SLOVENSKI STANDARD
SIST EN 16523-2:2015

01-junij-2015

Ugotavljanje odpornosti materiala proti pronicanju kemikalij - 2. del: Pronicanje plinastih kemikalij pri pogojih neprestanega stika

Determination of material resistance to permeation by chemicals - Part 2: Permeation by gaseous chemical under conditions of continuous contact

Bestimmung des Widerstands von Schutzmaterial gegen Permeation mit Chemikalien - Teil 2: Permeation von gasförmigen Chemikalien bei kontinuierlichem Kontakt

Détermination de la résistance des matériaux à la perméation par des produits chimiques - Partie 2: Perméation par un produit chimique gazeux dans des conditions de contact continu

Ta slovenski standard je istoveten z: **EN 16523-2:2015**

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English Version

Determination of material resistance to permeation by chemicals - Part 2: Permeation by gaseous chemical under conditions of continuous contact

Détermination de la résistance des matériaux à la perméation par des produits chimiques - Partie 2: Perméation par un produit chimique gazeux dans des conditions de contact continu

Bestimmung des Widerstands von Materialien gegen die Permeation von Chemikalien - Teil 2: Permeation durch eine gasförmige Chemikalie unter Dauerkontakt

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Foreword

This document (EN 16523-2:2015) 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of an identical text or by endorsement, at the latest by August 2015 and conflicting national standards shall be withdrawn at the latest by August 2015.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 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 of the following parts:

— *Part 1: Permeation by liquid chemical under conditions of continuous contact*;

— *Part 2: Permeation by gaseous chemical under conditions of continuous contact* [the present document].

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

This European Standard is used in conjunction with EN 16523-1. A future part of EN 16523 will explain the use of the series of standards EN 16523.

This standard includes only the specific aspects linked with the testing with gaseous challenge chemicals.

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 potentially hazardous gaseous chemicals under the condition of continuous contact.

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

This test method is not adapted for the assessment of gaseous chemical mixtures.

This test method describes the modifications to EN 16523-1 necessary to test against gaseous chemicals that can be collected by liquid or gaseous collecting media.

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 16523-1:2015, *Determination of material resistance to permeation by chemicals — Part 1: Permeation by liquid chemical under conditions of continuous contact*

3 Terms and definitions

For the purposes of this document, the terms and definitions in EN 16523-1:2015 together with the following apply.

3.1
gaseous challenge chemical
chemical that is gaseous at the test conditions (atmospheric pressure and 23 °C) and that is used to challenge the PPE (protective clothing, gloves and footwear) material specimen

Note 1 to entry: Annex A lists the most common gaseous challenge chemicals. Other gases may be tested.

Note 2 to entry: The gas may be either pure or diluted in air or in nitrogen.

4 Test principle

The resistance of a PPE (protective clothing, gloves and footwear) material to permeation by a gaseous chemical is determined by measuring the normalized breakthrough time (NBT).

In the permeation test apparatus, the PPE (protective clothing, gloves and footwear) material separates the challenge chemical from the collecting medium. The collecting medium, which can be a gas or, a liquid, is analysed quantitatively for its concentration of the chemical and thereby the amount of that chemical that has permeated the barrier as a function of time after its initial contact with the PPE (protective clothing, gloves and footwear) material.

5 Collecting media

See EN 16523-1:2015, Clause 5.

When selecting the collecting media, the following points should be taken in consideration:

a) oxidation;

b) solubility;

c) hydrolysis;

d) other items as appropriate.

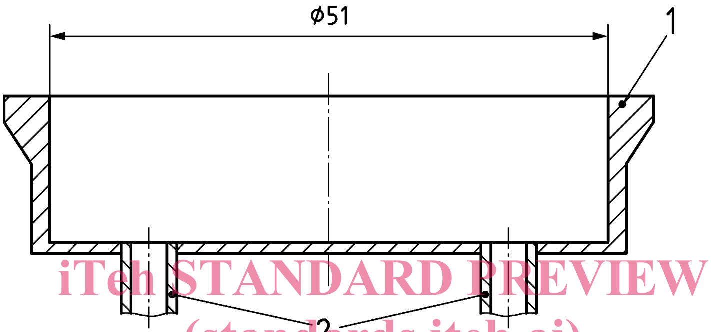
6 Apparatus

6.1 General

See EN 16523-1:2015, Clause 6, except for the sampling compartment of the challenge chemical.

6.2 Sampling compartment of the challenge chemical

The sampling compartment for the challenge chemical is described in Figure 1.



Key

1 sampling compartment for challenge chemical

2 pipe (in and out) for the gas setting, whose diameter shall be sufficiently large to avoid any deformation of the sample by the pressure of the incoming gas

Figure 1 — Important dimensions for the sampling compartment for challenge chemical

6.3 Challenge gas introduction system

The challenge gas shall be regulated to a pressure just above ambient. This pressure shall be sufficient to allow a flow of (5 ± 0,5) volumes of cell per minute without any significant deformation of the test piece.

7 Test specimens

See EN 16523-1:2015, Clause 7.

8 Procedure

8.1 Calibration

See EN 16523-1:2015, 8.1.

8.2 Preparation of test specimens and apparatus

See EN 16523-1:2015, 8.2.

8.3 Test procedure

The test temperature shall be (23 ± 1) °C. The challenge gaseous chemical entering in the permeation cell and the collecting medium shall be at (23 ± 1) °C.

Permeation is affected by temperature and so additional tests may be run at other temperatures if they are relevant to the use of the PPE (protective clothing, gloves and footwear).

The collecting medium is connected to the cell and the flow adjusted to the required rate (see EN 16523-1:2015, 6.3). Then the detection equipment (see EN 16523-1:2015, 6.5) is connected. The signal of the detector is observed to verify the blank steady-state. After a few minutes (between 1 min and 5 min) of blank steady-state, the following procedure shall be followed.

a) The flow of the test gas into the challenge chamber of the permeation test cell (the chamber to which the normal outside surface of the material specimen is facing) shall be commenced. Timing of the test begin once the equivalent of 5 chamber volumes of gas have passed through the chamber as determined by the mean of a rotameter or other monitoring device placed in the inlet stream of the chamber. The volumes of gas shall be passed through the chamber within approximately 1 min. Following this initial period, the gas flow may be reduced to a minimal level sufficient to ensure that the sample is always in contact with the test gas and that no air can leak-back into the challenge chamber.

   If the test is to be carried out at a non-ambient temperature, the challenge gas should be brought to the non-ambient temperature before it enters the test cell.

b) Care shall be taken so as not to pressurize the challenge or collection chamber. Overly high pressures may develop at high gas flow or as a result of attachments that restrict the flow of gas from the chamber. Tightly-packed activated carbon beds or highly restrictive sparger tubes are examples of such attachments.

The concentration of the chemical test in the collecting medium shall be measured periodically or continuously.

For periodical measurement, the number of measurement shall be sufficient to define the breakthrough time. The frequency of analysis of the collecting medium immediately before the time at which the NPR is measured shall be as listed in Table 1.

Table 1 — Minimum sampling rates for collection medium

Final result	Minimum rate of sampling
≤ 10 min	Every 75 s
> 10 min but ≤ 30 min	Every 150 s
> 30 min but ≤ 60 min	Every 150 s
> 60 min but ≤ 120 min	Every 6 min
> 120 min but ≤ 240 min	Every 6 min
> 240 min but ≤ 480 min	Every 11 min
> 480 min	At least one measurement after 8 h

In cases where the result cannot reliably be estimated more frequent analysis may be prudent.

NOTE 1 The values of 75 s, 150 s, 6 min and 11 min are intended as maximum permissible values of nominal 60 s, 120 s, 5 min and 10 min sampling frequencies.