

# The novelties of the European Standard EN 374

Protective gloves against dangerous  
chemicals and micro-organisms



The various parts of the EN374 Standard have been largely amended in the last years. Let us explain the main changes, which are summarized below:

New version	Title	Main changes
<b>EN ISO 374-1 : 2016</b> replacing EN 374-1 : 2003	Terminology and <b>performance requirements</b> for chemical risks.	- Protection types and associated pictograms - Determination of the performance - List of test chemicals - Case of gloves with long cuff
<b>EN 374-2 : 2014</b> remplace EN374-2 : 2003	Determination of resistance to <b>penetration</b> .	- The AQL is removed (an AQL is the responsibility of the manufacturer and cannot be checked by a Notified Body)
<b>EN 16523-1 : 2015</b> remplace EN 374-3 : 2003	Determination of material resistance to <b>permeation</b> by chemicals -Part 1 : Permeation by liquid chemical under conditions of continuous contact.	- No major change of the permeation test method, which becomes the unique test method to determine resistance to permeation (by liquid chemicals under conditions of continuous contact) of the materials used in manufacturing protective garments, gloves and shoes.
<b>EN 374-4 : 2013</b>	Determination of resistance to <b>degradation</b> by chemicals.	- New standard - Compulsory test for all chemicals tested in permeation - No level of performance - The test result must be included in the information supplied with the gloves
<b>EN ISO 374-5 : 2016</b>	Terminology and <b>performance requirements for micro-organisms risks</b> .	- New standard - Specific test to claim protection against viruses

#### Latest developments :

- EN ISO 374-1 : 2016 : an amendment for editorial corrections has been published in July 2018;
- EN 374-2 et EN 374-4 : these standards will become EN ISO standards in 2020.

Hereafter are some essential details of these changes :

## EN ISO 374-1 : 2016

1. First change : Only one pictogram remains for a chemical protective glove, with three types defined according to the level of performance

Type	Exigence	Exemple de marquage
<b>Type A</b>	- Liquidproof (EN 374-2) - Breakthrough time $\geq$ 30 min – Level 2 (EN 16523-1) for at least 6 products in the list - Degradation test result (EN 374-4) provided with the information supplied with the gloves	<b>EN ISO 374-1/Type A</b>  AJKLPR
<b>Type B</b>	- Liquidproof (EN 374-2) - Breakthrough time $\geq$ 30 min – Level 2 (EN 16523-1) for at least 3 products in the list - Degradation test result (EN 374-4) provided with the information supplied with the gloves	<b>EN ISO 374-1/Type B</b>  JKL
<b>Type C</b>	- Liquidproof (EN 374-2) - Breakthrough time $\geq$ 10 min – Level 1 (EN 16523-1) for at least 1 product in the list - Degradation test result (EN 374-4) provided with the information supplied with the gloves	<b>EN ISO 374-1/Type C</b> 

Note 1 : Thus the following pictogram  disappears.

Note 2 : The degradation test result, as well as the breakthrough time of the permeation test may help the end-user in selecting and using the glove in a proper manner. Of course it is not directly giving a recommended usage time, the latter depends on the condition of use (continuous or repeated contacts or risk of splashes, temperatures, movements and stresses on the glove etc.). Nevertheless, some principles may be given :



- Ensure that the glove is not subjected to a contact of a duration longer than the breakthrough time
- When using water based chemicals that may strongly degrade the glove's material (e.g. 96% sulfuric acid, 65% nitric acid), the glove may be recommended to protect against accidental splashes only, even if the breakthrough time is measured high. In such case, the test shows a highly visible degradation of the glove (turning brownish, cracks, stiffening...), that can be detected by the end-user, and a low performance level.

2. Second change : new chemicals have been added to the initial table

List of test chemicals (Table 2 - EN ISO 374-1 :2016)			
Code	Chemical	CAS Number	Class
<b>A</b>	Methanol	67-56-1	Primary alcohol
<b>B</b>	Acetone	67-64-1	Ketone
<b>C</b>	Acetonitrile	75-05-8	Nitrile compound
<b>D</b>	Dichloromethane	75-09-2	Chlorinated hydrocarbon
<b>E</b>	Carbon disulphide	75-15-0	Sulphur containing organic compound
<b>F</b>	Toluene	108-88-3	Aromatic hydrocarbon
<b>G</b>	Diethylamine	109-89-7	Amine
<b>H</b>	Tetrahydrofuran	109-99-9	Heterocyclic and ether compound
<b>I</b>	Ethyl acetate	141-78-6	Ester
<b>J</b>	n-Heptane	142-82-5	Saturated hydrocarbon
<b>K</b>	Sodium hydroxide 40%	1310-73-2	Inorganic base
<b>L</b>	Sulphuric acid 96%	7664-93-9	Inorganic mineral acid, oxidizing
<b>M</b>	Nitric acid 65%	7697-37-2	Inorganic mineral acid, oxidizing
<b>N</b>	Acetic acid 99%	64-19-7	Organic acid
<b>O</b>	Ammonium hydroxide 25%	1336-21-6	Inorganic base
<b>P</b>	Hydrogen peroxide 30%	7722-84-1	Peroxide
<b>S</b>	Hydrofluoric acid 40%	7664-39-3	Inorganic mineral acid
<b>T</b>	Formaldehyde 37%	50-00-0	Aldehyde

3. Third change : For gloves designed with a long cuff, with a total length of 400mm or more, the tests must be performed on specimens taken out of the glove's palm area and at 80mm from the end of the cuff.

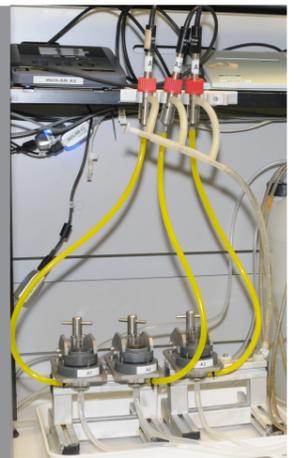
The permeation performance level is based on the lowest result between the palm and the cuff.

#### Quick reminder on the principles of chemical resistance :

**Resistance to penetration (liquidproofness) :**  
the glove shall not leak when subjected to the air and water leak tests.

**Resistance to permeation, breakthrough time :**  
measure of the time taken by a chemical in contact with the external surface of the glove to be detected inside the glove.

**Resistance to degradation :**  
measure of the change in puncture resistance according to EN 388, after a one hour contact of the external surface of the glove with the chemical. It is also possible to measure the weight change of the glove sample.



Changement : Un essai spécifique selon la méthode B de la norme ISO 16604 :2004 doit être pratiqué pour prétendre protéger contre les virus. Il existe en conséquence deux marquages possibles :

Protection	Requirement	Example of marking
<b>Against bacteria and fungi</b>	- Liquidproof (EN 374-2).	EN ISO 374-5 
<b>Against bacteria, fungi and virus</b>	- Liquidproof (EN 374-2) - No detection according to EN 16604 :2004 method B (bacteriophage Phi-X 174)	EN ISO 374-5  VIRU

## How to apply the revised EN374 standards ?

As soon as published on the OJEU (Official Journal of the European Union), the revised standards become the new reference document for any certification of a new product.

For existing products, it is not necessary to rush to have the certification revised. Nevertheless, it is reminded that the new PPE regulation requires a new certification, with the following considerations :

- PPE manufactured and placed on the European market before April 21, 2019 according to the Directive, may continue to be sold on the market after this date. Their CE certificate will remain valid until April 21, 2023, or until their CE certificate expires, if an expiry date is given on the CE certificate.

- PPE manufactured after April 21, 2019 shall comply with the Regulation. Compliance may be based on the CE certificate according to the Directive but it will need renewal, also as per the newest EN 374 standards, at the latest by April 21, 2023 if they do not have an expiry date, or otherwise at the latest once the former certificate has expired.

Moreover, it is recommended to update the certification if the CE-certificate is older than 5 years, in order to prevent difficulties with state organizations such as the customs services.

## For more information...

The different parts of the EN (ISO) 374 standard as well as the EN 16523-1 standard may be purchased on the site of your standard organization, such as (for France) : [www.boutique.afnor.org/](http://www.boutique.afnor.org/)



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