Technical Guide

NEW Glove standards & requirements

A technical guide for Glove manufacturers on the current standards and the recent changes.

Published Standards

EN (ISO) 374 Protective gloves against dangerous chemicals and micro-organisms - consists of the following:

BS EN ISO 374-1:2016	Terminology and performance **requirements** for chemical risks.
BS EN 374-2:2014	Determination of resistance to **penetration.**
BS EN 374-4:2013	Determination of resistance to **degradation** by chemicals.
BS EN ISO 374-5:2016	Terminology and performance **requirements** for micro-organisms risks.
BS EN 16523-1:2015	Determination of material resistance to **permeation** by chemicals. Permeation by liquid chemical under conditions of continuous contact.

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Introduction

The current suite of PPE Glove standards under **EN ISO 374 Protective gloves against dangerous chemicals and micro-organisms** have changed.

In this technical guide you can find out what all the changes are and how to update your CE certification with BSI.

The new standards ISO 374-1, ISO 374-5 with requirements for chemical and micro-organisms risks have now been published and will be harmonised with the PPE Directive in due course.

As a manufacturer you will need to be aware of these changes, as they will affect your product performance characteristics, labelling and marking information.

- If your gloves claim chemical protection, you need to start assessing and reporting the Degradation Resistance, test method in EN 374-4:2013. Degradation is a new requirement under the BS EN ISO 374-1:2016 for all gloves that claim protection against any chemicals.
- If your gloves are used to protect individuals against biological hazards, you need to decide whether or not you are going to claim protection against viruses. If gloves provide protection against viruses, in addition to fungi and bacteria, further testing to **ISO 16604 Clothing for protection against contact with blood and body fluids** is required.

Support from BSI

Please contact us to start the process of re-certification to the newly published standards.

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BS EN ISO 374-1:2016

Terminology and performance requirements for chemical risks

- The ISO 374-1:2016 Standard has now been published; it specifies the requirements for protective gloves intended to protect the user against dangerous chemicals. The Standard stipulates the requirements for Permeation, Penetration and Degradation.

- According to the new standard, gloves are classed as: **Type A, Type B or Type C** depending on their performance level and number of chemicals they can protect against. The table below lists the performance level and number of chemicals required for each type:

Classification	Minimum Performance Level required	Minimum number of Chemicals from the 18 listed
Type A	2 (min 30 minutes breakthrough)	6
Type B	2 (min 30 minutes breakthrough)	3
Type C	1 (min 10 minutes breakthrough)	1

- The new standard lists 18 instead of 12 chemicals; the 6 additional chemicals are:

Code Letter	Chemical	CAS Number	Class
M	65% Nitric acid	7697-37-2	Inorganic mineral acid, oxidizing
N	99% Acetic acid	64-19-7	Organic acid
O	25% Ammonium hydroxide	1336-21-6	Organic base
P	30% Hydrogen peroxide	7722-84-1	Peroxide
S	40% Hydrofluoric acid	7664-39-3	Inorganic mineral acid, contact poison
T	37% Formaldehyde	50-00-0	Aldehyde

- The new standard requires chemical gloves to be tested for resistance to degradation. Testing shall be performed to EN 374-4:2013 for each chemical claimed in the marking.

- Degradation Resistance (DR) shall be reported in the User Instruction. The mean degradation percentage results (% of change in puncture test before and after chemical exposure) shall be reported.

- **EN 16523-1:2015 'Determination of material resistance to permeation by chemicals. Permeation by liquid chemical under conditions of continuous contact'** is the new test method standard, which replaces the withdrawn EN 374-3:2003.

- The test method for chemical permeation EN16523-1 is similar to the EN 374-3 method, so products already certified will not need to be re-tested.

BS EN ISO 374-1:2016

Terminology and performance requirements for chemical risks

- For gloves longer than 400 mm, and if the cuff is claimed to protect against chemical risks, three additional test specimens shall be taken from the cuff area and tested for permeation, see ISO 374-1 clause 4.1. In instances where the palm and cuff achieve different performance levels, the lowest performance level shall be claimed in the marking against each chemical.
- The requirement for EN 388 mechanical testing has been removed.
- There is a new marking requirement, see pictograms below:

ISO 374-1:2016/Type C

X- Low chemical

Marking of **Type C** gloves

ISO 374-1:2016/Type B

XYZ

Marking of **Type B** gloves

ISO 374-1:2016/Type A

UVWXYZ

Marking of **Type A** gloves

BS EN 374-2:2014

Protective gloves against dangerous chemicals and microorganisms. Determination of resistance to penetration.

This standard replaces EN 374-2:2003. There are no major or technical changes.

This standard specifies a test method for the penetration resistance of gloves that protect against dangerous chemicals and/or micro-organisms (water leak and air leak test).

The main changes in comparison to EN 374-2:2003 are:

- Reference to EN 374-3 has changed to EN 16523-1 – this is the new test method for chemical permeation.
- Clearer wording in test principles and test report.
- Informative Annex A (AQL) for the purpose of production control only, e.g. by the manufacturer or auditing organisation.

BS EN 374-4:2013

Protective gloves against chemicals and micro-organisms. Determination of resistance to degradation by chemicals.

- EN 374-4 was prepared by CEN/TC 162, published in 2013. The standard is already available.
- This standard has become a mandatory test for all gloves that offer chemical protection, as required by ISO 374-1:2016 clause 5.3.
- Degradation is the change in the physical characteristics of a glove caused by contact with a chemical. Degradation may appear as flaking, swelling, disintegration, embrittlement, colour change, dimensional change, appearance, hardening and/or softening. The principle of the test is that a change in the puncture resistance of the glove material is measured after continuous contact of its external surface with a challenge chemical.
- The EN 16523-1:2015 chemical permeation standard replaces the withdrawn EN 374-3:2003.
- The degradation resistance (DR) shall be determined according to EN 374-4 for each chemical claimed in the marking.
- DR shall be reported in the User Instruction. The mean degradation percentage results (% of change in puncture test before and after chemical exposure) shall be reported.
- For gloves longer than 400 mm, the degradation corresponding to the lowest permeation results shall be reported at the very least.

BS EN ISO 374-5:2016

Terminology and performance requirements for micro-organisms risks

- This standard specifies performance requirements for gloves that protect the end user against micro-organisms.
- Microbiological agents are: bacteria, virus or fungi.
- Penetration testing is required for all gloves claiming micro-organisms protection; the test method is described in EN 374-2:2014, air-leak and water-leak. The test method has not changed.
- Gloves offering protection against viruses shall additionally pass a penetration test according to **ISO 16604:2004 Determination of resistance of protective clothing materials to penetration by blood-borne pathogens.**
- For gloves longer than 400 mm, and if the cuff is claimed to protect against micro-organisms risks, additional test specimens shall be taken from the cuff area and tested to ISO 16604.
- Marking/Pictograms used for gloves protecting against bacteria and fungi:

ISO 374-5:2016

Marking of gloves protecting against, bacteria and fungi

- Marking/Pictograms used for gloves protecting against virus, bacteria and fungi:

ISO 374-5:2016

VIRUS

Marking of gloves protecting against virus, bacteria and fungi