



Bundesamt für
Verbraucherschutz und
Lebensmittelsicherheit

Technical information

Use of protective gloves in plant protection

Safety of protective gloves for activities involving the handling of plant protection products or contact with dried residues

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Safety of gloves for activities involving contact with plant protection products or dried residues

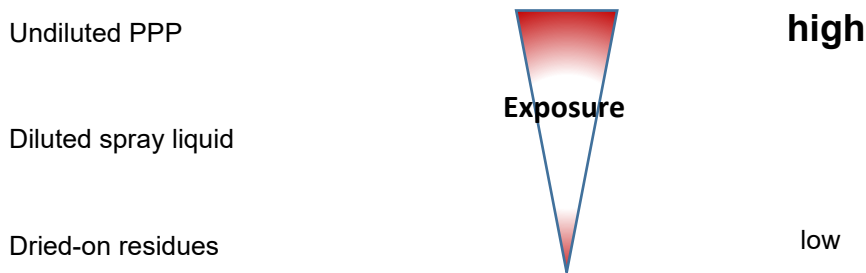
For the professional handling of a plant protection product (PPP), wearing protective gloves (plant protection) may be prescribed with the authorisation of the PPP. Protective gloves are available in various designs with different levels of protection against chemicals. Gloves for use in plant protection can be certified for different protection levels based on the ISO 18889 standard.

- G2: Protective gloves tested against mechanical risks having high permeation resistance to test chemicals for handling concentrated plant protection products,
- G1: Protective gloves not tested against mechanical risks having lower permeation resistance to test chemicals; NOT suitable for handling concentrated plant protection products,
- GR: Partially coated protective gloves for follow-up activities in treated crops having dried residues.

For PPP users and workers who have contact with treated crops, the possible intake of chemicals via the hands depends on the properties and aggregate state of the substances in addition to the activity performed:

- Handling concentrated liquids, for example with a high proportion of organic solvents, generally leads to higher penetration and thus exposure than handling dilute aqueous solutions.
- Liquids have a higher potential to penetrate glove materials than solids such as dried residues on leaf surfaces.

For the level of exposure for users and workers via the hands, due to the penetration of the glove material, the following ranking can be made:



Whenever possible and practicable, protective gloves of a higher or the highest protection level should be used according to the specifications in the [BVL Guideline for the Requirements for Personal Protective Equipment in Plant Protection](#).

Table 1 provides an allocation of suitable protective gloves of protection levels G2, G1 and GR to various activities in plant protection and monitoring activities.

Table 1: Use of appropriate protective gloves in crop protection

Operating conditions and activities	Protection level according to ISO 18889 or BVL PPE guideline		
	G2	G1	GR
Standard PSM application / spraying:	green = suitable, red = not suitable		
Handling concentrated PPPs			
Application of aqueous diluted PPPs			
Activities outside the driver's cab during application			
Cleaning of plant protection equipment			
Follow-up activities in treated crops			
Special cases:			
Handling ready-to-use PPPs			
Seed treatment / cleaning of the dressing plant			
Transfer / bagging of treated seed			
Control and inspection activities in plant protection:			
Contact with concentrated PPPs			
Contact with dried (on) residues on e.g. treated products such as seeds and harvested crops.			

Table 2 shows which protective gloves certified on the basis of the standards EN 374-1 ("Protective gloves against hazardous chemicals and microorganisms") and EN 388 ("Protective gloves against mechanical risks") are also suitable.

Table 2: Overview - Suitability of protective gloves (alternatives)

Protection level ISO 18889	Alternatives according to BVL Guideline / EN 374-1		
	Type A/B *)	Type B	Type C
G2	X	--	--
G1	X	X	--
GR	X	X	X

*) The requirements of the BVL PPE Guideline apply: 3 test chemicals (performance level 2 = measured permeation resistance time at least 30 min) and specifications for the mechanical protective effect according to EN 388. This usually includes certified reusable gloves EN 374-1, type A.

Handling concentrated plant protection products

Handling concentrates refers to activities where direct contact with the undiluted agent in any formulation is possible. This includes:

- Measuring and, if necessary, mixing plant protection products and filling spraying equipment for application,
- Cleaning of measuring equipment, rinsing devices on plant protection equipment and contaminated surfaces,
- Rinsing and disposal of empty plant protection product containers.

Due to the higher potential for penetration of the glove material when handling concentrated chemicals and handling technical equipment, mechanically stable gloves with high chemical protection of protection level G2 are provided for this purpose.

Application of PPPs

With the exception of the application of ready-to-use plant protection products such as granulates, baits or pheromone dispensers, the application of a plant protection product is usually carried out as a diluted spray liquid.

The application technique used is semi-mounted, trailed or self-propelled sprayers, as well as hand-held applications in the form of hose or backpack sprayers. Diluted solutions are also commonly used in pouring and dipping applications.

If the user is protected by a suitable driver's cabin ([see technical bulletin of 8 January 2020](#)), no protective gloves (plant protection) need to be worn during application inside the cabin.

In all other cases, such as application with vehicles without a suitable cabin and all hand-held applications, protective gloves must be worn if prescribed with the authorisation.

Due to the dilution effects and in activities without special mechanical stress during application, the exposure potential is lower than when handling undiluted agents. Protective gloves of protection level G1 are therefore appropriate (see Table 1).

Activities outside the driver's cabin when the application is interrupted

During the application of plant protection products with tractor-mounted or self-propelled plant protection equipment, it may be necessary for the operator to leave the cabin in order to fix the technical equipment or to carry out activities on the freshly treated plants or on plants that have been wetted by drift. This may result in temporary contact with diluted plant protection products.

Protection level G1 gloves are suitable for work outside the cabin. Appropriate disposable protective gloves should always be carried inside the driver's cabin for such cases.

Before re-entering the driver's cabin, the "used" protective gloves must be taken off. Disposable gloves offer a practical solution to avoid contamination. After use, they can be pulled "inside out" when put away and thus do not represent a further source of contamination until they are properly disposed of.

Cleaning of plant protection equipment

When cleaning equipment and tractors, the manufacturer's instructions must be observed. To protect the hands, the same level of protection is required as for the application of diluted sprays. Protective gloves corresponding to at least protection level G1 are therefore suitable.

Follow-up activities in treated crops and handling of treated seeds and harvests

Follow-up activities in treated cultures, and the handling of treated seeds and crops, are characterised by the fact that contact with (plant) surfaces with dried pesticide residues can occur. This includes all activities for which a treated area must be entered to carry out manual work in the crop, as well as when storing and moving crops and during sowing. Follow-up activities include, for example, crop maintenance and harvesting, but also inspections and work on irrigation systems.

If, as a result of the risk assessment, protective gloves are prescribed for the above-mentioned activities, protective gloves of all three categories of the BVL Guideline can be used, depending on the mechanical, ergonomic or tactile requirements. Partially coated protective gloves of protection level GR (ISO 18889) are designed and suitable precisely for use e.g. in follow-up activities.

Working with ready-to-use plant protection products

Ready-to-use plant protection products include, for example, granules for direct application, baits and pheromone dispensers. The activities include the direct application of the plant protection product by hand, but also the filling of equipment for application, e.g. granulate spreaders.

Usually, there are neither high mechanical risks nor a risk of coming into contact with concentrated liquids when handling such products. Protective gloves that correspond at least to protection level G1 are therefore suitable and sufficient.

Seed treatment and cleaning of the dressing plants

Seed treatments to protect against pests may, depending on the technical standard, involve the risk of contact with concentrated plant protection products in (viscous) liquid form. The same goes for cleaning the dressing plants after finishing the treatments. Only protective gloves of protection level G2 are to be used for this.

Handling freshly treated seeds

Handling freshly treated seed, e.g. when transferring it from one container to another or bagging of the seed, involves a risk of contact with residues of plant protection products. Protective gloves that correspond at least to protection level G1 are appropriate and sufficient.

Control activities of monitoring authorities

For the activities of the monitoring authorities, it is recommended to select appropriate protective gloves according to the risk description given above.

If contact with concentrated plant protection products is likely, protective gloves of protection level G2 should be chosen. For all other control activities, protective gloves that are at least protection level G1 are appropriate.

This compilation was coordinated with the authorities, institutions and industry representatives mentioned in the BVL Guideline for Requirements for Personal Protective Equipment in Plant Protection in 2020 in the course of updating the guideline. In this respect, it reflects the current state of knowledge. The BVL is very grateful for any information that helps to improve or expand this overview.

Please send your comments to: 232@bvl.bund.de