
**Protective gloves against dangerous
chemicals and micro-organisms —**

**Part 1:
Terminology and performance
requirements for chemical risks**

*Gants de protection contre les produits chimiques dangereux et les
micro-organismes*

*Partie 1: Terminologie et exigences de performance pour les risques
chimiques*



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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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.

ISO 374-1 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 13 *Protective clothing* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 374 consists of the following parts, under the general title *Protective gloves against dangerous chemicals and micro-organisms*:

- *Part 1: Terminology and performance requirements for chemical risks*
- *Part 5: Terminology and performance requirements for micro-organism risks*

Protective gloves against dangerous chemicals and micro-organisms —

Part 1: Terminology and performance requirements for chemical risks

1 Scope

This part of ISO 374 specifies the requirements for protective gloves intended to protect the user against dangerous chemicals and defines terms to be used.

NOTE If other protection features have to be covered, e.g. mechanical risks, thermal risks, electrostatic dissipation etc., the appropriate specific performance standard is to be used in addition. Further information on protective gloves standards can be found in the EN 420.

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 374-2:2014, *Protective gloves against dangerous chemicals and micro-organisms — Part 2: Determination of resistance to penetration*

EN 374-4:2013, *Protective gloves against chemicals and micro-organisms — Part 4: Determination of resistance to degradation by chemicals*

EN 420:2009, *Protective gloves — General requirements and test methods*

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 and the following apply.

3.1

dangerous chemicals

chemical substance potentially hazardous for the health (carcinogenic, mutagenic, reprotoxic, toxic, harmful, corrosive, irritant, sensitizing), as defined in any national regulation

Note 1 to entry: The former European Directives 1999/45/EC and 67/548/EEC have been repealed by regulation 1272/2008 on classification, labeling and packaging of substances and mixtures.

3.2

protective glove material

any material or combination of materials used in a protective glove for the purpose of isolating the hands or hands and arms from direct contact with a dangerous chemical

3.3

protective gloves against dangerous chemical risks

protective gloves which form a protective barrier to *dangerous chemicals* (3.1)

**3.4
degradation**

deleterious change in one or more properties of a *protective glove material* (3.2) due to contact with a chemical

Note 1 to entry: Indications of degradation may include flaking, swelling, disintegration, embrittlement, colour change, dimensional change, appearance, hardening, softening, etc.

**3.5
penetration**

movement of a chemical through materials, seams, pinholes, or other imperfections in a *protective glove material* (3.2) on a non-molecular level

**3.6
permeation**

process by which a chemical moves through a *protective glove material* (3.2) on a molecular level

Note 1 to entry: Permeation involves the following:

- absorption of molecules of the chemical into the contacted (outside) surface of a material;
- diffusion of the absorbed molecules in the material;
- desorption of the molecules from the opposite (inside) surface of the material.

**3.7
test chemical**

chemical substance, or mixture of chemical substances, potentially hazardous to the health that is used under laboratory test conditions to determine the breakthrough time

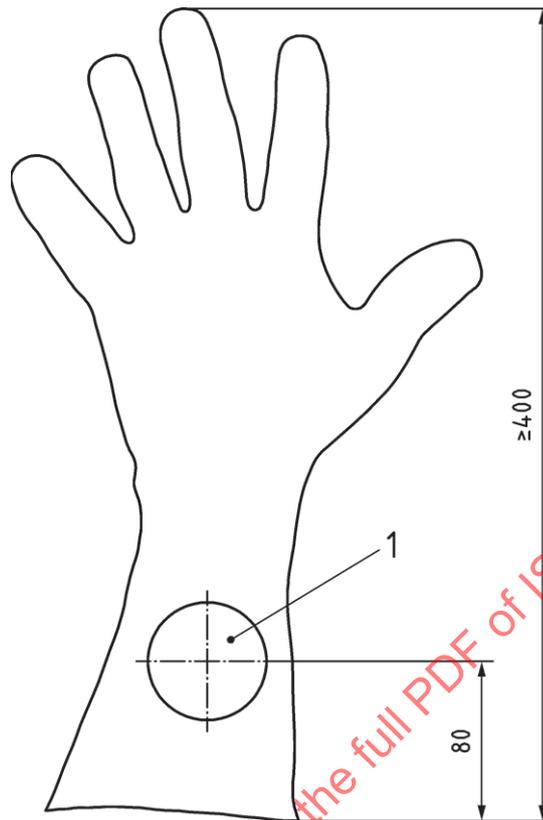
4 Sampling

4.1 Sampling for permeation

Each material specimen to be tested shall conform to the requirement in EN 16523-1:2015, Clause 7, so that the material can be sealed inside the test cell.

Three test specimens shall be taken from the palm area. If the glove is longer than or equal to 400 mm and if the cuff is claimed to protect against chemical risks, three additional test specimens shall be taken where the center is 80 mm from the end of the cuff (see [Figure 1](#)).

Dimensions in millimetres

**Key**

1 sample

Figure 1 — Additional sample location for gloves longer than 400 mm

Other parts of the glove can be tested on request. In the case of seams in the hand area, this area shall be tested. For multilayer chemical protective gloves, in the case of layers not bonded to the chemical protective layer, the layers not claiming any effect on the chemical protection can be removed, i.e. thermal insulation layer.

4.2 Sampling for penetration testing

The sampling for penetrations shall be done according to EN 374-2:2014, Clause 5.

4.3 Sampling for degradation testing

The sampling for degradation shall be done according to [4.1](#) and EN 374-4:2013, 5.1.

5 Performance requirement

SAFETY PRECAUTION — Persons using this part of ISO 374 shall be familiar with normal laboratory practice. This part of ISO 374 does not purport to address all the safety problems, if any, associated with its use. It is the responsibility of the user to apply established Health and Safety practices and to ensure compliance with European or national regulatory conditions.

5.1 General requirements

Protective gloves against dangerous chemicals shall comply with the requirements given in EN 420:2009, Clause 4, Clause 5 and Clause 7.

5.2 Penetration

Protective gloves shall not leak when tested according to EN 374-2:2014, 7.2 and 7.3.

5.3 Degradation

The degradation (DR) shall be determined according to EN 374-4 for each chemical claimed in the marking and reported in the user instruction.

For the glove longer than 400 mm, the degradation corresponding to the lowest permeation results shall at least be reported.

5.4 Permeation

5.4.1 General

For the glove longer than 400 mm, where the palm and cuff achieve different performance levels, the lowest performance level shall be claimed in the marking for each chemical.

All the results should be reported in the user instruction.

Each combination of protective glove/test chemical shall be classified according to [Table 1](#), using the results as given in EN 16523-1:2015, 8.5.1.1 or 8.5.1.3 for the normalized breakthrough time.

Table 1 — Permeation performance levels

Measured breakthrough time min	Permeation performance level
>10	1
>30	2
>60	3
>120	4
>240	5
>480	6

The test chemical(s) shall be taken from the list of test chemicals in [Table 2](#). Other test chemicals could be used depending on the application of the gloves.

The situation described in EN 16523-1:2015, 8.5.1.4 is considered a fail due to non-homogeneity of the samples.

According to their permeation performance, chemical protective gloves are classified into three types: type A, type B or type C.

5.4.2 Type A

The permeation performance shall be at least level 2 against a minimum of six test chemicals listed in [Table 2](#).

5.4.3 Type B

The permeation performance shall be at least level 2 against minimum of three test chemicals listed in [Table 2](#).

5.4.4 Type C

The permeation performance shall be at least level 1 against minimum of one test chemical listed in [Table 2](#).

Table 2 — List of test chemicals

CODE LETTER	CHEMICAL	CAS NUMBER	CLASS
A	Methanol	67-56-1	Primary alcohol
B	Acetone	67-64-1	Ketone
C	Acetonitrile	75-05-8	Nitrile compound
D	Dichloromethane	75-09-2	Chlorinated hydrocarbon
E	Carbon disulphide	75-15-0	Sulphur containing organic compound
F	Toluene	108-88-3	Aromatic hydrocarbon
G	Diethylamine	109-89-7	Amine
H	Tetrahydrofuran	109-99-9	Heterocyclic and ether compound
I	Ethyl acetate	141-78-6	Ester
J	n-Heptane	142-82-5	Saturated hydrocarbon
K	Sodium hydroxide 40 %	1310-73-2	Inorganic base
L	Sulphuric acid 96 %	7664-93-9	Inorganic mineral acid, oxidizing
M	Nitric acid 65 %	7697-37-2	Inorganic mineral acid, oxidizing
N	Acetic acid 99 %	64-19-7	Organic acid
O	Ammonium hydroxide 25 %	1336-21-6	Organic base
P	Hydrogen peroxide 30 %	7722-84-1	Peroxide
S	Hydrofluoric acid 40 %	7664-39-3	Inorganic mineral acid
T	Formaldehyde 37 %	50-00-0	Aldehyde

5.5 Requirements for gloves types A, B and C

The requirements are mentioned in [Table 3](#).

Table 3 — Requirements for different protection types of gloves

	5.1	5.2	5.4.2	5.4.3	5.4.4
Type A	X	X	X		
Type B	X	X		X	
Type C	X	X			X

X = required.

6 Marking

Protective gloves against dangerous chemicals shall be marked in accordance with the requirements for protective gloves in EN 420 and with the following.

6.1 Marking of Type A gloves

For protective gloves complying with the type A requirements stated in [5.5](#), the pictograms in [Figure 2](#) shall be used with reference to this part of ISO 374.