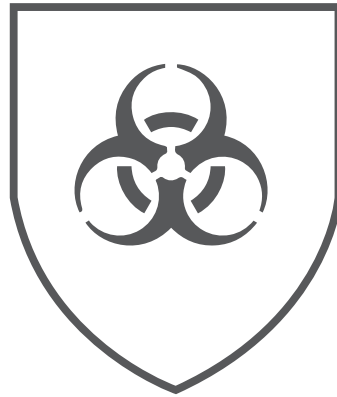
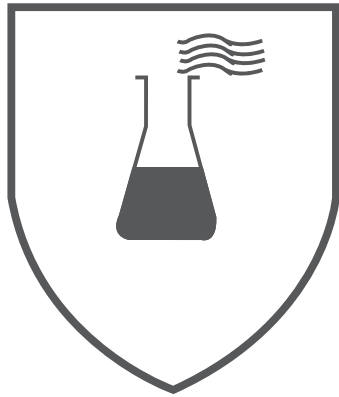


# WHAT IS EN 374:2016?





# WHAT IS EN 374:2016?

## Protection from chemicals and micro organisms

The EN 374:2016 Standard specifies the capability of gloves to protect the user against chemicals and/or micro-organisms.

The standard consists of 5 parts:

- EN ISO 374-1:2016 : Terminology and performance requirements for chemical risks
- EN 374-2: 2014: Determination of resistance to penetration
- EN 374-3: 2003: Substituted by EN 16523-1:2015 : Determination of material resistance to permeation by chemicals
- EN 374-4: 2013 : Determination of resistance to degradation by chemicals
- EN ISO 374-5: 2016: Terminology and performance requirements for micro-organisms risks (including viruses)

### penetration (*adj*) *pe-ne-tra-tion*

The movement of a chemical and or micro-organisms through porous materials, seams, pinholes or other imperfections in a protective glove material at a non-molecular level.

### permeation (*adj*) *per-me-a-tion*

The process by which a chemical moves through a protective glove material at a molecular level.

### degradation (*adj*) *de-gra-da-tion*

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.



## EN ISO 374-1:2016: Terminology and performance requirements for chemical risks

The new standard includes 6 additional chemicals (highlighted in **blue** in the table below) in addition to the 12 chemicals existing in the 2003 standard:

	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	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

Each chemical tested is classified in terms of breakthrough time. Breakthrough is deemed to have occurred when the flow rate of 1µg/cm<sup>2</sup>/min is reached.

Measured Breakthrough Time	Performance Level	Measured Breakthrough Time	Performance Level
> 10 minutes	Level 1	> 120 minutes	Level 4
> 30 minutes	Level 2	> 240 minutes	Level 5
> 60 minutes	Level 3	> 480 minutes	Level 6



Gloves are now separated into 3 classification 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 classification type:

Classification	Minimum Performance Level Required	Minimum Number of Chemicals from the 18 Listed
Type A	2 (min 30 minutes BTT)	6
Type B	2 (min 30 minutes BTT)	3
Type C	1 (min 10 minutes BTT)	1

BTT: Breakthrough time


The 'Iconal flasks' symbol depicts the permeation performances (minimum level 2 to permeation), with classification Type above and chemical letters underneath (Type A & B only) determining which chemicals the gloves have been tested against.

**Type A:**  
EN 374-1:2016/  
Type A




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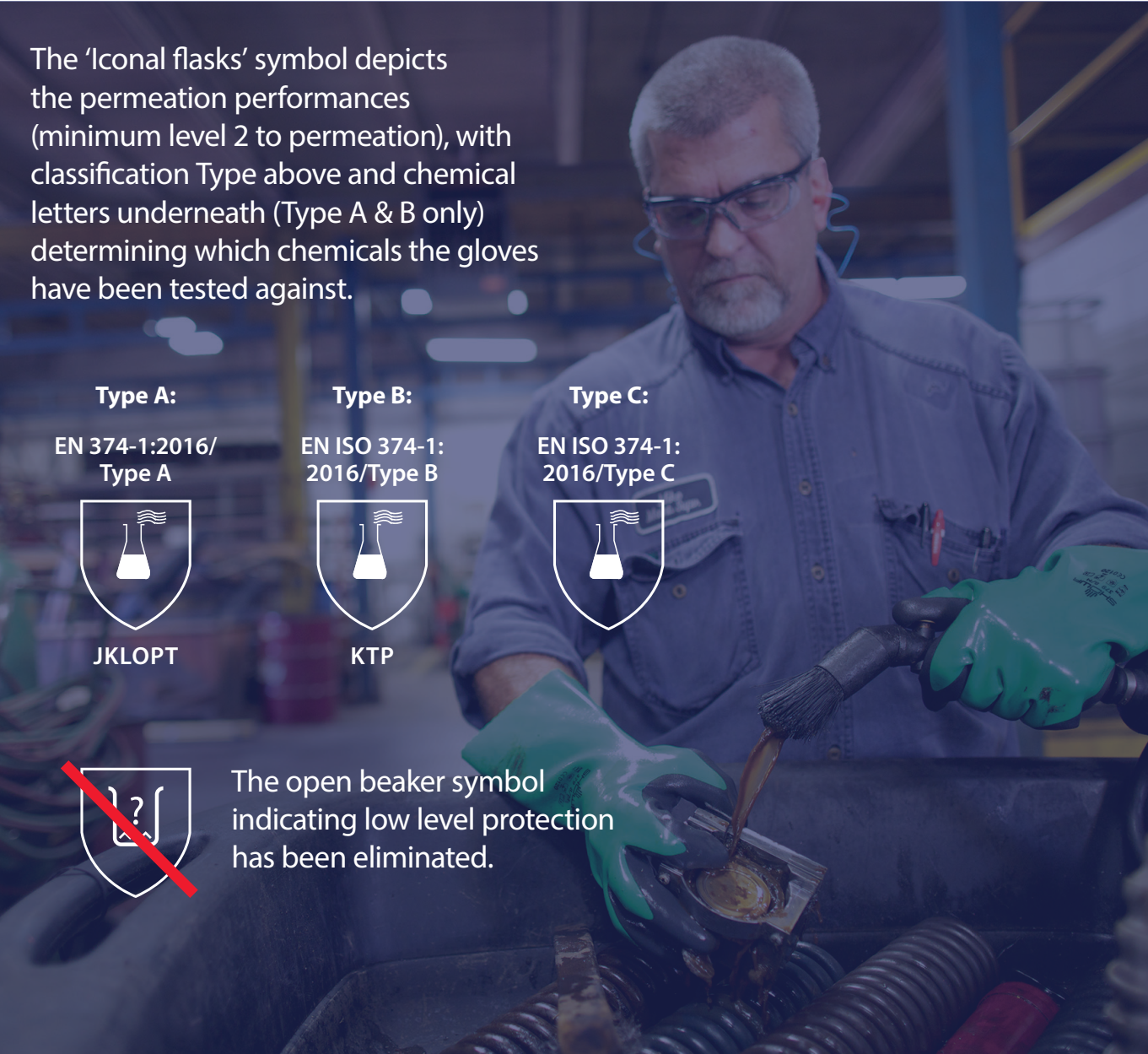
**Type B:**  
EN ISO 374-1:  
2016/Type B



KTP

**Type C:**  
EN ISO 374-1:  
2016/Type C





The open beaker symbol indicating low level protection has been eliminated.

## EN 374-2:2014: Determination of resistance to penetration

A glove is considered to be resistant to micro-organisms if it has successfully undergone the penetration test (air and/or water leak test) and if it meets at least level 2 of the penetration test set out in the AQL table below.

### Air Leak Test

1




Glove immersed in water

2



Glove interior pressurised with air


3



Leak detected by air bubbles from the glove


### Water Leak Test

1




Glove hung from a test frame

2



Glove filled with minimum of 1 litre of water


3



Leak detected by water droplets on outside of glove

Acceptable Quality Level (AQL) is assessed for the Penetration Tests

Performance Level	Acceptable Quality Level	ISO 2859 Inspection Level
Level 1	> 0.65	G1
Level 2	> 1.5	G1
Level 3	> 4.0	S4



Performance level 2

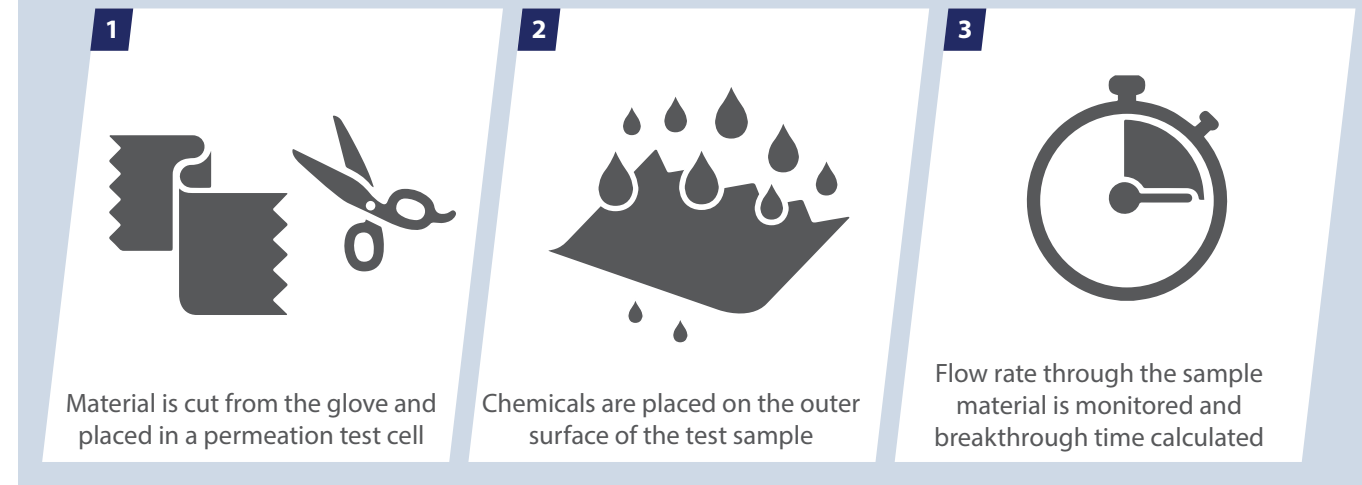
is deemed to be an effective barrier to microbiological hazards



## EN 16523-1:2015: Determination of material resistance to permeation by chemicals

Resistance to permeation is assessed by measuring the length of time it takes for a chemical to permeate the glove's material.

### Permeation Test



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

Part 4 is new and takes into account the effect of degradation (change of glove material) by the chemical. Degradation can cause brittleness, swelling shrinkage etc. of the polymer material. This is equivalent to a changing barrier function against the chemical.

This standard now creates a standardized measurement method for degradation.

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 %

## EN ISO 374-5:2016: Terminology and performance requirements for micro-organisms risks (including viruses)

Part 5 specifies performance requirements for gloves that protect the user against micro-organisms:

2 classifications now exists

- a. Protection against bacteria and fungi
- b. Protection against viruses, bacteria and fungi

A glove claiming protection from bacteria and fungi must be marked with the following pictogram and must have been tested according to EN 374-2:2014

EN ISO 374-5:  
2016



A glove claiming protection from bacteria and fungi must be marked with the following pictogram and must have been tested according to EN 374-2:2014

Gloves claiming protection from viruses require additional penetration testing according to ISO 16604:2004

EN ISO 374-5:  
2016



VIRUS

A glove claiming protection from virus, bacteria and fungi must be marked with the following pictogram



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