International Standard

ISO 17491-4

Protective clothing — Test methods for clothing providing protection against chemicals —

Part 4: Determination of resistance to penetration by a spray of liquid (spray test)

Habillement de protection — Méthodes d'essai pour les vêtements fournissant une protection contre les produits chimiques —

Partie 4: Détermination de la résistance à la pénétration par pulvérisation de liquide (essai au brouillard)

Second edition
2024-05

Reference number
ISO 17491-4:2024(en)

© ISO 2024



COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Published in Switzerland

Contents

Page

Foreword ... **iv**
Introduction ... **vi**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Principle of test method ... **2**
5 Test liquid ... **2**
6 Apparatus and test subjects ... **2**
7 Preparation of the test subjects for the spray test ... **5**
8 Preparation of the spray application system ... **5**
8.1 Test liquid ... 5
8.2 Nozzle output ... 5
8.3 Distribution of the spray liquid and alignment of spray nozzles ... 6
9 Procedure ... **7**
9.1 Spray procedure ... 7
9.2 Procedure for penetration and stains ... 7
10 Test report ... **8**
Annex A (informative) **The non-absorbent fabric and absorbent overall** ... **9**
Annex B (informative) **Body measurements and selection sizing of the test garment** ... **10**
Annex C (normative) **Donning and doffing of test garment and marking of stain** ... **12**
Annex D (informative) **Interlaboratory study (ILS) observations for ISO 17491-4 Methods A and B** ... **14**
Bibliography ... **18**

© ISO 2024 – All rights reserved

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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*, 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 17491-4:2008), which has been technically revised. It also incorporates the Amendment ISO 17491-4:2008/Amd.1:2016.

The main changes are as follows:

— specifications for test liquid have been revised/added;

— Clause 6 has been revised to provide more specificity. Specification have been changed and/or revised for absorbent overall, calibrated stain, turntable, spray booth, spray boom, hydraulic nozzles in Clause 6 and other applicable clauses;

— details for the selection of the right overall size have been added in 6.10 as well as in Annex B;

— 8.3 has been revised and heading changed to “Distribution of the spray liquid and alignment of spray nozzles.”;

— figure and additional information have been added in 9.1 to provide more specificity;

— inclusion of Annex A on absorbent fabric for the detector suit and non-absorbent fabric for the calibration pattern;

— inclusion of Annex B on test subject size measurement and right overall size fitting;

— inclusion of Annex C on right donning and doffing, as well as stain area measurement;

— inclusion of Annex D with the ILT results.

A list of all parts in the ISO 17491 series can be found on the ISO website.

© ISO 2024 – All rights reserved

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.

© ISO 2024 – All rights reserved

Introduction

This document describes a test method for determining the spray penetration resistance of chemical protective clothing Type 4 (with spray-tight connections between different parts of the clothing and, if applicable, between the clothing and other items of personal protective equipment) and Type 6 (limited performance protective clothing).

Such clothing comprises one or more items covering the full surface of the body and is intended to be worn under conditions where there is a risk of exposure to a spray of a liquid chemical. Other requirements with regard to this type of clothing and its constituent materials can be found in the respective product standards[1].

Interlaboratory testing has shown that this test method is a repeatable pass/fail method.

A document on the selection, use and maintenance of chemical protective clothing is available[2].

© ISO 2024 – All rights reserved

Protective clothing — Test methods for clothing providing protection against chemicals —

Part 4: Determination of resistance to penetration by a spray of liquid (spray test)

CAUTION — Some of the procedures specified in this document involve the use of processes which could lead to hazardous situations and hence appropriate precautions should be taken.

1 Scope

This document specifies the test method for determining the resistance of chemical protective clothing to penetration by sprays of liquid chemicals at two different levels of intensity:

a) Method A: low-level spray test. This is applicable to clothing that covers the full body surface and is intended to be worn when there is a potential risk of exposure to small quantities of spray or accidental low-volume splashes of a liquid chemical.

b) Method B: high-level spray test. This is applicable to clothing with spray-tight connections between different parts of the clothing and, if applicable, between the clothing and other items of personal protective equipment, which covers the full body surface and which is intended to be worn when there is a risk of exposure to sprayed liquid chemical.

This document does not apply to chemical permeation resistance of the materials from which the chemical protective clothing is made.

2 Normative references

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 11610, *Protective clothing — Vocabulary*

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 terminology 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
absorbent overall
overall made from an absorbent material, worn under the test suit and intended for collecting liquid penetration during spray and jet testing of chemical protective clothing

© ISO 2024 – All rights reserved