AS/NZS ISO 6529:2006
ISO 6529:2001

AS/NZS ISO 6529:2006

Australian/New Zealand Standard™

Protective clothing—Protection against chemicals—Determination of resistance of protective clothing materials to permeation by liquids and gases

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-004, Occupational Protective Clothing. It was approved on behalf of the Council of Standards Australia on 3 February 2006 and on behalf of the Council of Standards New Zealand on 17 February 2006.
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The following are represented on Committee SF-004:

Apparel & Textile Federation of NZ
Association of Accredited Certification Bodies
Australasian Fire Authorities Council
Australian Business Limited
Australian Chamber of Commerce and Industry
Australian Indutry Group
AWTA Textile Testing
Certification Interests (Australia)
Council of Textile and Fashion Industries of Australia
Department of Consumer & Employment Protection, WorkSafe Division (WA)
Department of Defence (Australia)
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The Australasian Assembly of Volunteer Fire Brigades Associations
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We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

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Australian/New Zealand Standard™

Protective clothing—Protection against chemicals—Determination of resistance of protective clothing materials to permeation by liquids and gases

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-004, Occupational Protective Clothing to supersede, in part, AS 3765.1—1990, *Clothing for protection against hazardous chemicals,* Part 1: *Protection against general or specific chemicals* and AS/NZS 4503.1:1997, *Protective clothing—Protection against liquid chemicals,* Part 1: *Test method: Resistance of materials to permeation by liquids.* It is identical with and has been reproduced from ISO 6529:2001, *Protective clothing—Protection against chemicals—Determination of resistance of protective clothing materials to permeation by liquids and gases.*

The objective of this Standard is to describe a laboratory test method to determine the resistance of materials used in protective clothing to permeation by liquid or gaseous chemicals under the conditions of either continuous or intermittent contact. The objective of this revision is to adopt the current edition of ISO 6529.

As this Standard is reproduced from an ISO Standard, the following applies:

(a) Its number appears on the cover and title page while the ISO standard number appears only on the cover

(b) In the source text 'this International Standard' should read 'this Australian/New Zealand Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian/New Zealand Standard*	
ISO		AS	
139	Textiles—Standard atmospheres for conditioning and testing	2001 2001.1	Methods of test for textiles Part 1: Conditioning procedures
2286	Rubber-or plastic-coated fabrics—Determination of roll characteristics	4878	Methods of test for coated fabrics
2286-2	Part 2: Methods for determination of total mass per unit area, mass per unit area of coating and mass per unit area of substrate	4878.3	Method 3: Determination of total mass per unit area, mass per unit area of coating and mass per unit area of substrate
2286-3	Part 3: Method for determination of thickness	4878.4	Method 4: Determination of thickness
3801	Textiles—Woven fabrics—Determination of mass per unit length and mass per unit area	2001 2001.2.13	Methods of test for textiles Method 2.13: Physical tests—Determination of mass per unit area and mass per unit length of fabrics
5084	Textiles—Determination of thickness of textiles and textile products	2001.2.15	Method 2.15: Physical tests—Determination of thickness of textile fabrics

In the course of considering adoption of this Standard, Committee SF-004 agreed that the reader's attention should be drawn to the following points:

(i) The issues of estimating and recording uncertainty in measurement is not addressed in this Standard. Users are encouraged to refer to '*Guide to Expression of Uncertainty in Measurement*' issued by BIPM, IEC, IFCC, ISO, IUPAC, IUPAP and OIML.

(ii) Caution is urged as the differences between levels of performance are dependent on the precision of the measurement and may not accurately reflect conditions of end use.

The term ‘informative’ has been used in this Standard to define the application of the annex to which it applies. An ‘informative’ annex is only for information and guidance.

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INTRODUCTION

Workers involved in the production, use, transportation, and emergency response with liquid and gaseous chemicals can be exposed to numerous compounds capable of causing harm upon contact with the human body. The deleterious effects of these chemicals can range from acute trauma such as skin irritation and burn to chronic degenerative disease, such as cancer. Since engineering controls may not eliminate all possible exposures, attention is often placed on reducing the potential for direct skin contact through the use of protective clothing that resists permeation, penetration and degradation.

These test methods are normally used to evaluate the barrier effectiveness of materials used for protective clothing and specimens from finished items (see Note 1) of protective clothing against permeation of either liquid or gaseous chemicals. Options are provided for conducting this testing under both conditions of continuous or intermittent contact with the chemicals.

These test methods provide various options for reporting test results in terms of breakthrough time, permeation rate and cumulative permeation to allow a comparison of protective clothing material permeation resistance. These parameters are key measures of the effectiveness of a clothing material to act as a barrier to the test chemical. Such information is used in the comparison of clothing materials during the process of selecting clothing for protection from hazardous chemicals. Long breakthrough detection times and normalized breakthrough detection times as well as low permeation rates are characteristic of the best barriers.

Resistance to penetration by liquid chemicals should be determined by using ISO 6530 while resistance to penetration by liquid chemicals under pressure should be determined by using ISO 13994. These International Standards are listed in the Bibliography.

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced people for whose guidance it has been prepared and that appropriate precautions will be taken to avoid injury to health and contamination of the environment.

NOTE 1 Finished items of protective clothing include gloves, arm shields, aprons, suits, hoods, boots, etc. The phrase “specimens from finished items” encompasses seamed and other discontinuous regions as well as the usual continuous regions of protective clothing items.

NOTE 2 At present, no quantitative information exists about acceptable levels of dermal contact. Therefore, the data obtained using this test method cannot be used to infer safe exposure levels.

NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Protective clothing—Protection against chemicals—Determination of resistance of protective clothing materials to permeation by liquids and gases

1 Scope

This International Standard describes laboratory test methods that enable a determination of the resistance of materials used in protective clothing to permeation by liquid or gaseous chemicals under the conditions of either continuous or intermittent contact.

Method A (see 8.3) is applicable to the testing of liquid chemicals, either volatile or soluble in water, expected to be in continuous contact with the protective clothing material.

Method B (see 8.4) is applicable to the testing of gaseous chemicals expected to be in continuous contact with the protective clothing material.

Method C (see 8.5) is applicable to the testing of liquid chemicals, either volatile or soluble in water, expected to be in intermittent contact with the protective clothing material.

These test methods are only suitable for the testing of air-impermeable protective clothing materials. They assess the permeation resistance of the protective clothing material under laboratory conditions in terms of breakthrough time, permeation rate, and cumulative permeation. These test methods also enable observations to be made of the effects of the test liquid on the protective clothing material under test.

These test methods address only the performance of materials or certain material constructions (e.g. seams) used in protective clothing. These test methods do not address the design, overall construction and components, or interfaces of garments or other factors which may affect the overall protection offered by the protective clothing.

It is emphasized that these tests do not necessarily simulate conditions to which clothing materials are likely to be exposed in practice. The use of test data should therefore be restricted to broad comparative assessment of such material according to their permeation-resistance characteristics.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 139, *Textiles — Standard atmospheres for conditioning and testing*

ISO 2286-2, *Rubber- or plastics-coated fabrics — Determination of roll characteristics — Part 2: Methods for determination of total mass per unit area, mass per unit area of coating and mass per unit area of substrate*

ISO 2286-3, *Rubber- or plastics-coated fabrics — Determination of roll characteristics — Part 3: Method for determination of thickness*