assessment of the workplace is carried out. Where hazards are identified and cannot be removed from a work place, the items of PPE chosen to protect personnel need to be fit for their intended use. They need to protect personnel whilst allowing them to carry out the work required in their workplace without unduly increasing the risk. In environments where firefighters can be required to work, not only needs the PPE protect the firefighter whilst enabling them to achieve the objectives of attendance at an incident, but it also needs safeguard them and allow a safe escape in the event that this becomes necessary. The risk assessment is the responsibility of the firefighting organisation that is purchasing the PPE. The PPE chosen will also allow the firefighter to carry out their duties without undue stress being caused by the PPE.

Some PPE, particularly PPE to protect against mortal danger, may have failure levels far above the limit of exposures of human beings. In situations such as this, it is important to ensure that proper and suitable safety procedures are in place that will both identify when personnel should be withdrawn from dangerous or potentially dangerous situations. In addition, they need to ensure that the relevant medical support is available for firefighters when they exit the incident, if rehydration or any other medical treatment is required.

As the risk assessment will dictate the performance parameters for the PPE, it is critical that decision-makers have the necessary knowledge of the risks against which the PPE is designed to protect. In addition, they also need to understand the limitations of the equipment. It is recommended that those who make the decision on the choice of PPE for particular work places should be competent in their knowledge and understanding of both the work place hazards and the PPE from which to choose, prior to making these decisions, to ensure that informed decisions are taken.

Further detail on carrying out risk assessment to ascertain the type of PPE required to protect personnel working in specific areas is included in Annex C of this document.

Hazards in the workplaces of firefighters are varied but may be common from workplace to workplace therefore some uses of PPE for firefighters can be multi-purpose. Because this Standard has been developed on a risk assessment approach, a number of different types, levels or classes are given for certain performance requirements of various parts of a PPE ensemble.

ISO 18639 series includes separate parts for each item of a firefighter's ensemble. As PPE to protect each part of the body can be so complex, this Standard draws from the expertise of other technical Committees in ISO, which specialise in such protection.

The results of the risk assessment for certain work places may require the use of PPE with higher and/or different levels or classes of performance than those in this Standard. PPE covered in this document will not protect from all possible exposures. Nothing in this document is intended to restrict any jurisdiction, purchaser or manufacturer from exceeding the minimum performance requirements specified in this Standard.

ISO/TC 94/SC 14 was established in 2000 with the purpose of standardisation of the performance of personal protective equipment (PPE) intended to safeguard firefighters against the hazards

encountered in the performance of their duties. Two of the objectives of the ISO/TC 94/SC 14 Business Plan are:

— to move away from prescriptive-based requirements in standards to a performance-based approach incorporating a risk assessment in all areas of firefighters personal protective equipment, and

— to ensure wherever practical, compatibility, integration and consistency between the components of firefighters PPE.

ISO/TC 94/SC 14 has developed a Technical Report on this subject, ISO/TR 21808. Firefighters are trained in the selection, use, care and maintenance of their PPE. Firefighters need also to be trained in the performance and limitation of their PPE.

PPE ensembles for firefighters undertaking specific rescue activities —

Part 1: General

1 Scope

ISO 18639 series of standards specify requirements of personal protective equipment (PPE) specifically designed to protect firefighters from injury and/or loss of life while engaged in specific rescue activities.

ISO 18639 series provides the principles that govern the development of incident type and/or hazard specific minimum test methods including design and performance requirements for personal protective equipment (PPE) worn by firefighters and other rescue workers to reduce injury and/or the loss of life while engaged in rescue activities.

To assist with selection based on a risk assessment (see Annex C), type of PPE, (if applicable) and performance levels, for different categories of protection are included.

This document covers PPE for use in the rescue activities for road traffic crash (RTC) and urban search and rescue (USAR), but could also include other rescue activities depending on the risk assessment.

It does not include PPE for use in high risk fire exposures.

Similarly, this document does not include PPE to protect against chemical and biological hazards, except against short term and accidental exposures whilst engaged in rescue activities.

This document describes the general structure of the ISO 18639 series, including each subsection, sets design and performance requirements for PPE and includes requirements for marking and manufacturer's instructions.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

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 13688, *Protective clothing — General requirements*

EN 1149-3, *Protective clothing — Electrostatic properties — Test methods for measurement of charge decay*

EN 1149-5, *Protective clothing — Electrostatic properties — Material performance and design requirements*

3 Terms and definitions

There are no normative references in this document.

4 Abbreviated terms and subscripts

4.1 Abbreviated terms

RTC	Road Traffic Crash
USAR	Urban Search and Rescue
PPE	personal protective equipment
RPD	respiratory protective device
HTI_{12}	heat transmission index (12 °C temperature rise)
HTI_{24}	heat transmission index (24 °C temperature rise)
TTI	thermal threshold index
m	mass
R'	coefficient of retroreflection
$RHTI_{12}$	radiant heat transmission index (12 °C temperature rise)
$RHTI_{24}$	radiant heat transmission index (24 °C temperature rise)
w_w	mass fraction of water absorbed

4.2 Subscripts

12	at 12 °C temperature rise
24	at 24 °C temperature rise
w	water

5 Design and performance requirements for PPE items and ensembles

5.1 PPE ensembles

An ensemble of PPE items is classified as meeting the requirements of this document, if every item in the ensemble meets the appropriate requirements of the relevant parts of ISO 18639 series and provide as an ensemble protection to the whole body of the firefighter for rescue operations.

For example, any item of PPE or any PPE ensemble, which are intended to provide protection for the firefighter's upper and lower torso, head, neck, arms, hands, legs and feet, shall be in accordance with the requirements of relevant part of ISO 18639 series.

Nevertheless, an item of PPE, which is in accordance with the requirements of one of the relevant part of ISO 18639 series, can individually be designated and marked for that item of PPE according to the relevant part of the ISO 18639 series.

5.2 Combination of items of PPE

A PPE combination is the use of 2 or more PPE elements, each of which meets the requirements of the relevant individual part of ISO the 18639 series but is not classed as an ensemble (see 5.1).

PPE combinations that claim compatibility shall be assessed according to the relevant interface compatibility testing method(s) described in relevant clause(s) or subclause(s) of ISO/TS 11999-2.

NOTE A combination is more than a single item of PPE but less than an ensemble, i.e. it is not an offering protection for the whole firefighter.

6 Marking

6.1 General

Marking requirements shall be as specified in ISO 13688 and in this clause.

ISO 13688 shall include the marking requirements specified in this clause and in additional specified requirements for the individual PPE elements of the relevant parts of ISO 18639 series.

Any marking in the form of labels shall not adversely affect the performance of any item to which they are attached or present a hazard to the wearer.

When required labels that shall be tested for flammability according to the requirements for labels in ISO 18639-3 only where placed on the exterior of the garment. Labels (interior and exterior) and closure systems shall be tested to the relevant requirements according to the PPE item they are attached.

Marking of PPE shall be under the specific requirements of the item in the relevant parts of ISO 18639 series.

6.2 Compliance marking requirements for an item of PPE

Each item of PPE, for which compliance with this document is claimed, shall have a label permanently and conspicuously attached in conformance with ISO 13688 and upon which the following information is printed in letters at least 1,5 mm high:

a) identification of product standard — ISO 18639-X:YYYY;

b) the name, trademark, or other means of identifying or tracing back to the manufacturer;

c) the manufacturer's model number and/or user's specified number.

6.3 Additional marking for compatibility

Ensembles and combination of PPE items which are intended to be worn together and or assembled, shall be tested together according to the respective compatibility requirements clause(s) and subclause(s) of ISO/TS 11999-2 and meet the requirements of the individual parts of ISO 18639 series. An additional marking shall be added to the item individual markings, clearly listing and identifying all items that are compatible:

— compatible with .....[using information in 6.2 c)].

7 Manufacturer's instructions to be supplied with each item of PPE

7.1 User's information

The manufacturer shall meet the requirements of ISO 13688 and the minimum requirements in 7.1 and 7.2. Manufacturers shall also add additional relevant information from each part of ISO 18639 series.

The manufacturer shall provide user's information including, but not limited to, data showing conformity to the item of relevant part(s) of ISO 18639 series, any additional data required by this document, the results of any optional tests undertaken, warnings, information, and instructions with each PPE.

Instructions shall be supplied in the official language(s) of the country of destination.

The manufacturer shall provide at least the following instructions and information with each PPE:

a) safety considerations,

b) information about the markings,

c) limitations of use,

d) preparation for use,

e) sizing,

f) recommended storage practices,

g) inspection frequency and details,

h) donning and doffing procedures,

i) maintenance and cleaning,

j) retirement and disposal,

k) known shelf life limitations, and

l) information about the use of integrated devices.

The manufacturer shall attach the manufacturer's instructions, or packaging containing this information, to the relevant item of PPE in such a manner that it is not possible to use the item of PPE without being aware of the availability of the information and that a deliberate action is necessary to remove it.

The manufacturer shall provide notice that the information is to be removed ONLY by the end user.

Instructions shall give the following additional information:

— In the situation where a combination of PPE items or an ensemble, do not have the same rating, for example, different levels of heat and flame protection, the manufacturer's instructions shall indicate additional effects and risks which may result.

7.2 Additional user information for compatibility

The combination of PPE items which are intended to be worn and or assembled together, shall be tested together according to the respective compatibility requirements of ISO/TS 11999-2 and meet the requirements of the individual parts of ISO 18639 series.

For the compatible items of PPE, the manufacture shall provide a declaration for each compatible PPE, additional information on the conformity to the requirements of relevant clause(s) and subclause(s) of ISO/TS 11999-2 and any additional checks or warnings, such as but not limited to:

— compatible with ……[using information in 6.2 c)];

— testing and classification of performance for items of PPE, for combinations of items of PPE for ensembles;

— additional compatibility testing, including detailed instructions, that shall be completed by the end user before wearing the PPE in hazard situations.

Annex A
(informative)

Structure of the ISO 18639 series

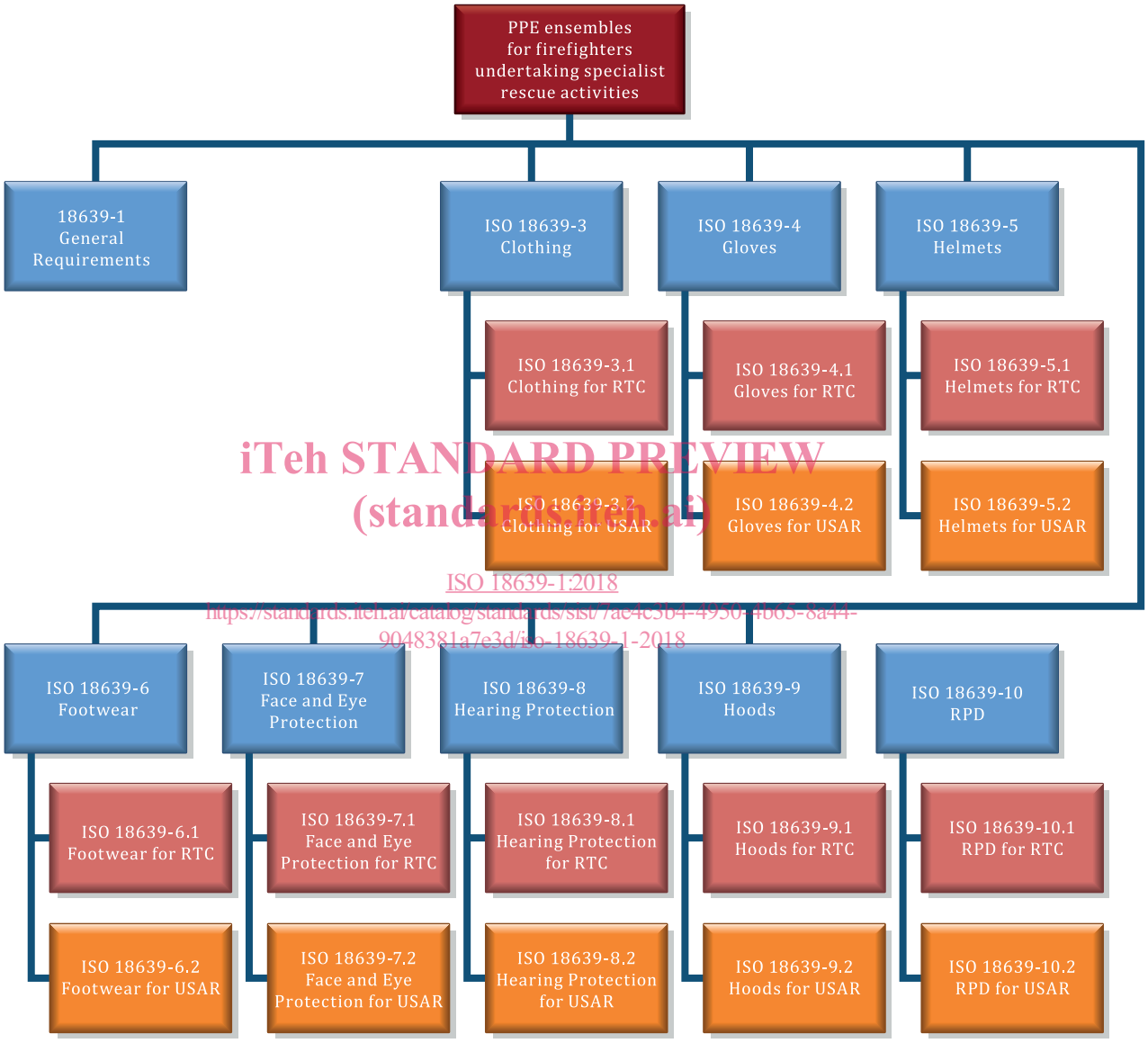

Figure A.1 — Representation of the structure of the ISO 18639 series