
**Protective clothing for firefighters —
Laboratory test methods and
performance requirements for
wildland firefighting clothing**

AMENDMENT 1

*Habillement de protection pour sapeurs-pompiers — Méthodes
d'essai en laboratoire et exigences de performance pour vêtements
portés pendant la lutte contre les feux d'espaces naturels*

AMENDEMENT 1





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This document was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 14, *Firefighters' personal equipment*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 162, *Protective clothing including hand and arm protection and lifejackets*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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AMENDMENT 1

Page 5, 4.4, second paragraph

The following paragraph was rephrased by adding "This requirement does not relate to dedicated radio pockets" at the end, from:

"Where fitted, Pocket flaps shall overlap the pocket opening by no less than 10mm on either side. The overlap shall be sufficient to prevent the entry of heat and other hot materials into the pocket."

to

"Where fitted, pocket flaps shall overlap the pocket opening by no less than 10mm on either side. The overlap shall be sufficient to prevent the entry of hot materials into the pocket. This requirement does not relate to dedicated radio pockets."

Page 6, 5.3

The following paragraphs have been deleted:

"Before each test specified in Clauses 6 and 7, the test materials and test specimens shall be pre-treated by cleaning. If the manufacturer's instructions indicate that cleaning is not allowed, i.e. single use garments, then testing shall be carried out on new material. In addition, limited flame spread and heat transfer (radiation) shall be carried out in accordance with 6.1 and 6.2 before and after the pre-treatment.

The cleaning shall be in line with the manufacturer's instructions, on the basis of standardized processes. If the number of cleaning cycles is not specified, the tests shall be carried out after five cleaning cycles (a cleaning cycle is one wash and one dry cycle). This shall be reflected in the information supplied by the manufacturer.

If cleaning method is not specified, the samples shall be subjected to a washing with a normal load in a front-loading horizontal drum machine using non-phosphate reference detergent N°3 in soft water in accordance with the procedures of ISO 6330 at 60 °C normal wash (6N). The dry procedure shall be F tumble dry at normal temperature (max 80 °C) measured at the outlet temperature.

If the garment can be washed and dry-cleaned it shall only be washed. If only dry-cleaning is allowed the garment shall be dry-cleaned in accordance with the manufacturer's instructions.

NOTE Manufacturer's instructions typically indicate one or several of the various methods and processes of ISO 15797, ISO 3175-2 or equivalent as standardized processes for cleaning."

and replaced with:

"Before each test specified in Clauses 6 and 7, the test materials and test specimens shall be pre-treated by cleaning. In addition, limited flame spread and heat transfer (radiation) shall be carried out in accordance with Clauses 6.1 and 6.2 before and after the pre-treatment.

Test specimens shall be subjected to five cleaning cycles (see 3.3) in accordance with the following procedures. If the garment can be washed and dry-cleaned it shall only be cleaned according to ISO 6330 using the front-loading horizontal drum machine and reference detergent 3 (ECE reference detergent 98). Washing shall be carried out by procedure 6N (60 ± 3) °C and drying by procedure F (machine Type A1) exhaust temperature normal (minimum 40 °C, maximum 80 °C). If only dry cleaning is allowed the garment shall be dry-cleaned in accordance with ISO 3175-2."

Page 6, 5.4

The following paragraph has been deleted:

"Prior to all tests and after having performed the pre-treatment specified in 5.3, the specimens shall be preconditioned in line with ISO 139, with the following modification: relative humidity (65 ± 5) %. Test the specimens within 5 min following their removal from the conditioning atmosphere."

and replaced with:

"Unless otherwise specified in the specific test methods, all specimens shall be conditioned for a minimum of 24 h prior to testing, in accordance with ISO 139 using a temperature of (20 ± 2) °C and a relative humidity of (65 ± 5) %. Unless otherwise specified in the specific test method, test the specimens within 5 min following their removal from the conditioning atmosphere."

Page 7, 6.1.1

The following paragraph has been changed by adding "but excluding" before hardware, from:

"Each material in the component assembly, including rank markings, retroreflective and fluorescent materials, hardware shall be tested separately using 6.1.2 and tested assembled as indicated using 6.1.3, before and after the pre-treatment specified in 5.3. All the individual results of the specimens of a test shall meet the performance requirement."

to:

"Each material in the component assembly, including rank markings, retroreflective and fluorescent materials, but excluding hardware shall be tested separately using 6.1.2 and tested assembled as indicated using 6.1.3, before and after the pre-treatment specified in 5.3. All the individual results of the specimens of a test shall meet the performance requirement."

Page 8, 7.2

Editorial correction due to incorrect rate of traverse:

"When tested in accordance with method B of ISO 4674-1, at a rate of traverse of 5 mm/s, the outer material shall give a tear strength in both machine and cross direction >25 N."

has been replaced with:

"When tested in accordance with method B of ISO 4674-1 the outer material shall give a tear strength in both machine and cross direction >25 N."

Page 9, New subclause, 7.4

After subclause 7.3, add a new subclause 7.4 with the following wording:

"7.4 Abrasion resistance

When tested in accordance with ISO 12947-2, at 12 kPa using crossbred worsted abradant fabric, the outer material shall achieve a specimen breakdown (end point) greater than or equal to 20 000 rubs. Continue testing to end point as defined in ISO 12947-2: 2016, Table 1 and report result."

Page 10, Table 3, Tear strength

Editorial correction due to bracketed wording being located against wrong standard:

"ISO 4674-1 Method B or ISO 13937-2 (coated fabrics) ≥ 25 N"

has been changed to:

"ISO 4674-1 Method B (coated fabrics) or ISO 13937-2 ≥ 25 N"

Page 11, New subclause after Table 3, 9.4

After Table 3 add a new subclause 9.4 with the following wording:

"9.4 Innocuousness

Protective clothing shall not adversely affect the health or hygiene of the user. The material shall not, in the foreseeable conditions of normal use, release substances generally known to be toxic, carcinogenic, mutagenic, allergenic, toxic to reproduction or otherwise harmful.

Acceptability of materials in relation to innocuousness shall be according to ISO 13688:2013, 4.2."

Page 11, 10.3

editorial correction, item f) missing. Insert item f):

f) The pictogram given in Figure 1



Figure 1 — Pictogram

Page 14, Annex A

The following title and wording in Annex A have been deleted:

"Uncertainty of measurement and determination of property values for the rating and classification

For each of the required measurements performed in accordance with this document, a corresponding estimate of the uncertainty of measurement shall be evaluated. This estimate of uncertainty shall be applied when it could affect the rating or classification of a property.

All the individual results of the specimens of a test shall meet the performance requirement.

The worst result shall be given.

If a material exhibits differing behaviour for a property in the length and cross directions of the material, the resultant property value shall be the value obtained in the lesser performing direction.

In the event that only one specimen fails, another set of specimens shall be tested and all the individual results of this second set of specimens shall meet the requirements. The result of this second set of specimens shall be given. Otherwise, the sample is considered to have failed the requirement."

and replaced with:

"Uncertainty of measurement and determination of property values

All individual results of the specimens of a test shall be reported along with the calculated result according to the test method.

For each of the required tests performed in accordance with this document, the corresponding estimate of the coefficient of Variation (expressed as a percentage) for the Laboratory Test variability (excluding sample variability) shall be given."