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Second edition
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Protective clothing — Mechanical properties — Determination of resistance to cutting by sharp objects

Vêtements de protection — Propriétés mécaniques — Détermination de la résistance à la coupure par des objets tranchants

Reference number
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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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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 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 — Personal protective equipment*, Subcommittee SC 13, *Protective clothing*, 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).

This second edition cancels and replaces the first edition (ISO 13997:1999), which has been technically revised.

This document has been completely rewritten based on the current practices and experience in cut testing as well as comparing other cut test methods standards around the world. The main changes are as follows:

— new blades and revised range of cutting stroke length for the blades to be valid;

— new neoprene, with calibration data and Annex C;

— new specimen securing clamp;

— new Figure 3;

— new paper sheet in the specimen assembly;

— new data form ILT in Annex A;

— a few new information in Annex B for calculation;

— the neoprene control is only referenced to in Annex C.

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

Although textiles, composites, leather, rubbers and reinforced materials may resist cutting by sharp edges in different ways, a test method for evaluating the resistance to cut of materials in protective clothing needs to be applicable to all materials. The test described in this document provides a method that allows calculations of the downwards (normal) force required to cause a blade drawn across the sample for a fixed distance to cut through the specimen.

The performance of protective clothing materials may be classified using the numerical values obtained from this test.

Protective clothing — Mechanical properties — Determination of resistance to cutting by sharp objects

1 Scope

This document specifies a tomodynamometer cut test method and related calculations, for use on materials and assemblies designed for protective clothing, including gloves. The test determines resistance to cutting by sharp edges, such as knives, sheet metal parts, swarf, glass, bladed tools and castings.

When this document is cited as a test method in a material or product requirement standard, that standard contains the necessary information to permit the application of this document to the particular product.

This test does not provide data on the resistance to penetration by pointed objects such as needles and thorns, or the point of sharp-edged blades. The test described in this document is not considered suitable for testing materials made from chain mail and metal plates. The text of this document does not include provisions for the safeguard of the operator.

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 34-1, *Rubber, vulcanized or thermoplastic — Determination of tear strength — Part 1: Trouser, angle and crescent test pieces*

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48-4, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 4: Indentation hardness by durometer method (Shore hardness)*

ISO 2781, *Rubber, vulcanized or thermoplastic — Determination of density*

ISO 11610, *Protective clothing — Vocabulary*

ISO 23388:2018, *Protective gloves against mechanical risks*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11610 and the following apply.

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