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Handläggande organ

SIS-STG

SVENSK STANDARD SS-EN 367

Fastställd	Utgåva	Sida
1992-11-30	1	1 (1 + 13)

Skyddskläder — Skydd mot hetta och flamma — Metod för bestämning av värmegenomgång vid påverkan av flamma

Europastandarden EN 367:1992 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 367:1992.

Den titeländring som meddelas i rättelsen EN 367/AC:1992 är inarbetad i detta dokument.

Protective clothing — Protection against heat and flames — Test method: Determination of the heat transmission on exposure to flame

The European Standard EN 367:1992 has the status of a Swedish Standard. This document contains the official English version of EN 367:1992.

The correction of the title which is announced in corrigendum EN367/AC:1992 has been made in this document.

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Descriptors: personal protective equipment, protective clothing, heat protection, heat resistant materials, fire resistant materials, filing, thermal tests, heat transfer, flames, heat transfer coefficient

English version

Protective clothing — Protection against heat and fire — Method of determining heat transmission on exposure to flame

Vêtements de protection — Protection contre la chaleur et les flammes — Détermination de la transmission de chaleur à l'exposition d'une flamme

Schutzkleidung — Schutz gegen Wärme und Flammen — Verfahren zur Bestimmung des Wärmedurchgangs bei Flammenwirkung

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard was prepared by CEN/TC 162 'Protective clothing including hand and arm protection and lifejackets' of which the secretariat is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1993, and conflicting national standards shall be withdrawn at the latest by April 1993.

The standard was aproved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

0 Introduction

This method has been developed from an ASTM method which was based on the Du Pont thermal protective index (TPI) method. It has been considerably modified from previous versions following extensive interlaboratory trials carried out by ISO/TC 94/SC 13/WG 2.

The heat transmission through clothing is largely determined by its thickness including any air gaps trapped between the different layers. The air gaps can vary considerably in different areas of the same clothing assembly. The present method provides a grading of materials when tested under standard test conditions.

The following major modifications have been made from previous versions of this test method.

a) The air gap between the back of the test specimen and the calorimeter has been eliminated. This was found to increase all the values recorded and to distort the results with some materials more than others.

b) The specimen size has been increased and the mass of the location plate has been specified. The mass of the location plate is used to hold the specimen in position so that the specimen is compressed by a standard mass and is also restricted from shrinking.

c) The method of measuring the heat transmission has been drastically simplified and a new term heat transfer index (HTI) has been introduced to avoid confusion with the thermal protective index (TPI) or other terms used in previous versions of this test. This change makes it easier to perform the test and reduces the possibility of mathematical errors in calculating the results. The heat transfer index provides a method of grading materials which does not imply that the material tested will give any precise protection time under actual use conditions.

d) Other methods of restraining the test specimens using clamps or pins have been rejected on the basis of interlaboratory trials because of practical difficulties which were believed to increase the interlaboratory variability.

e) All terminology which implies that the test method measures the protection time provided by the test material has been eliminated. The protection provided under actual use conditions will vary considerably, depending on the severity of the actual flame source and the thickness of the clothing, including intermediate air gaps, in the exposed area.

1 Scope

This European Standard specifies a method for comparing the heat transmission through materials or material assemblies used in protective clothing. Materials are ranked by calculation of a heat transfer index, which is an indication of the relative protection under the specified test conditions. The heat transfer index should not be taken as a measure of the protection time given by the tested materials under actual use conditions.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 139	*Textiles — Standard atmosphere for conditioning and testing*
IEC 584-1	*Thermocouples. Part 1 : Reference tables*

3 Definitions

For the purposes of this standard the following definitions apply.

3.1 test specimen

All the layers of fabric or other materials arranged in the order and orientation as used in practice and including undergarments.

3.2 incident heat flux density

The amount of energy incident per unit time on the exposed face of the specimen, expressed in kW/m^2.

3.3 heat transfer index (flame)

A whole number calculated from the mean time in seconds to achieve a temperature rise of (24,0 ± 0,2) °C when testing by this method using a copper disc of mass (18,00 ± 0,05) g and a starting temperature of (25 ± 5) °C.

4 Principle

A horizontally oriented test specimen is partially restrained from moving and subjected to an incident heat flux of 80 kW/m^2 from the flame of a gas burner placed beneath it. The heat passing through the specimen is measured by means of a small copper calorimeter on top of and in contact with the specimen.

The time to record a temperature rise of (24,0 ± 0,2) °C in the calorimeter is recorded in seconds. The mean result for three test specimens is calculated as the 'heat transfer index (flame)'.

5 Apparatus

The apparatus consists of:

- a gas burner;
- a copper disc calorimeter;
- a specimen support frame;
- a calorimeter location plate;
- a support stand;
- suitable measuring equipment;
- a template.

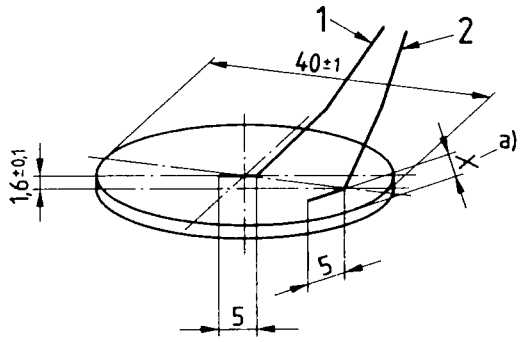
5.1 *Gas burner.* A flat topped Meker burner with a perforated top area of (38 ± 2) mm diameter and a jet suitable for propane gas shall be used. Commercial grade propane shall be used with the flow being controlled by a fine control valve and flowmeter.

5.2 *Copper disc calorimeter.* The calorimeter consists of a disc of copper of at least 99 % purity, having a diameter of 40 mm and thickness 1,6 mm, and a weight of 18 g. The disc should be accurately weighed before assembly.

A copper-constantan thermocouple, with an output in millivolts complying with IEC 584-1, is mounted on the copper disc as shown in figure 1. The constantan wire should be attached to the centre of the disc and the copper wire should be attached as near the circumference as possible but so as not to interfere with mounting the disc in the block. The diameter of both wires should be 0,26 mm or less and only the length attached to the disc should be bared.

The calorimeter is located in a mounting block which shall consist of a 89 mm diameter circular piece of asbestos-free non combustible, heat insulating board of nominal thickness 13 mm. The thermal characteristics should comply with the following specification:

- density: (750 ± 50) kg/m^3
- thermal conductivity: 0,18 W (m·k) ± 10 %



Key

1 Constantan wire

2 Copper wire

a) 2 ≤ × ≤ 5 mm so as not to interfere with seating of disc in mounting block but still as near edge as possible

Wires attached to disc by soft solder using minimum quantity necessary.

All dimensions in millimetres.

Figure 1. Calorimeter

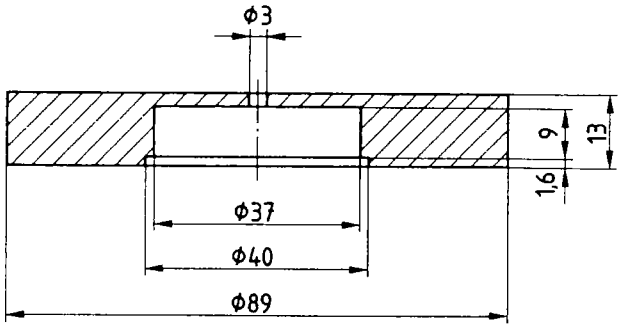
A circular cavity is machined in the centre of the block to accommodate the disc and an air gap, as shown in figure 2. The disc is bonded in position around its circumference with an adhesive capable of withstanding temperatures of about 200 °C. The face of the copper disc shall be flush with the surface of the mounting block. It shall also be coated with a thin layer of an optically black paint having a coefficient of absorption, a, greater than 0,9 (see annex A).

5.3 *Specimen support frame.* The specimen support frame consists of a piece of copper 150 mm square and 1,6 mm thick with a 50 mm square hole in its centre (see figure 3).

5.4 *Calorimeter location plate.* The calorimeter location plate is made from a piece of aluminium 149 mm square and 6 mm thick A circular hole 90 mm in diameter shall be centrally in this block (see figure 4). The plate shall weigh (264 ± 13) g.

5.5 *Support stand.* A support stand is used to locate the specimen support frame relative to the burner. The top face of the specimen support frame should be 50 mm above and parallel with the top face of the burner with the axis of the burner aligned with the centre of the opening in the support frame (see figure 5).

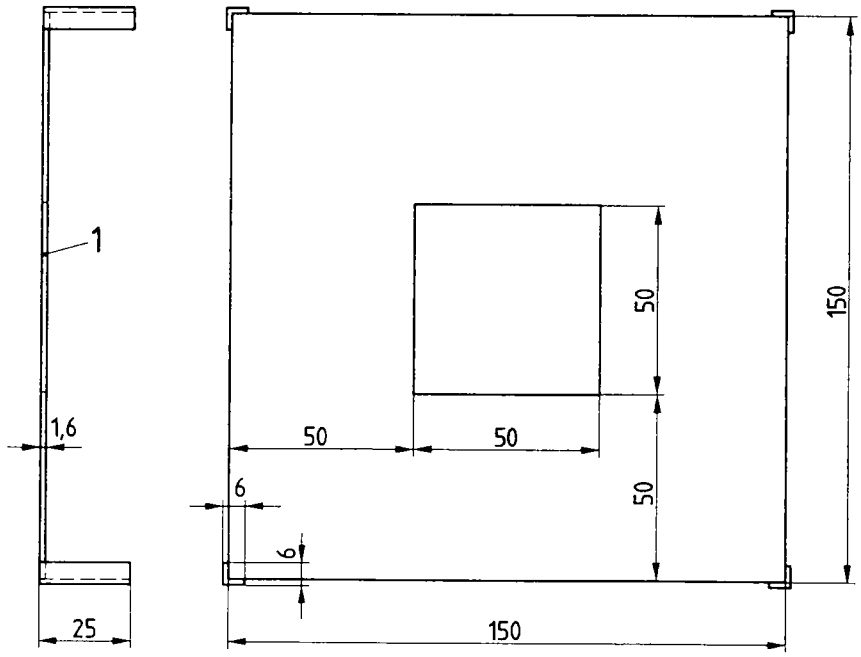
It is convenient to have a shutter between the burner and the specimen support frame. The shutter should open completely in less than 0,2 s and should be operated immediately after placing the burner in position. It is useful if the positioning of the burner, or the opening of the shutter, if fitted, can be used to record the start of the exposure automatically.



Construction material: Monolux 500 (cape boards) or equivalent

All dimensions in millimetres.

Figure 2. Calorimeter mounting block

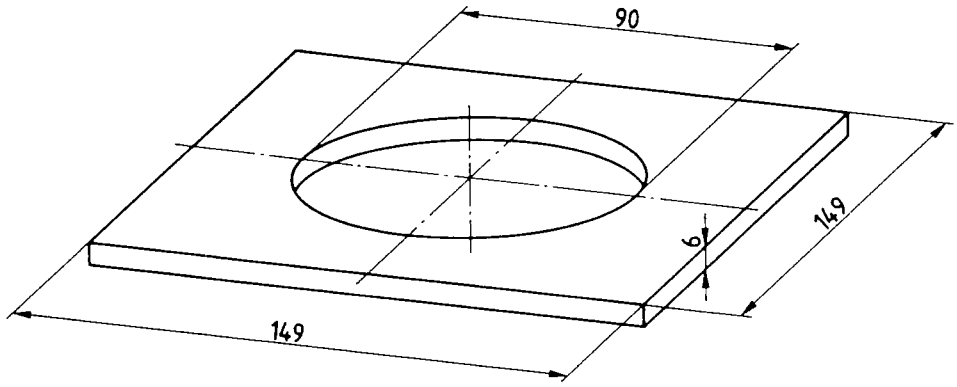


Key

1 Copper sheet

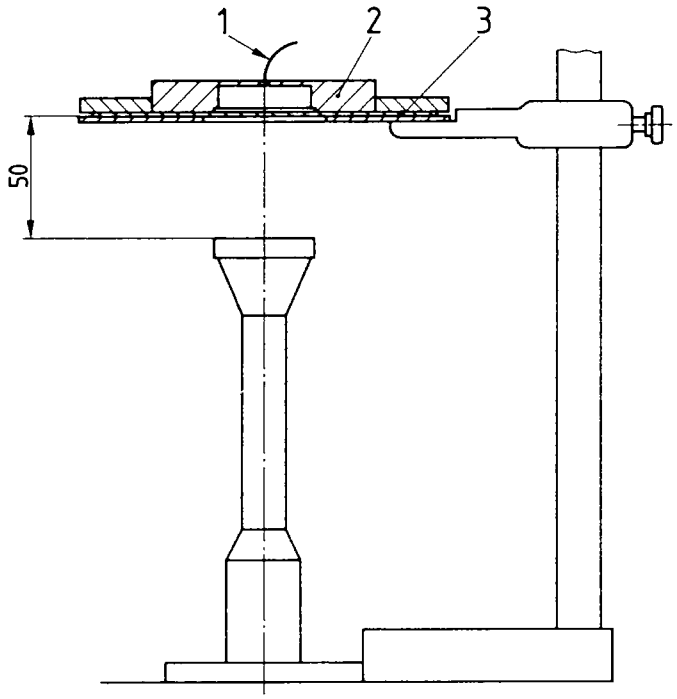
All dimensions in millimetres.

Figure 3. Specimen support frame



All dimensions in millimetres.

Figure 4. Calorimeter location plate



Key

1 Thermocouple
2 Calorimeter block
3 Specimen

Figure 5. Support stand