SLOVENSKI STANDARD
oSIST prEN ISO 6942:2021

01-december-2021

Varovalna obleka - Zaščita pred toploto in ognjem - Metoda preskušanja za vrednotenje materialov in izdelkov iz teh materialov, ki so izpostavljeni viru toplotnega sevanja (ISO/DIS 6942:2021)

Protective clothing - Protection against heat and fire - Method of test: Evaluation of materials and material assemblies when exposed to a source of radiant heat (ISO/DIS 6942:2021)

Schutzkleidung - Schutz gegen Hitze und Feuer - Prüfverfahren: Beurteilung von Materialien und Materialkombinationen, die einer Hitze Strahlungsquelle ausgesetzt sind (ISO/DIS 6942:2021)

Vêtements de protection - Protection contre la chaleur et le feu - Méthode d'essai: Évaluation des matériaux et assemblages des matériaux exposés à une source de chaleur radiante (ISO/DIS 6942:2021)

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13.340.10	Varovalna obleka	Protective clothing

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Protective clothing — Protection against heat and fire — Method of test: Evaluation of materials and material assemblies when exposed to a source of radiant heat

Habillement de protection — Protection contre la chaleur et le feu — Méthode d'essai: Évaluation des matériaux et assemblages de matériaux exposés à une source de chaleur radiante

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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 of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 94, *Personal safety -- Personal protective equipment*, Subcommittee SC 13, *Protective clothing*.

This second cancels and replaces the first edition 2002, clause 2 and Annex on ILT have been revised.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Protective clothing against radiant heat is worn at different occasions and accordingly the radiation intensity (characterised by the heat flux density) acting on the clothing material extends over a wide range. This European Standard describes two test methods which can be applied to all sorts of materials, but, according to the intended use of the material, the heat flux density has to be chosen properly and the results have to be interpreted correctly,

Industrial workers or fire fighters may be exposed to a relatively low radiation intensity over a long period of time. On the other hand, industrial workers or fire fighters may be exposed to medium radiation intensities for relatively short periods of time or to high radiation intensities for very short periods of time. In the latter case, the clothing material may be changed or even destroyed.

The materials for the protective clothing should be tested at medium and high heat flux densities. The reaction on method A and the times t_{12} and t_{24} and transmission factor measured with method B characterise the material. Information of the precision of method B see annex A.

Protective clothing — Protection against heat and fire — Method of test: Evaluation of materials and material assemblies when exposed to a source of radiant heat

1 Scope

This document specifies two complementary methods (method A and method B) for determining the behaviour of materials for heat protective clothing subjected to heat radiation.

These tests are carried out on representative single or multi-layer textiles or other materials intended for clothing for protection against heat. They are also applicable to assemblies, which correspond to the overall build up of a heat protective clothing assembly with or without underclothing,

Method A serves for visual assessment of any changes in the material after the action of heat radiation. With method B the protective effect of the materials is determined. The materials may be tested either by both methods or only by one of them.

The tests according to these two methods serve to classify materials; however, to be able to make a statement or prediction as to the suitability of a material for protective clothing additional criteria must be taken into account.

Since the tests are carried out at room temperature the results do not necessarily correspond to the behaviour of the materials at higher ambient temperatures and therefore are only to a limited extent suitable for predicting the performance of the protective clothing made from the materials under test.

2 Normative reference

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 139:2005, *Textiles — Standard atmospheres for conditioning and testing*

ISO 139:2005/Amd 1:2011, *Textiles — Standard atmospheres for conditioning and testing — Amendment 1*

IEC 60584-1:2013, *Thermocouples - Part 1: EMF specifications and tolerances*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 11610 and the following apply (see also Annex A).

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
heat transfer levels
Time t_{12} The time in seconds expressed to one decimal place, to achieve a calorimeter temperature rise of (12 ± 0,1) °C

Time t_{24} The time in seconds expressed to one decimal place, to achieve a calorimeter temperature rise of (24 ± 0,2) °C

3.2
heat transmission factor (TF)
A measure of the fraction of heat transmitted through a specimen exposed to a source of radiant heat. It is numerically equal to the ratio of the transmitted to the incident heat flux density.

3.3
test specimen
All the layers of fabric or other material arranged in the order and orientation as used in practice and including undergarments if appropriate.

3.4
incident heat flux density:
The amount of energy incident per unit time on the exposed face of the calorimeter, expressed in kW/m^2.

3.5
radiant heat transfer index (RHTI)
A number, calculated from the mean time (measured in seconds, to one decimal place) to achieve a specified temperature rise in the calorimeter when testing by this method with a specified incident heat flux density.

3.6
change in appearance of the specimen
All changes in appearance of the material (shrinkage, formation of char, discoloration, scorching, glowing melting etc.).

3.8
multi-layer clothing assembly
series of layers in garments arranged in the order as worn

Note 1 to entry: It may contain multi-layer materials , material combinations or separate layers of clothing material in single layers.

4 Principle

4.1 Method A

A specimen is supported in a free-standing frame (specimen holder) and is exposed to a specific level of radiant heat for a specific time. The level of radiant heat is set by adjustment of the distance between the specimen and the thermal radiation source. Following the exposure, the specimen and its individual layers, are examined for visible changes.

4.2 Method B

A specimen is supported in a free-standing frame (specimen holder) and is exposed to a specific level of radiant heat. The times for temperature rises of 12 °C and 24 °C in the calorimeter are recorded and are expressed as radiant heat transfer indexes. The percentage heat transmission factor is calculated from the temperature rise data and is also reported.

5 Apparatus

5.1 General

The test apparatus consists of the following items, which are used for both test methods:

— source of radiation (5.2);

— test frame (5.3);

— specimen holder (5.3).

For method B, the following are also required:

— calorimeter (5.4);

— temperature measuring and recording device (5.5).

5.2 Source of radiation

The radiation source consists of six silicon carbide (SiC) heating rods, with the following characteristics:

— total length: (356 ± 2) mm;

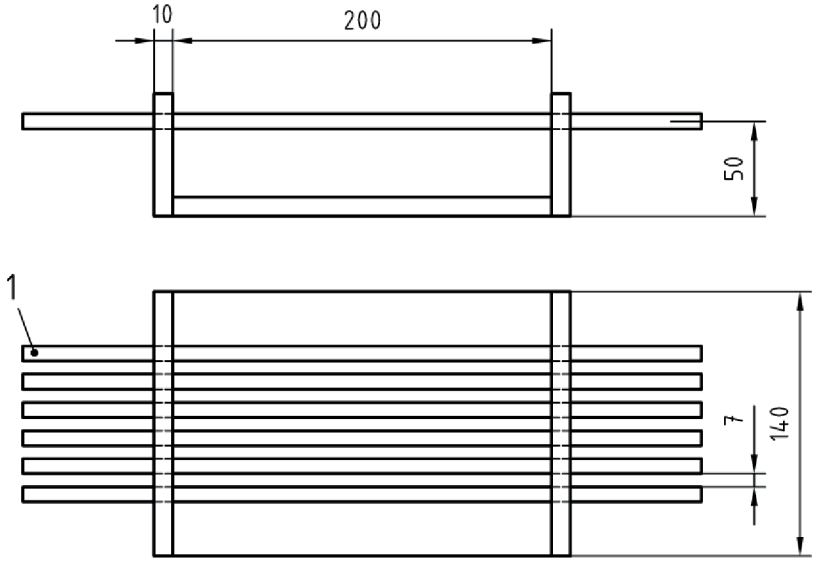
— length of heating part: (178 ± 2) mm;

— diameter: (7,9 ± 0,1) mm;

— electrical resistance: 3,6 Ω ± 10 % at 1 070 °C.

These rods are placed in a U-shaped support made of insulating, flame resistant material so that they are arranged horizontally and in the same vertical plane. Figure 1 shows the constructional details of the support and the arrangement of the heating rods, which are loosely mounted in the grooves of the support to avoid mechanical stress.

Dimensions in millimetres
(tolerance for measurements ±0,1 mm)



Key

1 silicon carbide rod

Figure 1 — Source of radiation