

Safe and Sustainable Use Initiative

The responsible use of crop protection products

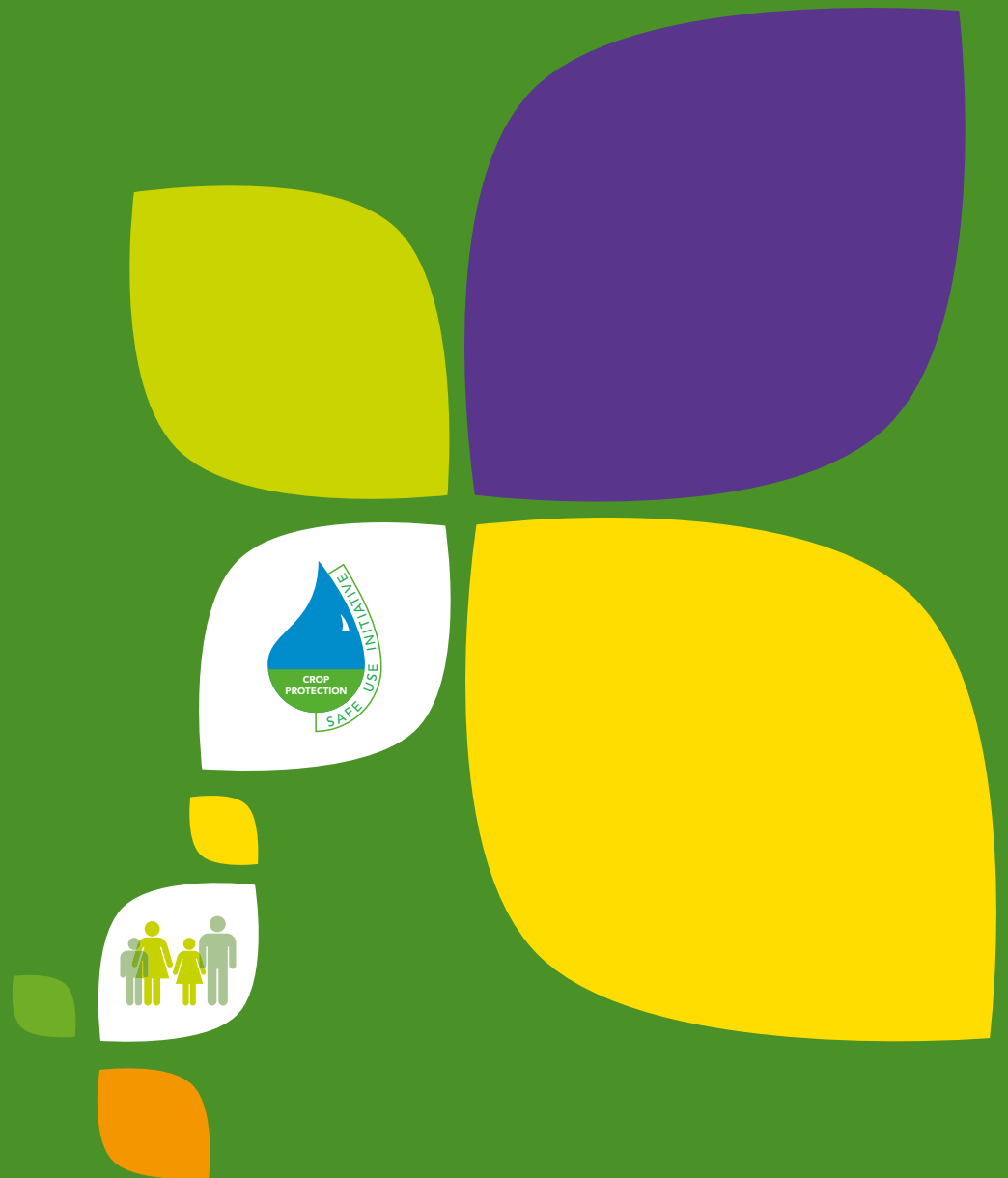


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Safe and Sustainable Use Initiative

The safe and sustainable use of crop protection products is improved with practical know-how and skills. As part of the crop protection industry's on-going commitment to safe and sustainable use, the industry provides training in the responsible use of crop protection products, with a focus on operator safety aspects. The training covers all aspects in the handling and use of crop protection products.

Often referred to as safe and sustainable use, the training is provided to a range of people depending on their need such as farmers and workers, advisors and trainers.

In order to increase impact and outreach, the training programmes are often undertaken in cooperation and partnership with other stakeholders and different formats are employed.

This document encapsulates the key recommendations forming part of the different industry training programmes on the responsible use and safety when handling and using crop protection products. It aims at capturing the main elements for all those involved or interested in training and continuous formation in the responsible use of crop protection products. This information is not replacing or subordinating any legal requirement which need to be obeyed in any event.

Specific training needs may vary depending on individuals, existing knowledge, local conditions and requirements, application equipment and techniques used, or cropping systems.

To accomplish this, the industry has developed numerous tailor-made training materials, manuals, videos, leaflets and information sheets. These training materials are also available to all interested parties and can be accessed via a new dedicated section on the ECPA website: www.ecpa.eu



1. Worker safety



A successful case of industry initiative for the protection of user and worker health

The crop protection industry provides solutions for use in agriculture, horticulture, forestry and gardening, delivering crop protection products such as herbicides, fungicides, insecticides and biopesticides. For these products to reach the market, they must first undergo a long research and development process. Hereafter, manufacturers must overcome an extremely rigorous and complex authorisation procedure that starts at European Union level and ends at Member State level. Both procedures are complicated and costly, and include a series of studies to ensure that the product is safe for the user, the consumer, flora and fauna, ground water and the environment in general.

An important part of these studies and requirements is related to the safety of the users (farmers and their workers) and the preventive measures users must adopt for the correct handling of the product.

The safety standards of manufacturers and their workers go beyond all the latest legal requirements and all products are labeled with the officially prescribed protection, hygiene and preventive measures.

Manufacturers and associations are committed to product stewardship, a part of which is dedicated to recommending the best safety measures during use.

Occasionally, and especially in hot and humid climate where personal protective equipment can be uncomfortable, operators applying crop protection products might not comply with label recommendations for use of protective clothing. In addition pests and diseases in such climate can be abundant with the consequence that many treatments with crop protection products (CPPs) might be required during the year.

The crop protection industry encourages occupational protection and proper label compliance when using crop protection products.

Scope and objectives

Safety measures are particularly challenging in the warm, dry and sometimes humid conditions of the Mediterranean countries; an area of Europe that produces much of the continent's food. Ten years ago these were the two decisive factors for the industry to launch the Safe Use Initiative, destined to improve the safety conditions of millions of farmers, initially in Portugal, Spain, France, Italy and Greece. Later, the SUI was rolled-out to other countries including Poland, Lithuania, Latvia, Romania, Slovakia, Bulgaria, Cyprus and Turkey, and more recently in Serbia and Croatia.

ECPA launched the initiative in the area of Almería, in South-eastern Spain, where the most intensive greenhouse conglomeration is; greenhouses offer the most challenging work conditions for the use of personal protective equipment.

Methodology

Conscious of the important local differences in terms of crops, culture as and national legislation, ECPA decided to deliver the initiative combining a pan-European perspective with strong local support.

The aim of the SUI is to promote the uptake of safety issues regarding label compliance.

Issues identified:

- Application techniques and equipment;
- Personal Protective Equipment (PPE);
- Hygiene;
- Waste disposal.

Objectives:

- To reduce potential user exposure through the improvement of application techniques;
- To reduce dermal and inhalation exposures through the use of appropriate PPE and proper PPE use;
- To reduce environmental impact with container rinsing, in addition to correct disposal, and avoidance of surpluses.

Measures to apply:

- Promotion of best handling techniques and encouragement of use and continued improvement through adaption of application equipment and techniques;
- Identifying, testing, validating (including acceptance by appropriate authorities) and making specific protective equipment available (clothing, gloves, boots, masks, face shields, goggles);
- Using, maintaining, storing and cleaning PPE correctly;
- Encouraging triple rinsing of containers, appropriate disposal of containers and waste, and waste avoidance through preparation of appropriate mixture volumes;
- Running 'train the trainers' schemes;
- Raising awareness through communication, information and media campaigns.

Control and measurement factors:

- Baseline survey to analyse and measure the national situation and confirm target areas for the initiative;
- Determination of key factors (indicators);
- Laboratory trials to scientifically validate section of suitable PPE;
- Field trials to test protective clothing penetration and comfort under practical conditions;
- Spray equipment trials to verify spray distribution and biological efficacy;
- Impact of training and awareness campaign;
- A progress survey for measuring initiative progress and guiding future roll-out.

Supervision and continuity:

- National Associations and industry will ensure the continuity of SUI efforts and continued improvement.



2. Transport



Transport of small quantities of crop protection products

The transport of crop protection products is governed by regulations on the transport of hazardous goods by road. Agricultural products should be transported by people who are experienced and/or licensed in transporting such products. Products should be transported in vehicles designed for this purpose.

In transporting small quantities of products the following aspects should be considered.

Transport vehicle

It is essential to undertake a general check of the condition of the vehicle to ensure that the products are transported safely. The compartment in which the products are transported should be clean, dry and without any projecting screws, nails or other objects that may pierce the containers.

Storage of products

Crop protection products should be transported in separate compartments from passengers, wherever possible on the outside of the vehicle and well away from foodstuffs and other goods. The products should be secured so as to prevent them from shifting during transport, using for example sealed boxes or containers. Heavy packages should not be stacked on top of lighter ones. Check that packages are in good condition and properly sealed.

When the crops that require treatment are spread across different parcels of land, some distance from the pesticide store,

it is recommended that the spray mixture is prepared at the field side so as to avoid transporting it on public roads.

When it is necessary to travel on public roads with the sprayer tank full of spray mixture, check that the cap of the sprayer is securely closed, that there are no leaking tubes and that the level of the mixture will not cause it to slop over.

In the event of an accident, take precautions to ensure that there is no spillage of products, and if there is, control any effects by containing it.

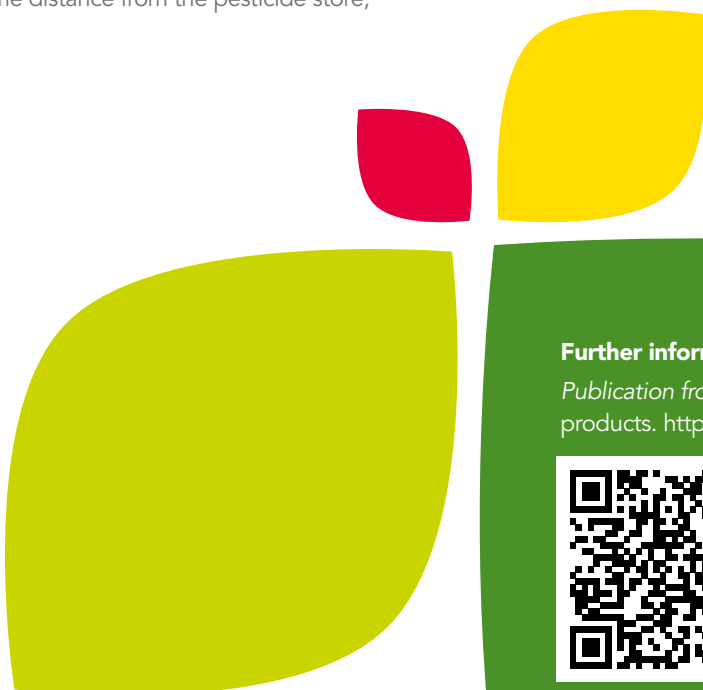
If circumstances justify, do not hesitate to seek assistance from the fire service, informing them of the nature of the products.

Further information

Publication from *CropLife* - Guidelines for the safe transport of crop protection products. http://www.croplife.org/view_document.aspx?docId=414



This booklet deals with the safe transport of crop protection products. It includes advice on type and maintenance of vehicles, proper route planning, labeling and handling of loads, training of operators and drivers, as well as procedures in case of emergency.



3. Storage



Storage of pesticides on the agricultural holding

The safe storage of pesticides is essential to prevent contamination of operators and the environment. In order to safeguard health and safety there are decrees how crop protection products have to be stored.

Construction of store room

A crop protection product store room should be used exclusively for the purpose of storing pesticides and be separate from other buildings. 10 meters is regarded as the minimum distance between a pesticide store and another building. Where this is not possible, the separating walls should be solid and not provide any internal communication with other structures.

The site of the store should be at least 10 meters from any watercourse, well, drainage ditch or spring, and should never be situated on steep slopes or in places vulnerable to flooding. The store should always be built above ground. Cellars are inappropriate places for storing crop protection products.

The materials used in the construction of stores must be robust, fireproof and easy to clean. Concrete, brick and stone are recommended materials. The floor must be impermeable to liquids. The roof, as well as being incombustible, must provide sufficient thermal insulation to prevent extreme temperatures inside the store. This aspect, combined with efficient ventilation, normally by means of openings in the upper and lower part of the walls, will ensure adequate renewal of the air inside the store.

In some circumstances, despite good ventilation it is possible that the store room will not be completely odour free, but this does not necessarily mean that the atmosphere in the store poses a risk to human health.

An important consideration during the construction of a pesticide store is its' ability to retain any spillage or firefighting water. The possible solutions will depend on the local conditions, but in the majority of cases on farms, constructing the floor a few centimeters below soil level will be a good solution. In other cases, creating a spill pond by waterproofing the floor and the lower parts of the walls and constructing ramps at the doors to prevent the loss of liquid to the exterior may be an alternative. The spill pond should have a capacity of at least 110% of the volume of liquids stored.

Lighting should be sufficient to read the labels on the products without difficulty. Where there are shelves, they should be made from washable, non-absorbent and non-inflammable materials.

Storage rules

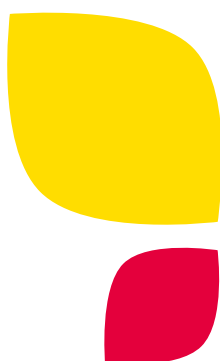
Crop protection products should be stored in such a way as to maintain the quality of the products and ensure the safety of workers who have access to them. The products should be stored exclusively in their original containers and in a position that enables them to be readily identified from their labels. It should be stressed that it is only permitted to store and use nationally registered and approved products. Only the quantities needed for crop protection purposes on the agricultural holding should be stored, and the oldest product in the store should always be used first, in line with the rule:

First In, First Out

Solid products should be stored on shelves above liquid products. Doing so ensures that no liquid drops on solid products in the event of leakage.

The crop protection products store room should also be used to store all the utensils used in the measuring and weighing of products, such as measuring devices, pails, etc. Ensure that all utensils are cleaned before being stored. The store is also an ideal place to collect empty containers in purpose-designed bags, for later delivery to empty container collection schemes.

To prevent animals coming into contact with seeds treated with crop protection products they can also be kept in this store room until sowing.

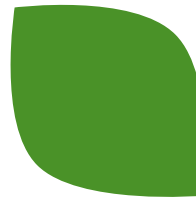


Health and safety

Access to a crop protection products store should always be restricted. Only people trained to handle these types of products should be allowed to enter the store, and should only do so briefly. Clearly printed signs should be affixed at the entrance, visible from the exterior, indicating that it is a crop protection products store room. The entrances to the store should be kept locked and be marked with the following safety signs: 'keep out', 'no naked flames' and 'no smoking'. The ventilation windows should be barred to prevent access.

There should be no potential fire ignition sources in the store room and the electrical installation should be conformed to current certification regulations. It is essential to keep stores clean and tidy and to ensure that workers understand the required health and safety rules. Hygiene and the use of personal protective equipment (PPE) are essential for all who potentially come into contact with crop protection products. Neither the place where the PPE is stored nor the washing facilities should be in the same compartment as the one used for storing the products. Where operators put on PPE in the place where it is stored, there should be a separate locker/compartment for storing their ordinary clothes. The existence of a chemical powder extinguisher is also recommended. The store room should be provided with equipment for dealing with spillages: sand, strong plastic sacks, buckets, brush and dustpan.

Cleaning up spillages in a crop protection products store room should be done with care. It is recommended to immediately contain the spillage and ventilate the store well. Afterwards clear up the spilled product and clean the site. Where the spilled product is a solid, an industrial vacuum cleaner fitted with a filter may be used. If this is not available, scatter damp fine sand on the spill and use a brush and dustpan to clear it up. In the case of spilled liquids, an inert material (e.g. fine sand) should be used to absorb it and clear it up. The substances resulting from spillages should be stored in plastic sacks for later disposal.



Checklist

Safety is crucial when storing crop protection products. We recommend the use of the following checklist of the essential conditions of a store. Where the answer to any of these items is No, the item concerned should be corrected.

Storage	Yes	No
The crop protection products are stored in separate compartments used exclusively for this purpose.		
The crop protection products are stored separately from fertilisers.		
The crop protection products are stored separately from personal protective clothing		
The crop protection products are registered and approved for the purpose for which they are to be used (pests, disease, weeds, crop).		
The crop protection products are stored in a solidly built structure.		
The storage place is kept locked.		
The storage place is protected against extreme temperatures.		
There are signs prohibiting smoking and naked flames.		
The storage place has constant and sufficient ventilation to prevent the accumulation of hazardous vapours.		
The storage place is sufficiently well lit to enable the labels of the products on the shelves to be read.		
The storage shelves are made of non-absorbent, non-inflammable materials, e.g. metal.		
Products in powder or granule form are stored on shelves above liquids.		

Storage	Yes	No
The storage place is provided with equipment for dealing with spillages: receptacle containing inert materials such as sand, waste bin and plastic sacks, in a clearly marked place and ready for use.		
Near the storage place there is an eye wash bottle, water for decontaminating operators in the event of an accidental spillage, and a clear procedure, including emergency telephone numbers (toxicological centre, police, ambulance, hospital, fire service) and a first aid guide. All of this is regularly updated and clearly signed.		
There are clean bathrooms/showers and washbasins at the workplace.		
An inventory is kept of the products held. The inventory is updated every 3 months.		
Products in powder or granule form are stored on shelves above liquids.		

Further information on subjects:



Publication from CropLife - Guidelines for the safe warehousing of crop protection products.

http://www.croplife.org/view_document.aspx?docId=415

This booklet covers the important area of warehousing and storage of crop protection products. It includes advice on construction and operation of facilities, as well as procedures in case of emergency.



Video on YouTube

Playlist: https://www.youtube.com/playlist?list=PLFCBF7D8DC03E8880&feature=view_all

Video: sustainable use of pesticides – receipt and storage of pesticides

4. Preparation and disposal



Preparation of the spray mixture

The preparation of a spray mixture calls for special precautions on the part of the operator. In addition to handling concentrated, undiluted products, there is a range of operations such as mixing and filling sprayer tanks that call for careful attention.

Preparing the spray mixture is an operation involving a high level of responsibility, which should only be carried out by trained personnel. It is essential to ensure that there are no people or animals in the vicinity of the place where the spray mixture is being prepared and to take every precaution to ensure that no errors or accidents occur that might have negative effects on the quality of the treatment, or on the operator or the environment.

Before preparing the mixture, there are some basic rules that should be remembered:

- Read the labels and follow the instructions;
- Wear suitable personal protective equipment;
- Check that the application equipment to be used is calibrated and working properly;
- Check that the first aid equipment and emergency telephone numbers are within easy reach;
- Calculate the quantity of spray mixture required for the crop protection treatment.

Place where the spray mixture is prepared

If spray mixtures are prepared on farm, it is recommended that a specific place is used to prepare the mixture. The place must be practical, functional and safe for worker health and the environment. Places close to the crop protection products store will often be the most suitable. The place, which may be roofed, should not have any side walls and the floor should be impermeable, at least in the area where the sprayer is filled, and should be capable of retaining accidental spillages.

When a fixed place is not possible, e.g. in the field, it is recommended to regularly change the place where the mixture is prepared, bearing in mind that these places should be well away from springs, wells and watercourses.



Personal Protective Equipment (PPE)

The labels of products state, under the heading Toxicological, Ecotoxicological and Environmental Precautions, for the personal protective equipment to be worn. If a product requires the use of special protective measures, these are stated on the label.

The minimum precautionary protective equipment to be worn during the preparation of the spray mixture consists of:

- Protective coveralls;
- Nitrile gloves;
- Rubber boots;
- Face shield.



Reading the label

The label is an official document that contains all the information about the product, its correct use and recommendations. All label instructions must be followed. Reading the labels of the products before use is compulsory both for experienced personnel and for those who are preparing a crop protection spray mixture for the first time. Reading the label is absolutely necessary. The information contained on labels is not the same for all products. It is essential to follow good agricultural practices.

Precautions when preparing the spray mixture

- Open the container by holding it vertically and empty it carefully so as to avoid splashing and spillage; when emptying a large container (over 5 L/Kg), take care to allow the air to circulate while pouring the product. This allows the product to flow freely, preventing splashing;
- Keep the container away from your body so as to reduce the likelihood of contact with the product;
- Measure the product correctly. Do not estimate the quantity, because with some products a small difference in the quantity used can mean that the expected result is not obtained;

- After measuring the quantity of the product to be used, close the container to avoid spills;
- Rinse the utensils used to measure the product and empty this rinsing water into the sprayer tank;
- Always place containers and measuring utensils on even, stable surfaces to prevent them falling and spilling their contents;
- Where products are applied by tractor, it is essential to have gloves present, in case it is necessary to repair the application equipment (e.g. unblocking nozzles, etc). If the operator is the same person who prepared the spray mixture, he should wash the gloves he used, take them off, stow them on the tractor and only after that carry out the treatment.

Preparing the spray mixture directly in the sprayer tank

As the result of the huge progress made in improving the quality of product formulations, it is not necessary nowadays to dilute the product first in a separate bucket with some water (pre-mix) and then empty it into the sprayer. The majority of solid products and all liquid products can be emptied directly into the sprayer tank. However, the spray tank stirring system must run while emptying the product.



Mixing procedure

1. Calculate the quantity of water and product to be used that correspond with the area to be treated to avoid leftover spray.
2. Place half of the required water in the sprayer tank, stir, add the product(s) and then add the rest of the water while continuously stirring.
3. If necessary to mix several products, solid formulations (Wettable Powder – WP, Water Dispersible Granules – WG) should be added first to the sprayer tank until a homogeneous mixture is obtained, and liquid formulations such as ECs should only be added afterwards.
4. Check that the products are compatible, that the desired mixture is recommended and that a homogeneous mixture is achieved before adding the next product.

Triple rinsing of containers

After the product has been completely used up, empty containers should be triple rinsed:

1. Empty the contents of the container completely into the sprayer tank.
2. Quarter fill the container with water.
3. Replace the lid and shake vigorously for a few seconds.
4. Empty the contents of the container into the sprayer tank.
5. Repeat steps 2 to 4 twice more; make the container unusable, preferably without damaging the label and place it in the bags designed for collecting used containers.

Triple rinsing of containers only applies to rigid containers with a capacity/weight of 25 L/25 Kg which contained crop protection products intended for the preparation of spray mixture.

Rinsing containers yields the following benefits:

- Economic: An unwashed container could contain up to 5% of the product;
- Efficacy: By rinsing containers all the product is used which increases the efficacy of the treatment;
- Safety: A well-rinsed container will not contain residues, thereby avoiding the risk of poisoning and other accidents;
- Environmental: A triple rinsed container will not contaminate the environment with crop protection product.

Non-rigid containers of any capacity and rigid containers with capacities between 25 L/25 Kg and 250 L/250 Kg should be completely emptied of their contents, without prior rinsing.



Disposal of empty containers

General container disposal recommendations

Never dispose of empty containers carelessly.

Never throw away and dispose of empty containers:

- In fields (cultivated or uncultivated);
- In rivers, streams or drainage ditches;
- In public refuse bins.

Never burn crop protection product containers.

Never reuse empty crop protection product containers for any purposes as they may contain product residues.

Practices that were accepted until a few years ago, such as burning, burying or disposal in public refuse bins are unacceptable. Ask your dealer or the crop protection industry about the empty container collection scheme in place.

Checklist

Safety during the preparation of crop protection product mixtures is crucial. It is recommended to follow the checklist below before beginning the task. If the answer to any of these items is No, the item concerned should be corrected.

Mixing / Filling / Disposal	Yes	No
The application equipment is clean, in good condition and free from spills. There is a roll of Teflon tape to repair any tube that leaks.		
The personal protective equipment (PPE) is clean, in good condition and ready to be worn by the operator who is preparing the spray mixture.		
The utensils for measuring the crop protection products are clean and are kept in the place where the spray mixture is prepared.		
There is a receptacle nearby containing clean water for rinsing hands and eyes in the event of accidental contamination.		
Water/shower is available near the mixture preparation site for decontaminating the operator in the event of an accidental spillage.		
Emergency telephone numbers (police, ambulance, hospital, fire service, Centre of Toxicology) and a first aid guide are within easy reach, and are regularly updated and clearly signed.		
There are facilities for the triple rinsing of containers.		
Empty containers, after being placed in sacks ready to be collected, are stored in the crop protection products store.		



Further information:



Video on YouTube:

Playlist: https://www.youtube.com/playlist?list=PLFCBF7D8DC03E8880&feature=view_all

Videos: sustainable use of pesticides – preparation of spray liquids and filling of the sprayer tank
sustainable use of pesticides – rinsing the container of a pesticide product

5. Application



Application of pesticides

The objective of applying a crop protection product is to resolve a particular plant health problem. Achieving this objective depends on various factors that must not be ignored. Incorrect application, in addition to wasting product, may cause additional problems for crops and lead to contamination of the operator and the environment. The recommendations given hereafter only highlight the safety aspects.

Before applying

- Check that there are no people or animals in the area to be treated;
- Be sure to read the label of the product to be applied;
- Do not drink alcohol before beginning treatments;
- If you are using a tractor, make sure you have clean gloves with you to put on in case you need to repair anything on the sprayer;
- In case of custom application (contract work), ensure that the operator is qualified and authorized.

During application Personal Protective Equipment (PPE)

The labels of products state under the heading Toxicological, Ecotoxicological and Environmental Precautions the minimum personal protective equipment (PPE) which must be worn.

The minimum protective equipment recommended during applications consists of:

- Protective coveralls;
- Nitrile gloves;
- Rubber boots;
- Hat/cap;
- All protective equipment, with the exception of the hat/cap, should be marked with the CE symbol and EN certified;
- Wear suitable nitrile gloves (ordinary kitchen gloves do not offer sufficient protection);
- Read the product label to check whether any additional protective equipment is necessary (apron, dust mask or respirator against vapour, goggles, etc);
- Ensure that the operators' assistants are also properly protected with PPE.

Precautions during application

- Keep people and animals away from the areas to be treated;
- Do not eat, drink or smoke during application;
- Do not use your mouth to unblock nozzles.

Check the weather conditions, as these may affect the efficacy and safety of the treatment.

- Do not apply products in strong winds;
- The spray drift caused by the wind may be hazardous if it blows in the direction of the operator, other crops, water sources, animals or homes;
- Some products are easily washed off by rain, so a dry period following spraying is necessary;
- Avoid applying crop protection products during the hottest time of the day.

The quality of application of the crop protection product will largely influence the success of the treatment, but has also an impact on operator safety.

- In tall crops where the application is directed upwards, the exposure of the operator is increased;
- In crops grown in confined spaces, tall plants and narrow plant rows, the operator contamination by sprayed wet foliage is increased;
- During manual applications with high volumes the length and direction of the spray lance, the walking speed, and the direction of walking (forwards or backwards) affect the potential for operator contamination. Walking backwards avoids contact with the sprayed wet foliage.



Left-over spray mixture

An experienced operator prepares just the quantity of spray mixture necessary for the desired treatment. In general, left-over spray mixture does not occur where operators are used to carry out crop protection treatments on the same parcels year after year and calibrated the application equipment themselves.

Where left-over spray mixture occurs, the correct procedure is to dilute the mixture by a factor of 10 and apply it on crops not intended for human or animal consumption. In such cases, it is necessary to analyse the reason why the excess spray mixture occurred and to adjust the procedure for future applications.

Application equipment

Make mechanical and operating checks and ensure that the application equipment is in good condition.

Use the application equipment in compliance with the use recommendations of crop protection products. This is a basic precondition for the success of the treatment. Read the manufacturers use recommendations and see whether these match the crop to be treated, the area and stage of growth of the crop, and the pest or disease to be controlled.

It is essential that the application equipment is calibrated and correctly maintained irrespective of the type of equipment used.

Calibration

The calibration of the application equipment is crucial for effective crop protection treatments. The calibration procedure is explained in detail on the ECPA website <http://www.ecpa.eu/page/application>

Benefits of a correctly performed calibration are product savings for the farmer, an effective treatment and lower environmental impact by ground contamination and drift. Calibrating a device means ensuring that

the spray will be correctly and uniformly applied at the recommended dose.

Before calibration, check that the application equipment is functioning correctly, that there are no dripping tubes and no blocked nozzles. Check also that the pressure gauge is functioning correctly, and that filters are clean.

Calibration should be performed at least once a year; and should be carried out whenever equipment or the treatment process changes. Correctly calibrated equipment can avoid or significantly reduce the occurrence of left-over spray mixture at the end of treatment.

Use of tractors with close cabin

A tractor equipped with a closed cabin greatly reduces potential operator exposure.

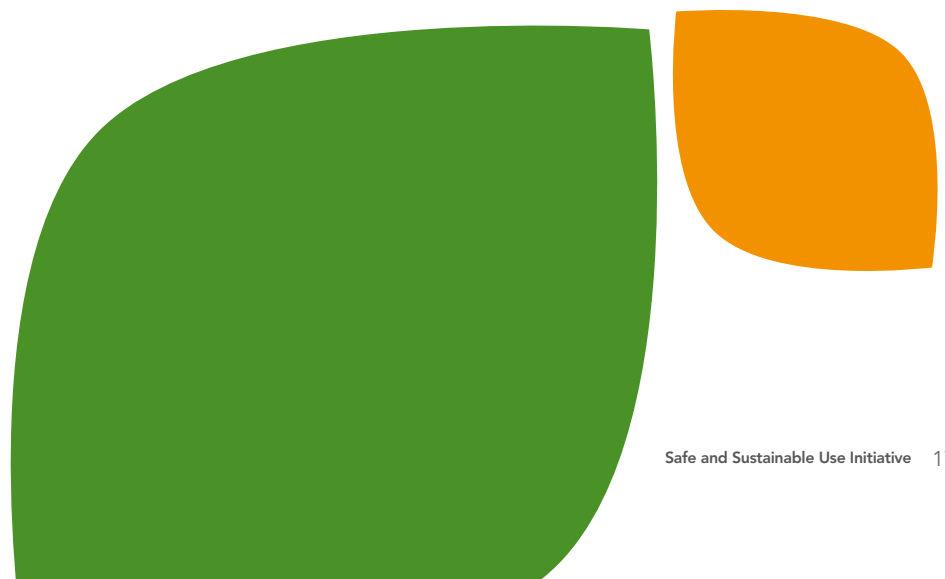
Application equipment should be selected to match the field conditions (area, topography, crop, plant spacing, etc.) so as to achieve maximum efficiency and lowest cost. A tractor is a significant investment and it is therefore important to obtain the maximum benefit from it. Whenever possible, the use of a tractor with a closed cabin is recommended. The additional investment is largely offset by enhanced safety and comfort for the operator.

Studies carried out in various countries show that using a tractor with a closed cabin can reduce operator exposure by approximately 10 times. A closed cabin protects the operator from the external environment (atmospheric agents, spray cloud, etc). Closed cabins should be approved and certified; they must fulfil minimum standards. Their compliance with standards is displayed on a plate indicating the OECD or EC notified body which carried out the tests.

Modern tractor cabins are equipped with filters. The tractor cabins/filters are categorized according to the European standard EN 15695. Tractor cabin filters can replace protective clothing, gloves and mask of operators.

Category	Filtering performance according to EN 15695
1	No protection against toxic material
2	Dust ≥ 99%
3	Dust ≥ 99% Aerosol 99.95%
4	Dust ≥ 99% Aerosol 99.95% Vapour

Clean and change filters regularly.



Precautions when using a tractor

A tractor is a vehicle that should be operated with maximum care and in accordance with the manufacturer's instructions. Below are some general guidelines for the safe use of tractors:

- Familiarise yourself with the tractor before using it;
- Avoid the possibility of the tractor overturning on steep slopes or in tight turns;
- Do not couple machinery that is too heavy for the tractor's power;
- Do not work excessively long hours.

The following rules should be observed when spraying with a tractor:

- When using a tractor with a closed cabin, keep clean gloves in the cab in case it is necessary to repair the application equipment (e.g. unblocking nozzles, etc);
- Close the sprayer nozzles when turning the tractor at the end of rows;
- Prevent the spray reaching areas other than the crop being treated. Take special care with watercourses or springs and leave an untreated zone around them (buffer zone);
- Ensure that the spray does not drift onto other areas. Whenever possible use low drift nozzles. Where spray drift occurs, check the reason for this and correct the situation. Possible reasons are:
 - The wind is too strong;
 - Excessive nozzle pressure;
 - Unsuitable fine spray nozzles for the type of treatment;
 - The spray boom with nozzles is too high (distance between the treated crop and the spray boom).

Checklist

Safety is of crucial importance when applying crop protection products. It is recommended to follow the checklist below before starting treatment. If the answer to any of these items is No, the item concerned should be corrected.

Application	Yes	No
The application equipment is clean, in good condition and not leaking		
There are clean gloves kept on the tractor		
The application equipment is calibrated		
There is a receptacle nearby containing clean water for rinsing eyes or an eye wash bottle in the event of accidental contamination		
There is a place nearby for washing hands		
There is a clear procedure, including emergency telephone numbers (police, ambulance, hospital, fire service, Toxicological Centre) and a first aid guide. All is regularly updated and clearly signed		
The operator knows the procedure to follow in case there is left-over spray mixture		
All applications of crop protection products are recorded (location, crops, product brand and active substance(s), quantity applied and date of application)		
After application: The application equipment is left clean and ready for the next application		



Further information:

Video on YouTube:

Playlist: https://www.youtube.com/playlist?list=PLFCBF7D8DC03E8880&feature=view_all

Videos: sustainable use of pesticides – Internal equipment and GPS
sustainable use of pesticides – repairing a malfunctioning spray boom

6. After application



After application

Immediately following the application of crop protection products there are four issues to pay attention to:

1. Reading and complying with the conditions stated on the label about the interval before re-entering treated parcels and the pre-harvest interval;
2. Cleaning and maintenance of the application equipment;
3. Cleaning and maintenance of the personal protective equipment (PPE);
4. Operator hygiene.

Interval before re-entering treated parcels

Some pesticides stipulate a waiting period before allowing workers to re-enter fields after treatments. In such cases, precautions should be taken to prevent anybody inadvertently entering those parcels. One way to do this is to erect signs stating that the field has been treated and that entry is prohibited.

All products that stipulate a waiting period before re-entering fields state this on the label.

Where it is necessary to re-enter fields during the 24 hours following application, appropriate personal protective equipment should be worn.

Pre harvest interval

The products and the date and dose applied should be recorded immediately following application so as to avoid subsequent uncertainty, in particular as to the date after which the crop can be harvested, i.e. after the pre harvest interval.

Maintenance and cleaning of application equipment

The basic rule to follow for cleaning and maintaining application equipment is simple and practical:

“Clean and check the application equipment at the end of each day’s work, leaving it ready for the next treatment”.

The cleaning should be made in 2 steps:

1st step: cleaning of the inside of the sprayer:

The application equipment should be cleaned immediately after each application. An appropriate cleaning agent can be added. The washing water should be sprayed over vegetation in areas containing plants not intended for human or animal consumption and well away from springs, wells or watercourses and in uninhabited areas.

2nd step: cleaning the outside of the sprayer:

It is recommended to clean the sprayer in the field changing the cleaning place regularly. If the sprayer is cleaned on a platform on farm, the collected wash water ends up as more or less concentrated toxic waste which has to be disposed as such.

The equipment should be maintained in accordance with the manufacturer’s instructions. Special attention should be paid during long off-season periods when the equipment is not used. During the off-season, more thorough maintenance is required.

Maintenance and cleaning of personal protective equipment (PPE)

The personal protective equipment (PPE) for pesticide use should be kept exclusively for this purpose. It should be cleaned at the end of each day’s work and replaced if it is not in good condition, e.g. torn.

“Clean and check the application equipment at the end of each day’s work, leaving it ready for the next treatment”



Washing boots

Rubber boots should be washed under running water while still wearing gloves. Do not use detergents when washing boots, as these may affect their impermeability.

Washing gloves

Gloves should also be washed under running water without the use of detergent. Although gloves should only be removed after being washed, avoid touching the outside of the gloves with your hands. It is recommended that gloves should be removed as follows:

1. Partly remove one of the gloves as far as the wrist;
2. Pull the other glove down to thumb level;
3. Grasp the gloves by the insides with your free hand and insert your thumb in the unremoved glove to remove it;
4. Always hold the gloves by their insides.

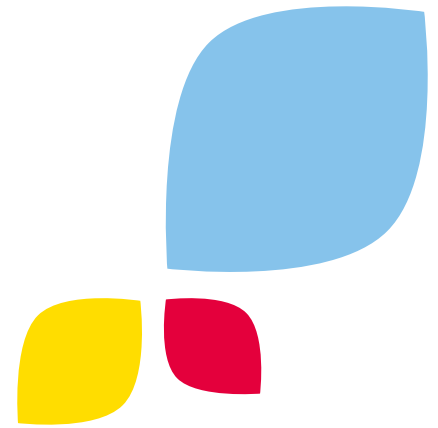
Washing protective garment

At the end of each day of work the reusable garment should always be washed. The garment should preferably be washed in a washing machine or, if not available, by hand. It is important that at the end of the washing process garments are well rinsed with clean water and no soap otherwise detergent residues may remain.

Protective garments should always be washed separately from ordinary clothes.

Always follow the manufacturer's washing instructions. Read the garment label carefully, as the instructions for care and maintenance may vary. Some garments need ironing after washing in order to regain their water repellent properties; others must be washed at low temperature, etc.

Disposable overalls should not be washed, because they would lose their protective properties. They should be replaced after use.



Cleaning visors, goggles and respirator masks

Goggles and visors should be washed under running water; a gentle detergent may be used.

Respirator masks should be cleaned with a damp cloth. In the case of reusable respirator masks with built-in filters, take care not to get the filters wet.

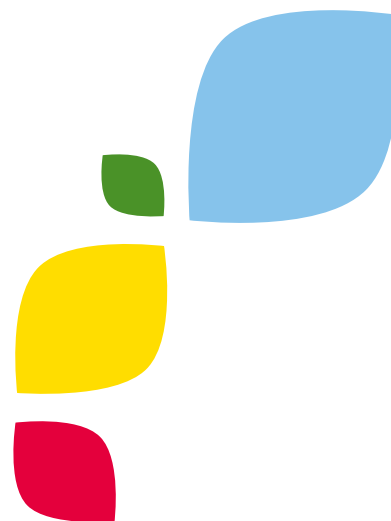
Disposable masks should be replaced after each use.

It is important to replace the filters or the respirator itself in accordance with the manufacturer's instructions or, where these do not exist, whenever difficulty in breathing is experienced or you detect the smell or taste of the product you are using.

Operator hygiene

Immediately after using the products, cleaning the application equipment and personal protective equipment, the operator should take a shower. It is recommended that the operator showers with soap or equivalent and puts on clean clothes. The operator should perform any other activity only after having completed his personal hygiene.

Where crop protection products are applied in the morning and afternoon, for example, it is recommended that at the end of the morning the operator cleans the protection equipment and showers, and starts the afternoon activities with clean equipment.



Further information:

Video on YouTube:

Playlist: https://www.youtube.com/playlist?list=PLFCBF7D8DC03E8880&feature=view_all

- Videos: sustainable use of pesticides – cleaning of the sprayer tank interior in the field
- sustainable use of pesticides – correct procedure of rinsing the sprayer tank
- sustainable use of pesticides – incorrect procedure of rinsing the sprayer tank
- sustainable use of pesticides – outside cleaning of the sprayer in the field
- sustainable use of pesticides – outside cleaning of the sprayer in the farm yard
- sustainable use of pesticides – cleaning of personal protective equipment



7. Preventive measures



Preventive measures in the use of pesticides

Crop protection products contain active substances; they should be handled with caution and used in a controlled way so that they do not harm operators, the environment or consumers.

Negative effects of crop protection products can be minimised when operators follow the instructions on the label, as well as recommended protection and hygiene measures.

Concepts of hazard, exposure and risk

There is frequent confusion between the concepts of hazard and risk. It is important to clarify the difference. Hazard is an intrinsic property of the product which cannot be changed by the operator when using it. In the case of crop protection products, the hazardousness of a product is determined by its toxicity, which is expressed on labels by means of toxicity symbols and precautionary measures by safety and risk phrases.

Exposure, however, depends exclusively on the way the operator uses the product. Risk is a combination of hazard and exposure. Risks for operators, workers, bystanders and residents are evaluated by risk assessments.

Exposure

Exposure is influenced by the user and depends on:

- The crop to be treated (density, height, field, greenhouse, etc);
- The application techniques;
- The application equipment;
- The application conditions (weather, topography, etc);
- The use of suitable protective equipment (PPE);
- The maintenance and cleaning of PPE;
- The duration of the treatment process.

Risk = Toxicity x Exposure

Risk can be described as the possibility of harm occurring to somebody or something when exposed to a hazard. In the case of crop protection products, exposure is classified according to the type of contact with the products: dermal, inhalation and oral and, as described above, is influenced by the user.

Using crop protection products safely means controlling exposure to avoid direct contact with the products.

Situations in which accidental contamination can occur

The objective of the crop protection industry is the elimination of accidents during crop protection products use. The recommendation is the adoption of preventive measures at all stages of the "use" of such products: during transport, in the store, during the preparation of the spray mixture, in applying it, during the cleaning of spray equipment and personal protective equipment, etc.

Absorption by ingestion

How can absorption by ingestion occur?

- Accidental ingestion due to poor storage of the products;
- Poorly closed sachet or bottle stored alongside food;
- Product kept in a container other than the original;
- Product left within reach of children;
- Small quantities absorbed by the operator when eating, drinking or smoking during application;
- Droplets of spray entering the mouth.

Avoidance

- Store crop protection products in their original containers at suitable places, following the rules for the correct storage of these types of products;
- Always wear personal protective equipment;
- Do not eat, drink or smoke during application.

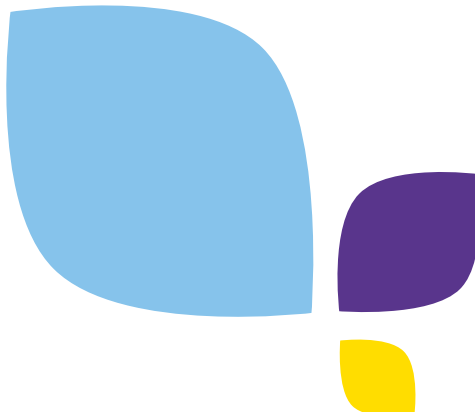
Dermal absorption

How can dermal absorption occur?

- Drops or spillages of the product coming into direct contact with the skin, or via clothes;
- Spray drift during application or spraying against the wind;
- Contact with the treated parts of plants;
- Use of contaminated clothes or utensils.

Avoidance

- Spray only when the weather conditions are suitable;
- Always wear suitable, clean personal protective equipment.



Absorption by inhalation

How can absorption by inhalation occur?

- Small particles of dust or droplets from the spray cloud can be deposited in the respiratory mucosa;
- Active substances in the form of vapour are absorbed rapidly into the bloodstream.

Avoidance

- Wear dust masks or respirators with filters against vapour when recommended on the label of the product to be used.

What to do in the event of accidental contamination?

In the event of poisoning, phone the toxicological centre. Have the phone number of the centre in your country at hand.

It is important to recognise the symptoms that indicate the existence of contamination.

If you experience any of the following symptoms while handling crop protection products, you should stop any activities immediately.

- Excessive tiredness;
- Dizziness;
- Headache;
- Blurred vision;
- Difficulty in breathing;
- Chest pains;
- Vomiting;
- Stomach pains or diarrhoea;
- Skin irritation or itching;
- Weeping or watering eyes.

In the event of contamination of the eyes

1. Go immediately to a water tap or eye wash bottle.
2. Keep the eye open.
3. Rinse with water for 10 minutes.
4. Let the water run into the eye from the side of the face towards the nose.

In the event of contamination of the body

1. Immediately remove contaminated clothing.
2. Wash the affected area thoroughly with soap and water.
3. Change protective clothing. Put on clean clothing.

In the event of difficulty in breathing

1. Go outside (or stay outside).
2. Sit down and breathe normally.
3. Seek help.

Visit the doctor if you feel ill during or after applying crop protection products. Show the doctor the label of the product you were using. The label contains information needed for the correct treatment.

First aid measures

In the event of poisoning, act calmly and quickly.

1. Put the affected person in a clean, well-ventilated place.
2. Check how the product entered the body.
3. Keep the label and collect all possible details of the accident so as to be able to give the doctor the fullest information.
4. It is very important that the poisoned person continues to breathe properly. Apply artificial respiration if necessary. The correct posture is with the person lying on his back with his head tilted back, or on his side if he is vomiting. If he is hot and sweating, cool him with cold water; if he is cold, cover him with clothes or a blanket.
5. Do not allow the poisoned person to smoke or drink, especially alcoholic drinks, milk or water containing olive oil, as this may be harmful.
6. Immediately phone the toxicological centre.



Further information:

Publication from CropLife - Guidelines for emergency measures in case of crop protection product poisoning.

http://www.croplife.org/view_document.aspx?docId=416



These guidelines have been prepared especially for the management of cases of poisoning and over-exposure where medical facilities may be limited.

Recommended Personal Protective Equipment (PPE)

As precautionary measures personal protective equipment should always be worn when applying crop protection products. Protecting yourself properly before handling any crop protection product should become a habit, and be viewed in the same way as fastening your seat belt before driving a car. Always read the product label!

What protective equipment to wear?

Products normally specify on the label under the heading Toxicological Precautions the type of PPE to be worn. When there is no or only very general PPE information, the user should always wear the following basic protective equipment, depending on the activity to be performed.

Preparing the spray mixture

Minimum recommended protective equipment:

- Coverall;
- Strong nitrile rubber gloves;
- Rubber boots – the legs of the coverall should be worn outside the boots;
- Face shield;
- Dust mask, if mixing powders.

Application

Minimum recommended equipment:

- Coverall;
- Nitrile rubber gloves;
- Rubber boots – the legs of the protective coveralls should be worn outside the boots;
- Hat/cap;
- Mask against liquid aerosols and solid particles (e.g. application on tall crops; in greenhouses, etc).

Cleaning the application equipment

Minimum recommended protective equipment:

- Coverall;
- Nitrile rubber gloves;
- Rubber boots – the legs of the protective coveralls should be worn outside the boots;
- Hat/cap.

Types of Personal Protective Equipment (PPE)

Personal protective equipment should be approved for use in crop protection products treatments. Ordinary trousers or gloves may not provide sufficient protection. Only equipment that fulfills minimum standards and has been proved in specific tests to be effective in protecting the operator should be used.

The following recommendations do not aim to provide an exhaustive list of all the personal protective equipment on the market in Europe, but rather highlight the properties they must have in order to protect users of crop protection products.

The manufacturers listed below are just some of those who offer suitable protective equipment. There will certainly be others whose equipment meets the stringent standards in protecting users of crop protection products.

All such equipment should be EN certified and bear the CE mark.

Protective coveralls

The protective coveralls to be worn when handling crop protection products may belong to one of the following types:

- Coveralls providing protection against chemical products:
 - Type 3: Tight to liquids;
 - Type 4: Tight to spray;
 - Type 6: Tight to splashes and limited protection against liquid mist;
- Garments specifically approved for crop protection treatments.

Protective gloves

Protective gloves for applying crop protection products must comply with standard EN 374 – Protective Gloves against Chemicals and Microorganisms.

Gloves must be marked with the following symbols:



When preparing the spray mixture with highly concentrated products, the use of strong nitrile gloves is recommended.

Masks against aerosol/spray and vapour

There are basically two types of mask:

- Disposable masks against aerosol/spray – These masks have a relatively short life time and are marked FF (facial filter) followed by the filter's protection specifications: P2 or P3;
- Reusable against aerosol/spray and vapour – Have special replaceable filters, which have a longer life time.

Types of Filter:

- Mechanical filters P1, P2, P3
 - Retain solid particles and liquid aerosols;
 - The level of protection increases in line with the number following the letter P.
- Chemical filters A, B, E, K
 - Each letter corresponds to protection against a certain type of vapour or gas;
 - The letters are followed by numbers and the level of protection increases in line with the number.

How to identify a respirator mask that gives adequate protection

The mask should bear the following marks:

- CE followed by 4 digits;
- Against dust and spray droplets: P2 (used in the majority of applications in the open air) or P3;
- Against organic vapours: A2 filter.



For the majority of applications in the field a FFP2 mask provides sufficient protection.

When in addition to dust and aerosol protection against vapour is required (see product label), A2P2 or A2P3 combined filters provide sufficient protection for the majority of crop protection product.

Boots

Boots should be waterproof made of resistant rubber.

Hat/cap

The type of hat is not important, provided it is impermeable to spray and has a wide brim so as to protect the head and face better.

Face shield

The face shield should be:

- Transparent;
- Not mist up.

Goggles

Goggles should fit snugly, should have ventilation holes and protect the eyes against dust, liquids or aerosols.



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National Associations as Associate Members



GAPEG Member Companies (non-agriculture)



GAPEG Member Associations (non-agriculture)





European Crop Protection

The European Crop Protection Association (ECPA) represents the crop protection industry at the European level. Its members include all major crop protection companies and national associations across Europe.

ECPA promotes modern agricultural technology in the context of sustainable development; to protect the health of humans and the environment, and to contribute towards an affordable healthy diet, competitive agriculture and a high quality of life.

ECPA members support fair, science-based regulation as a guarantee to the consumer, and the crop protection user, of high standards and safe products.



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