

EN ISO 374

Summary of changes & FAQ's
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EN ISO 374



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EN ISO 374

Summary of changes & FAQ

Understanding the changes and frequently asked questions about the new EN ISO 374 standard

As a manufacturer of disposable gloves offering a level of chemical protection we have been preparing our product portfolio to comply with the new EN ISO 374 standard. As well as new glove tests and performance ratings, the updated standard requires manufacturers to report the degradation of gloves when used with chemicals, providing you with more detailed information to help you chose the correct glove for your requirements.

BioClean gloves remain the same quality and offer the same protection you can depend on.

In this document we've prepared a number of questions to help you understand the changes, new performance ratings, test methods and rating symbols.



Questions:

What parts will the new EN ISO 374:2016 - Protective gloves against dangerous chemicals and microorganisms consist of?

The new standard will consist of the following parts;

EN 374-1: 2016	Protective gloves against dangerous chemicals and micro-organisms — Part 1: Terminology and performance requirements for chemical risks
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EN 374-2: 2015	Protective gloves against dangerous chemicals and micro-organisms — Part 2: Determination of resistance to penetration
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EN 374-3: 2003	Protective gloves against chemicals and micro-organisms — Part 3: Determination of resistance to permeation by chemicals SUPERSEDED, WITHDRAWN
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EN 374-4: 2013	Protective gloves against chemicals and micro-organisms - Part 4: Determination of resistance to degradation by chemicals
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EN 374-5: 2016	Protective gloves against dangerous chemicals and micro-organisms — Part 5: Terminology and performance requirements for micro-organisms risks
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Questions:

Why has the standard changed and have new tests?

The standard has been updated to address the following needs;

- To ensure consistency between test results
- To better assist users in their glove choice by more accurately reflecting the chemicals being used throughout the industry
- The standard stipulates the requirements of manufacturers to test for Permeation, Penetration and Degradation



What is Penetration, Permeation and Degradation?

Penetration

Penetration is the movement of a chemical and/or micro-organism through pinholes or other imperfections in a protective glove material at a non-molecular level.

Permeation

The rubber and plastic films in gloves are the barriers to chemicals. It is therefore necessary to measure breakthrough times, or the time taken for the hazardous liquid to come in contact with the skin. Each chemical tested is classified in terms of breakthrough time performance level 0 to 6.

Degradation

Sometimes chemical protective gloves can act as sponges, soaking up the liquids and holding them against the skin. This degrades the glove. Degradation is the change in one or more physical characteristics of a glove caused by contact with a chemical. Indications of degradation are flaking, swelling, disintegration, embrittlement, colour change, dimensional change, appearance, hardening, softening, etc.



Below we outline details of the changes to each part of the standard;

Part 1 – EN374-1:2016 Terminology and performance requirements for chemical risks

- Permeation testing still requires three samples taken from the palm
- New requirement for gloves 400mm or longer - 3 ADDITIONAL samples must be taken from the cuff area and tested for permeation
- The new standard includes 6 additional chemicals (highlighted in blue in the table below);



	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	142-85-5	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	Hydrogen fluoride 40%	7664-39-3	Inorganic mineral acid, contact poison
T	Formaldehyde 37%	50-00-0	Aldehyde

- The permeation performance levels remain unchanged

Measured breakthrough time (mins)	
>10	Level 1
>30	Level 2
>60	Level 3
>120	Level 4
>240	Level 5
>480	Level 6



- Gloves are now separated into 3 types based on permeation performance - TYPE A, TYPE B or TYPE C.

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

- New pictogram to depict permeation performance, with Type above and letters underneath determining which chemicals the gloves have been tested against;

TYPE A

EN ISO 374-1/Type A

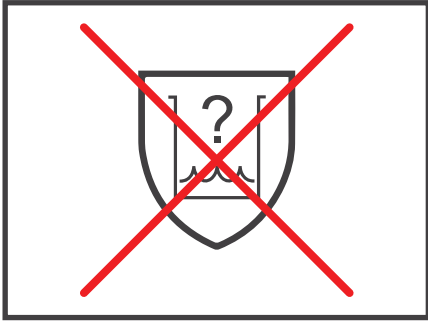
TYPE B

EN ISO 374-1/Type B

TYPE C

EN ISO 374-1/Type C

- The beaker icon indicating low level protection has been eliminated;



- New requirement that degradation resistance test carried out per EN 374 part 4. Test must be carried out for each test chemical claimed in the marking
- The requirement for EN 3888 mechanical testing has been removed
- The following warnings are required to be added to the packaging of gloves;

"The information does not reflect the actual duration of protection in the workplace and the differentiation between mixtures and pure chemicals."

"The chemical resistance has been assessed under laboratory conditions from samples taken from the palm only and relates only to the chemical tested. It can be different if it is used in a mixture."

"It is recommended to check that the gloves are suitable for the intended use because the conditions in the workplace may differ from the type test depending on temperature, abrasion and degradation."

"When used protective gloves may provide less resistance to the dangerous chemical due to changes in physical properties. Movements, snag, rubbing, degradation caused by the chemical contact etc. may reduce the actual use time significantly. For corrosive chemicals, degradation can be the most important factor to consider in selection of chemical resistant gloves."

"Before usage inspect the gloves for any defect or imperfection."

- Multiple use gloves must have instructions for decontamination
- If no decontamination instructions gloves are single use and must be labelled
"For single use only"

Questions:

Are the extra 6 chemicals included in the permeation test more aggressive than the existing 12?

- No, they were added because they are more representative of chemicals in the modern industrial environment

Are the Type A, Type B or Type C markings mandatory on the pictogram?

- Yes, the pictogram must have the marking Type A, Type B or Type C

Part 2 – EN 374-2:2014 Determination of resistance to penetration

- This part replaces EN 374-2:2003, which specified the test method used for the penetration resistance of gloves that protect against dangerous chemicals and/or micro-organisms (water leak and air leak test)
- Acknowledgement that air leak test is not appropriate for non-homogenous gloves
- Performance levels (AQL) for use in production control still given in Annex A;

Performance level	AQL	Inspection level
Level 3	<0.65	G1
Level 2	<1.5	G1
Level 1	<4.0	S4



Part 3 – EN 374-3:2003 Determination of resistance to permeation by chemicals

- Replaced by test method EN 16523-1:2015 'Determination of material resistance to permeation by chemicals. Part 1: Permeation by liquid chemical under conditions of continuous contact'.

Part 4 – EN 374-4:2013 Determination of resistance to degradation by chemicals

New standard and a mandatory test for all gloves that offer chemical protection. The puncture resistance of the glove material is measured after continuous contact of its external surface with a challenge chemical. The test is carried out using the following method;

- 6 specimens are cut from each of 3 gloves
- For each glove 3 specimens are exposed to test chemicals and 3 specimens are unexposed
- Exposure to chemical is for 60 mins
- Standardised puncture stylus used to measure peak force required to puncture the specimen
- Degradation is the average change in force required from unexposed to exposed as %
- No Pass/Fail

There is also a non-mandatory weight change test (Annex B) which consists of;

- Cut same finger off three gloves and weigh individually
- Immerse each finger in a beaker of test chemical and weigh down
- After 60 minutes reweigh the fingers
- Calculate the % change based on starting weight
- No Pass/Fail



Part 5 – EN 374-52016 Terminology and performance requirements for microorganisms risks

New part specifies performance requirements for gloves that protect the user against micro-organisms, it's been taken out of the old Part 2 and developed.

- Now two classifications
 - a. Protection against bacteria and fungi
 - b. Protection against viruses, bacteria and fungi
- A glove claiming protection from bacteria and fungi must carry the following pictogram and warnings;



"The penetration resistance has been assessed under laboratory conditions and relates only to the tested specimen".
"Not tested against viruses".

- All gloves claiming microorganism protection must have been penetration tested as outlined in Part 2 of the standard
- Gloves claiming protection from viruses require additional penetration testing according to ISO 16604:2004 Clothing for protection against contact with blood and body fluids — Determination of resistance of protective clothing materials to penetration by blood-borne pathogens — Test method using Phi-X174 bacteriophage;
 - a. Test uses a nutrient broth containing a virus is forced against the glove for specified time and pressure pattern
 - b. Glove is elastomeric – mesh inserted into test chamber to prevent ballooning
 - c. Visual detection of penetration plus assay procedure to detect the presence of virus
- The detection of any permeation constitutes a test failure
- A glove claiming protection from virus, bacteria and fungi must carry the following pictogram and warnings;



"The penetration resistance has been assessed under laboratory conditions and relates only to the tested specimen".

- For gloves longer than 400mm and if the cuff is claimed to protect against microorganisms , an additional test specimen shall be taken from the cuff area and tested to ISO 16604

If you have any further questions or would like to discuss your requirements and how the EN ISO 374 changes could affect you please **contact us**;

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