GLOVES

Introduction

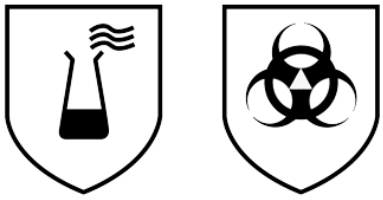
Workers must be trained and informed about the risks they may be exposed to during work and how to prevent them, including how to use Personal Protective Equipment (PPE), such as gloves, in the best possible way. Just like any other PPE, gloves should only be used when no technical prevention or collective protection measures are available to avoid or sufficiently reduce risks. Glove selection should therefore be covered by the risk assessment for the work to be carried out, which must demonstrate that the use of gloves is necessary as no other control methods are reasonably applicable.
This is because:

- While gloves protect you, they do not remove contaminants from your workplace;
- Certain types of gloves are uncomfortable and can hinder work;
- Wearing gloves affects grip;
- Good protection depends very much on how you wear your gloves and how careful you are when you use them;
- Improper use or poor maintenance may jeopardise protection.

Every glove must be manufactured in accordance with appropriate standards and be compatible with:

- The user
- The work to be done
- Any other PPE in use (e.g. aprons)

The general standard for protective gloves (EN 420) and the specific standards for protection against chemicals and micro-organisms (EN 374 /1, /2, /3) apply. Compliance with these standards must be indicated on the packaging, together with the following pictograms.



Chemical resistance of protective gloves

There is no single material or combination of materials capable of providing unlimited resistance to any individual or combination of chemical agents. This means that you will probably need to choose from several types of gloves to ensure appropriate protection. In order to select the right glove, it is crucial that you know what substances and concentrations a glove is tested for, which is why you must read the information mandatorily provided with all PPE.

There are three scenarios in which gloves may fail to protect the user:

- Permeation, i.e. the process by which a chemical agent migrates through the glove at a molecular level;
- Penetration, i.e. the flow of a chemical agent through punctures, pores or other imperfections in the material, or via cuffs;

- Degradation, i.e. a change in one or more physical properties of the material due to exposure to chemical agents.

Knowing the exact permeation rate allows establishing the actual risk of contact with a substance, so as to avoid choosing too high-rate gloves which may be much less comfortable.

The permeation rate may vary with every tested substance and is expressed by the following scale:

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

Another test that may be considered is a penetration test, which is carried out by looking for any air and, sometimes, water leakages. The positive or negative outcome of this test translates into Acceptable Quality Levels (AQLs) that define three performance scores, where 1 is the best performance.

Selecting gloves

Upon selecting your gloves, it is recommended that you seek expert advice from someone who is familiar with the work to be carried out and the characteristics of the gloves themselves. The choice is not easy, as gloves must:

- Suit the risks and conditions where they are used;
- Consider the ergonomic requirements and health of the user;
- Fit the user correctly;
- Consider the environmental workplace conditions;
- Prevent and control the risk involved without introducing new risk sources.

Two key factors are the dexterity required for a certain task and the length of the glove above the wrist. Always remember that workers tend not to use gloves if they think that they are too thick or not enough flexible. Training on the proper use of gloves must cover topics such as how and when to wear and remove them while ensuring maximum protection. Instructions must also be provided as to how dispose of them, and suitable waste containers must be made available.

Choosing the wrong type of gloves or failing to use them properly may increase risks, as:

- The contaminant may get inside the glove and remain in contact with the skin for a long time. In that case, exposure would be increased compared to not wearing gloves at all;
- Wearing gloves for long periods of time may lead to the build-up of moisture, which irritates the skin. When no lining is present, a fabric liner may be inserted inside the glove to avoid direct skin contact;
- Natural latex gloves may cause an allergic reaction in sensitive workers, who may therefore develop contact dermatitis. In this case, get in touch with the Occupational Health Physician.

The following table shows an indicative list of the compatibilities between materials and the main chemical product groups.
However, reference should be made to the safety data sheets mandatorily attached to all chemical products, which describe the required PPE.

Laboratory gloves and common chemical recommendations (12)

Compound	Latex	Neoprene	Butyl	PVC	Nitrile
Hydrochloric acid, 37%					
Ammonium hydroxide, 70%					
Sodium chloride, 70%					
Aromatic hydrocarbons					varies
Methylene chloride					
Acetone					
Methanol					
Ethanol					
Isopropanol					

Not recommended Fair Good Excellent

Under certain circumstances, several materials may be suitable for a certain contaminant. In that case, the extent and duration of exposure play a key role in opting for a glove that is more or less bulky or expensive. Please remember that, if the surface of your glove becomes contaminated, exposure will occur, regardless of how carefully it was selected and worn. For example, temporarily removing contaminated gloves can result in hand contamination, and putting them back on can transfer the contamination inside the glove. To prevent this, it is recommended that you wash your gloves before taking them off.

Here are some rules:

- Never reuse disposable gloves.
- Gloves are effective only in the short term. Over time, all gloves allow for most organic compounds to seep through, to a different extent that is proportional to their thickness.
- Gloves must be worn at all times when there is a risk of potential skin contact.
- Refer to the tables for choosing the material. If the risk is unknown, at least nitrile rubber gloves are recommended. The glove type to be used should in any case be specified in the standard operating procedure.
- Gloves must be removed before touching any surface that must not be contaminated (handles, telephone, etc.).
- Special gloves must be worn for handling hot or abrasive materials (e.g. broken glass) – these are not suitable for chemicals.
- Before using gloves, inspect them for damage or contamination (cuts, punctures, decolouration, etc.). Apply a barrier cream for additional protection.
- Remove gloves by turning them inside out before disposing of them among special waste.
- Non-disposable gloves must be periodically replaced depending on their resistance to substances and frequency of use. Chemical permeation may become a source of chronic

exposure. Washes and non-polar solvents remove plastic agents and rapidly deteriorate your gloves.

- Always wash your hands after removing gloves.
- In the event of a spill on your gloves, remove them and wash your hands immediately.
- Wear two pairs of gloves for handling carcinogens or antiblastic drugs.