
**Protective clothing against heat and
flame —**

**Part 2:
Skin burn injury prediction —
Calculation requirements and test
cases**

Vêtements de protection contre la chaleur et les flammes —

*Partie 2: Prédiction de blessure par brûlure de la peau — Exigences
de calculs et cas d'essai*



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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).

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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.

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

This first edition of ISO 13506-2, together with ISO 13506-1, cancels and replaces the first edition of ISO 13506:2008, which has been technically revised.

A list of all parts in the ISO 13506 series can be found on the ISO website.

Introduction

The purpose of heat and flame-resistant protective clothing is to shield the wearer from hazards that can cause skin burn injury. The clothing can be made from one or more materials, which can be made into a garment or protective clothing ensemble for testing on a manikin fire exposure system.

This document is a companion document to ISO 13506-1. It replaces ISO 13506:2008, Annex C and specifies in a normative way the method of calculating and reporting test results for ISO 13506-1 in the form of skin burn injury prediction. The data gathered by tests according to ISO 13506-1 are used as input for this calculation.

In the test method standard ISO 13506-1, a stationary, upright, adult-sized manikin is dressed in a garment or protective clothing ensemble and exposed to a laboratory simulation of a fire with controlled heat flux, duration and flame distribution. The average incident heat flux to the exterior of the garment is 84 kW/m². Thermal energy sensors are fitted to the surface of the manikin. The output from the sensors is used to calculate the heat flux variation with time and location on the manikin and to determine the total energy absorbed over the data-gathering period. The data-gathering period is selected to ensure that the total energy transferred will no longer be rising. The information obtained from the calculation of skin burn injury prediction (see Annex B) can be used to assist in evaluating the performance of the garment or protective clothing ensemble under the test conditions. It can also be used as a model-based tool to estimate the extent and nature of potential skin damage resulting from the exposure of the test garment.

Fit of the garment or protective clothing ensemble on the manikin is important. Thus, variations in garment or protective clothing ensemble design and how the manikin is dressed by the operator may influence the test results and skin burn injury prediction. Experience suggests that testing a garment one size larger than the standard can reduce the percentage of predicted body burn by up to 5 %.

The ISO/TC 94/SC 13 and SC 14 committees and the European Committee for Standardization CEN/TC 162 specify the method described in this document as an optional part in the fire fighter standards ISO 11999-3 and EN 469 and as an optional part in the industrial heat and flame protective clothing standard ISO 11612.

The National Fire Protection Association standard NFPA 2112^[6] (specifies ASTM F1930-17^[7], which is a test method similar to the one described in ISO 13506-1 and which contains skin burn injury prediction calculations similar to the one described in this document.

