Irish Standard
I.S. EN 16523-1:2015

Determination of material resistance to permeation by chemicals - Part 1: Permeation by liquid chemical under conditions of continuous contact

I.S. EN 16523-1:2015

Incorporating amendments/corrigenda/National Annexes issued since publication:

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This document is based on:	*Published:*
EN 16523-1:2015	2015-02-18

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2015-03-07	13.340.01
	NOTE: If blank see CEN/CENELEC cover page

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16523-1

February 2015

ICS 13.340.01

Supersedes EN 374-3:2003

English Version

Determination of material resistance to permeation by chemicals - Part 1: Permeation by liquid chemical under conditions of continuous contact

Détermination de la résistance des matériaux à la perméation par des produits chimiques - Partie 1 : Perméation par un produit chimique liquide dans des conditions de contact continu

Bestimmung des Widerstands von Materialien gegen die Permeation von Chemikalien - Teil 1: Permeation durch eine flüssige Chemikalie unter Dauerkontakt

This European Standard was approved by CEN on 5 December 2014.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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Contents

Page

Foreword

This document (EN 16523-1:2015) has been prepared by Technical Committee CEN/TC 162 “Protective clothing including hand and arm protection and lifejackets”, the secretariat of which 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of an identical text or by endorsement, at the latest by August 2015 and conflicting national standards shall be withdrawn at the latest by August 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 374-3:2003.

In comparison with EN 374-3:2003, the entire document has been revised.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

EN 16523, *Determination of material resistance to permeation by chemicals*, is composed with the following parts:

— *Part 1: Permeation by liquid chemical under conditions of continuous contact* [the present document];

— *Part 2: Permeation by gaseous chemical under conditions of continuous contact*.

NOTE CEN/TC 162 WG 13 has foreseen to work on other test methods in the future that will spread in several standard parts:

— *Permeation by solid chemical under conditions of continuous contact;*

— *Permeation by chemical under conditions of intermittent contact;*

— *Permeation by chemical of seams, joins, assemblages and closers;*

— *Permeation by chemical in a form of droplets;*

— *Guide on testing and interpretation.*

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Users involved in the production, use, transportation, and emergency response with liquid chemicals can be exposed to numerous compounds capable of causing harm upon contact with the human body. The harmful 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 personal protective equipment (PPE) that resists permeation, penetration and degradation.

The test method described in this part of EN 16523 is intended to be used to evaluate the barrier effectiveness of materials used for protective clothing, gloves and footwear materials against permeation by liquid chemicals.

This method does not assess the chemical degradation or penetration of the material. Resistance to penetration by liquid chemicals can be determined by using for example ISO 6530 [10] while resistance to penetration by liquid chemicals under pressure can be determined by using for example ISO 13994 [11]. Resistance to chemical degradation can be determined by EN 374-4 [2] for gloves and EN 13832-1:2006, 4.2 [3] for footwear.

This method provides tests results in terms of breakthrough time. This parameter is a key measure of the effectiveness of a material to act as a barrier to the challenge chemical. Such information is used in the comparison of the performances of PPE materials during the process of selecting PPE for protection from hazardous chemicals. Long breakthrough times are characteristic of high permeation resistance. Breakthrough time does not provide a correlation between protection and the toxicity of the chemicals tested, only cumulative permeation can provide this information.

It has been assumed in the drafting of this part of EN 16523 that the execution of its provisions will be entrusted to appropriately qualified and experienced people with a sound understanding of analytical chemistry. Appropriate precautions should be taken when carrying out this type of testing in order to avoid injury to health and contamination of the environment.

A future part of EN 16523 will explain the use of the series of standards EN 16523.

1 Scope

This European Standard specifies a test method for the determination of the resistance of protective clothing, gloves and footwear materials to permeation by potential hazardous liquid chemicals under the condition of continuous contact.

This test method is applicable to the assessment of protection against liquid chemicals that can be collected only by liquid or gaseous collecting media.

This test method is not adapted for the assessment of chemical mixtures, except for aqueous solutions.

This standard is used with the specifications given in the products standards (for example EN 374-1 for gloves) where the following information is defined:

— any pre-conditioning;

— precise sampling (place, size, number);

— associated levels of performance.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 374-1, *Protective gloves against chemicals and micro-organisms - Part 1: Terminology and performance requirements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
analytical technique
method of identifying and quantifying the amount of permeated chemical in the collection medium

Note 1 to entry: Such methods are often specific to individual chemical and collection-medium combinations.

EXAMPLE Applicable analytical techniques can include ultraviolet (UV) or infrared (IR) spectrophotometry, mass spectrometry, pH measurement, ion chromatography, conductimetry, colourimetry, atmospheric analytical detector tubes and radionuclide tagging/detection counting. Although liquid and/or gas chromatography are separation techniques rather than detection methods they can be used in conjunction with suitable detectors to quantify the amount of permeated chemical in the collection medium (see Annex C).

3.2
liquid challenge chemical
liquid chemical that is used to challenge the protective clothing, gloves and footwear material specimen

3.3
collecting medium
liquid or gas on the inner “clean” side of the test sample in which any permeated chemical is collected

3.4
response time
time between the actual arrival of the challenge chemical on the collecting side of the specimen and the time when the analytical instrumentation responds to it