



# Guide to Health and Safety during exposure to Phytosanitary Products



**FREMAP**

*Mutua Colaboradora con la  
Seguridad Social nº 61*



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# 1 Foreword

Article 18 of the OCCUPATIONAL RISK PREVENTION ACT establishes the employer's obligation to inform its workers about the risks that could affect their health and the prevention measures to be implemented to avoid them.

This Guide has been published with this aim, for the purpose of informing workers employed in the farming and livestock sector who handle phytosanitary products of the most common risks to which they are exposed and how they should act in order to prevent them.

FREMAP hopes that this publication will help to improve health and safety standards in this sector.



## 2 Health Risks

Due to their toxic nature, all pesticides have harmful effects on human health.

The risk to human health depends largely on three factors:

- THE TOXICITY OF THE PESTICIDE ITSELF.
- THE METHOD OF EXPOSURE.
- THE EXPOSURE TIME.

$$\text{HEALTH RISK} = \text{TOXICITY} \times \text{METHOD OF EXPOSURE} \times \text{EXPOSURE TIME}$$

The greater these factors are, the greater the risk.

Specific health risks associated with pesticides are:

### INTOXICATIONS

These may be of two types.

#### Acute Intoxication

This occurs if the pesticide enters the body in a single dose and causes harmful effects (intoxication) within a maximum period of 24 hours.



E.g., accidental ingestion of a liquid pesticide that is colourless and odourless by confusing it with water. Another example might be symptoms of intoxication due to contact of a pesticide with the worker's skin during treatment, as a result of not wearing protective gloves.

#### Chronic Intoxication

This is long-term and caused by exposure to the pesticide over long periods of time, so that small doses of the product accumulate in the worker's body until symptoms of intoxication start to appear.

Its effects develop over a long time, by which time they are very dangerous and often irreversible. This occurs with chronic injuries of the nervous system, liver and kidneys as well as the development of cancer.



## 2 Health Risks

### DANGER TO HEALTH

The damage done by pesticides to health is varied and includes:

- Allergic, inflammatory reactions in skin and eyes.
- Effects on the central and peripheral nervous system.
- Capacity to cause cancer or increase its likelihood of developing.
- Risk of infertility.
- Capacity to cause injuries and damage to the foetus during its development in the womb and hereditary genetic damage.
- Death.

### OTHER RISKS

The storage of certain pesticides under inadequate conditions can cause fire and/or explosion.

- Negative effects on the environment (ozone layer), and on flora, fauna and the aquatic environment.



## 3 Entry Routes

**DERMAL ROUTE:** This is the main entry route of toxins into the body and occurs when the pesticide comes into contact with bare skin. It is caused by splashing, spills, using contaminated clothes, etc. The mucous membranes are especially receptive to the entry of contaminants (eyes, lips, mouth and genitals since their skin is less thick). Liquid and more concentrated products are more dangerous due to the fact that they can easily penetrate the skin.

**RESPIRATORY ROUTE:** Through this route small particles can penetrate the body when the person breathes in contaminated air from treatments carried out with equipment forming droplets of the product (spraying and nebulising equipment).

This situation is especially serious in confined spaces (greenhouses, storerooms, stables, etc.) and at high temperatures.



## 3 Entry Routes

**DIGESTIVE ROUTE:** The entry of the pesticide takes place through the mouth, passing through to the digestive tract. This happens when erroneously handling and applying the pesticides through one's hands becoming impregnated with the product and then touching the face, by direct contact of the pesticide with the lips or mucous membrane, when eating with contaminated hands, or drinking, smoking, blowing into nozzles, etc., during treatment.

**PARENTERAL ROUTE:** The entry of the toxin takes place when the skin is not protected and has wounds, sores, pricks, rashes, etc., circumstances which are particularly dangerous since they mean the direct entry of the pesticide into the bloodstream.



## 4 Factors affecting Toxicity

The toxicity of a phytosanitary product is determined by the following factors:

### A) THE PHYTOSANITARY PRODUCT ITSELF

#### **Toxicity of the active ingredient**

The following classification exists: Harmful, Toxic and Extremely Toxic.

#### **Dose and concentration**

The larger the dose and concentration, the greater the risk.

#### **Mixing**

Mixing several phytosanitary products can increase the risk of the mixture being toxic.

#### **Volatility**

The greater the volatility, the greater the risk of inhaling the product through the airways.





## 4 Factors affecting Toxicity

### **Presentation**

Pesticides may have different presentations (solid, liquid and gaseous), in general, those applied as gases and liquids are more dangerous to health.

### **Odour and colour**

Some phytosanitary products having disagreeable odours and a bright colour are safer for workers, as these properties make them easier to recognise and lead workers to avoid contact with them.

## **B) CLIMATIC CONDITIONS AND THE WORKING ENVIRONMENT**

### **Atmospheric temperature and stability**

The higher the temperature, the greater the risk, added to which workers tend to take off clothes, thereby reducing protection.

Try not to apply treatments on hot days, and when there is wind.



## **C) THE WORKER**

### **Sex**

The female sex is more sensitive to the toxic effects of these substances, due to the fact that they reproduce and are especially sensitive during pregnancy and when nursing.

### **Age**

Certain age groups exist in which the toxic effects caused by exposure to phytosanitary products are particularly damaging: the elderly and children, especially infants, in which the effects are much more serious.

### **Nutritional condition and diet**

A good nutritional state means better predisposition to toxic response.

### **State of health**

The existence of certain pathologies, in particular those related with heart failure, kidney and liver failure, or simply the presence of open wounds, make that person more sensitive to toxic substances. DANGER.



## 4 Factors affecting Toxicity

### **Attitude: Lack of knowledge about the risk and personal protection**

It is of prime importance to know the risks involved in the incorrect handling and use of these products, in order to take the necessary prevention measures.

### **Improper use of phytosanitary products**

Directly related with the above, lack of knowledge of what one is handling leads to the improper use of these products.

### **Hygienic habits**

Certain habits such as lack of hygiene, consumption of alcohol, smoking, etc. increase the health risks of these products.

### **OTHER FACTORS**

#### **Type of crops**

The use of phytosanitary products in confined spaces (greenhouses, under plastics) increases the risk for workers.

In the case of taller crops (fruit trees, olive trees,...) the risk is increased for the airways, and upper body (torso, arms, head,...).

#### **Method of use or application**

Treatments carried out with machinery producing droplets involve greater risks to health, since those droplets can easily enter the airways.

#### **Exposure time**

The longer the exposure time, the greater the risk of intoxication and so protection measures must be aimed at reducing exposure time.



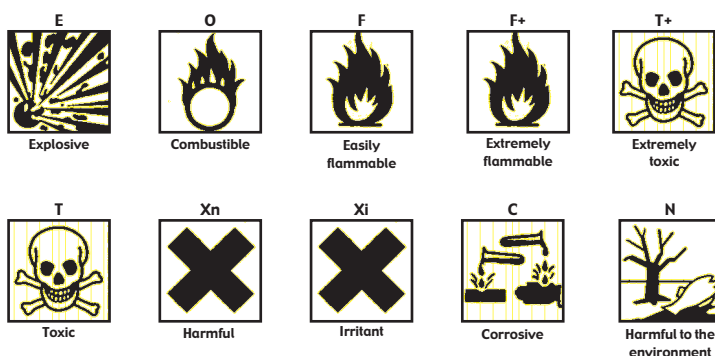
## 5 Label and Safety Data Sheet: Information and Interpretation

### LABEL:

The label contains information on the use of the phytosanitary product. Compliance with its instructions is a guarantee of product efficiency and safety.

It contains the following information, among others:

- ✓ Trade name of the pesticide.
- ✓ Name of the active ingredients and other substances found in the formulation.
- ✓ Concentration of the active ingredients.
- ✓ Net quantity of the product in the container.
- ✓ Type of pesticide: insecticide, weed-killer, fungicide, rat poison,...
- ✓ Type of formulation: powder for dissolving, emulsifiable liquid, powder for spraying, soluble granules, etc...
- ✓ Dose and directions for use.
- ✓ Authorised applications and uses.
- ✓ Safety period.
- ✓ Registration number in the respective official registry (Ministry of Health and Consumer Affairs or Ministry of Agriculture, Fisheries and Food) and the year in which its marketing authorisation expires.
- ✓ Reference number of the production batch, date of manufacture, and shelf life, in cases where product stability is guaranteed in the warehouse for a minimum period of 2 years under normal conditions.
- ✓ Toxicological classification and hazard symbols and indications of danger in pictogram form.
- ✓ "R" phrases alluding to the risks and hazards involved in the use, handling and storage of the pesticide.
- ✓ "S" phrases related to advice on taking precautions while handling and storing the pesticide.
- ✓ Information on waste disposal (containers and left over product).
- ✓ Symptoms of intoxication and first aid indications in the event of intoxication or accident.
- ✓ Telephone number of the National Toxicology Institute: 915 620 420.
- ✓ Antidotes and recommendations for medical staff in the case of intoxication.



## 5 Label and Safety Data Sheet: Information and Interpretation

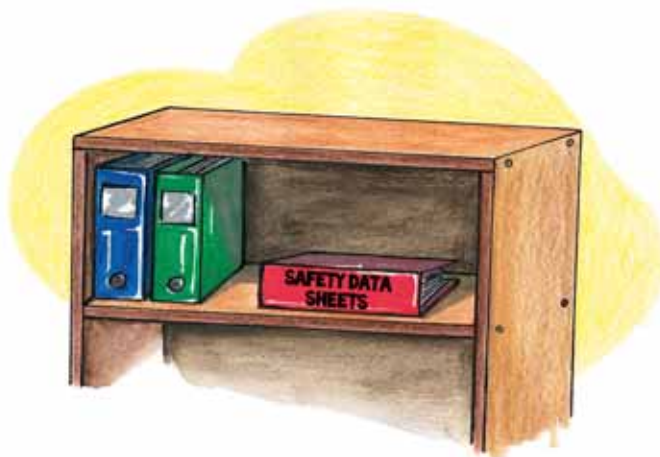
### **SAFETY DATA SHEET:**

This contains the necessary information (in a more exhaustive form than on the label) to ensure that persons handling and using certain pesticides take the necessary precautions for protecting the environment and health and safety in the workplace.

This sheet must be provided by the manufacturer or distributor to the user, free of charge, when the pesticide is first purchased or if it is revised. The safety data sheet must be dated and upgraded, in accordance with applicable guidelines.

The enterprise shall have the safety data sheets of all the pesticides used. They must be made available to the workers for consultation.

Safety data sheets shall be written in Spanish (the official language of the Spanish State) at least and shall include the following sections:



1. Identification of the pesticide.
2. Identification of the manufacturer.
3. Data on the composition.
4. Identification of risks.
5. First aid
6. Fire-fighting methods.
7. Measures to prevent accidental spills.
8. Handling and storing.
9. Control of explosion/personal protection.
10. Physical and chemical properties.
11. Stability/reactivity.
12. Toxicological information.
13. Environmental information.
14. Waste disposal.
15. Regulatory information.
16. Other information.



## 6 Training and Information for Workers

- ✓ Have the corresponding accreditation authorising the worker to handle pesticides (**Phytosanitary Products Handling Permit**, Basic, Qualified or Special levels).
- ✓ Have sufficient information (clear, easy to follow instructions) on each activity or job involving exposure to pesticides and the risks involve in using the pesticide, precautions, doses, application techniques, use of personal protection equipment and other necessary considerations for reducing risk and preventing potential accidents.
- ✓ Consult the label and safety data sheet for the phytosanitary product.



## 7 Selection and Purchase

- ✓ Purchase only authorised products for the treatment to be carried out ones that have not expired and have a current Official Registration number. In case of doubt, consult specialists and ask for technical advice.
- ✓ Purchase only the amounts required to avoid having excessive product left over and to ensure it remains in perfect condition.
- ✓ When purchasing phytosanitary products classified as **EXTREMELY TOXIC**, a special authorisation is necessary (only specialised, authorised companies).
- ✓ Purchase products in their original sealed containers, and reject any products that are sold in bulk without labels or with defects, in poor condition with no seals, open, etc.



## 8 Transport

- ✓ During transport, both driver and the passengers must be isolated from the load, that is, in separate cabins.
- ✓ Pesticides must not be transported together with animal feeds, food or animals.
- ✓ Pesticides must be stored in their original containers, hermetically sealed and properly labelled.
- ✓ The cargo shall be properly secured to prevent it from moving and being knocked which could lead to breakages and spills. It is also advisable to immobilise the pesticide containers in boxes or water-tight containers to prevent leaks in the event of breakage.
- ✓ Avoid or remove any sharp objects or edges that could damage containers.
- ✓ Carry absorbent material and fire extinguishers for use in the event of an accident.
- ✓ Protect the load from bad weather conditions (rain, hail, wind, sun,...).
- ✓ Take great care in loading and unloading products.



## 9 Storage

### Construction and siting conditions for warehouses

- ✓ Ensure the premises are located in areas with no risk of flooding and far from water sources.
- ✓ Storage facilities must be outside inhabited urban areas.
- ✓ Construction materials used for warehouses must be fireproof (concrete, steel, iron, cement floor, etc.).
- ✓ Materials must be protected from damp and the roof of the facility must be waterproofed.
- ✓ The floor must be waterproofed, easy to clean, without cracks and with a watertight skirting with a height of at least 20 cm to prevent the accidental seepage and spilling of the pesticides.
- ✓ The premises will have a drainage system with a watertight tank that must not be connected to the water mains or water courses.
- ✓ The product must never be ware-stored in a basement or in premises without windows.



## 9 Storage

- ✓ If there is no appropriate natural ventilation, artificial ventilation systems shall be installed.
- ✓ The temperature of the warehouse shall be kept more or less constant with no great fluctuations.
- ✓ Avoid damp places (this accelerates the packaging deterioration process, causes the rusting of metal containers and leads to the labels becoming detached).
- ✓ Never store this type of product in homes.
- ✓ Store them in uninhabited places, and preferably on the ground floor.
- ✓ Rooms used to store phytosanitary products must be separated by a brick wall from rooms used for other purposes.



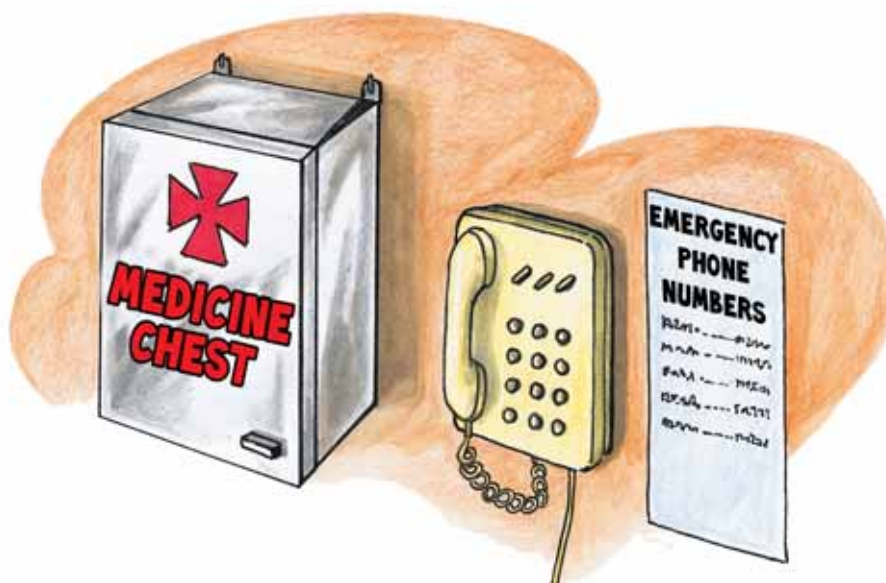
### Safety measures

- ✓ The warehouse shall have an appropriate enclosure to prevent the entry of unauthorised persons.
- ✓ It must have fire protection equipment, in compliance with applicable standards in this respect. Fire extinguishers shall be installed and marked, and fire doors must open outwards, etc
- ✓ The warehouse shall have sufficient lighting.
- ✓ The electrical installation shall be appropriate to the risk involved in storing these products.
- ✓ Corridors, doors, entrances and exits shall be kept clear of obstacles.
- ✓ Apply the necessary measures to ensure that the premises are kept clean and tidy.
- ✓ There must be emergency exits.
- ✓ There must be the appropriate signing for: emergency exits, no smoking, no fire, no eating and drinking, no using the warehouse as a garage for vehicles, prohibiting the entry to non-authorized persons, fire fighting and prevention equipment, the storage of each group of pesticides, etc.



## 9 Storage

- ✓ Regular inspection of each of these measures.
- ✓ A list with emergency telephone numbers and the number of the **National Toxicology Institute (915 620 420)** placed in strategic points in the warehouse.
- ✓ Plans of the warehouse with the emergency exits, indicating where each group of pesticides is stored.
- ✓ Inert, absorbent material to collect potential spills or tipping, and the appropriate containers for them (both solids and liquids).
- ✓ In the case of leaks, spills or overflows, avoid direct contact with these products.
- ✓ Have the necessary protection equipment available.
- ✓ Have emergency shower and eye wash facilities.
- ✓ Have washroom facilities for personal hygiene at the end of the day or if exposed to pesticides.
- ✓ Have a first aid kit.
- ✓ Prevent children from entering the facilities.
- ✓ Have an emergency and warehouse evacuation plan in place in accordance with applicable legislation, inspected by the Occupational Risk Prevention Service.
- ✓ Be in possession of the appropriate documentation and permits for the premises and types of pesticides stored there, and also the Safety Data Sheets and specific documentation.
- ✓ Keep the products locked up.
- ✓ The protocol or procedure to be followed in an emergency will be posted at strategic points, in visible places, and in the language used by the majority of the workers.





## 9 Storage

### Recommendation for storing pesticides

- ✓ Store the minimum possible quantity of pesticide for the minimum amount of time.
- ✓ Follow the pesticides control programme, based on the "first in first out" principle.
- ✓ Never store these products together with animal feeds or foods in general.
- ✓ Prevent the containers from coming into direct contact with the floor, by placing them on protective material (e.g., pallets, shelves,...).
- ✓ Do not stack containers. Limit stacking height to prevent them from becoming damaged.
- ✓ Do not store phytosanitary products in any container other than the original ones.
- ✓ Do not store combustible or flammable material (paper, cardboard, wood, etc.) near phytosanitary products.
- ✓ Pesticides whose shelf life has expired must be disposed of (by an authorised waste disposal company).
- ✓ Different phytosanitary products may be grouped together and stored separately according to their:
  - Use: weed-killer, insecticide, fungicide,....
  - Toxicity: extremely toxic, toxic and harmful
  - Other risks: flammable, combustible, explosive products, etc...
- ✓ Storage zones for products classified as **EXTREMELY TOXIC** shall be well ventilated and in the case of fumigants, access shall be restricted, to authorised staff.



## 10 Preparing Mixtures

This is a considerably risky operation, since the active ingredients in pesticide formulations are often found in high concentrations.

### Before mixing:

- ✓ Consult the label on the container and the product safety data sheet, to verify the dose, precautions, risks, personal protection, compatibility with other products, etc.
- ✓ The area used for mixing shall be outdoors, and well ventilated, and not in confined spaces or poorly ventilated areas.
- ✓ Never handle pesticides inside houses or near water courses, fountains, wells, drinking troughs, springs, inhabited areas, etc.
- ✓ Never handle pesticides on unstable supports or platforms that could cause spills.
- ✓ Wear the personal protection equipment recommended in the product safety data sheets.
- ✓ Have available basic first aid equipment, clean clothing, water, soap, etc....
- ✓ Calculate the treatment liquid you will use to prevent any products being left over.
- ✓ Mix them just before using and in the place where they are to be used.

### With respect to the equipment and utensils to be used:

- ✓ Use the appropriate application equipment, which must be in perfect condition.
- ✓ Calibrate the equipment correctly.
- ✓ Use containers (vats or drums) and graduated measuring equipment such as funnels, filters or sieves, to permit the correct dose to be obtained, and prevent spills and splashing.
- ✓ Use clean water to prevent the equipment from being blocked up.
- ✓ The utensils used for mixing the pesticides shall be used only for that purpose.
- ✓ Use palettes or scoops with handles that are as long as possible to avoid coming into contact with the product (e.g., by putting your hand in sacks or bags containing pesticides in powdered form).
- ✓ After mixing and loading the pesticides, wash all the tools and utensils used and store them in a safe place after use.
- ✓ Never leave utensils, equipment and containers lying around in the mixing area.
- ✓ Do not use your hands or arms to calculate the quantity to be used, or to stir the mixture.



## 10 Preparing Mixtures

### While mixing:

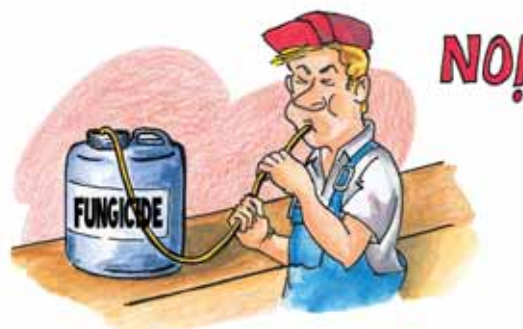
- ✓ Remember: A greater concentration does not mean greater efficacy, but it does mean a greater risk to health.
- ✓ Concentrated pesticides mixed previously in water shall be measured first and then added to the device's tank, part filled with water.
- ✓ Gauge the treatment dose based on the recommended dose on the label and the crop surface area to be treated.
- ✓ Mix the pesticides carefully and slowly.
- ✓ Do not mix two or more products without knowing their reactivity and stability when mixed.
- ✓ If the pesticide is in solid form (for direct use or wettable), handle it carefully, to avoid raising dust or splashing.
- ✓ Pour the liquids carefully, trying not to splash or spill them.



- ✓ If the formula is based on wettable powder, make a preliminary mixture by mixing 1/3 of the product with 2/3 of water, making a paste and filling and homogenising it afterwards.
  - ✓ When handling pesticides that could give off dust or toxic vapours, take the appropriate personal protection measures by using respiratory protection, wearing gloves, goggles or face shields, and protective suits or aprons.
  - ✓ Do not add diesel-based products such as anti-frothing agents to the treatment liquid.
  - ✓ Never suck liquid pesticides through pipes or hoses to transfer them from one container to another, due to the high risk of accidental ingestion.
- ✓ It is necessary to transfer pesticides whose containers are broken or damaged to new containers, specify the name of the product contained, and any toxic risks and effects it may have.
  - ✓ Whenever possible try not to transfer pesticides from one container to another.

### After mixing:

- ✓ Keep all left-over pesticides in their original containers.
- ✓ These containers must be closed and stored properly to prevent leaks, spills and accidents.
- ✓ Rinse each container well three times, and then pour the used water into the spraying device.
- ✓ Empty containers (hazardous waste) will be rendered unusable and returned to the manufacturer or given to an authorised waste disposal company.



# 11 Application

## With respect to the treatment equipment:

- ✓ Inspect the application equipment carefully before and during treatment, to verify its watertightness, proper operation, watertightness of seals, caps, nozzles, etc., to prevent leaks of the product. If any element or part is damaged, it must be replaced.
- ✓ Reject any faulty equipment (e.g., individual backpacks with leaks that wet the operator's clothing with the pesticide).

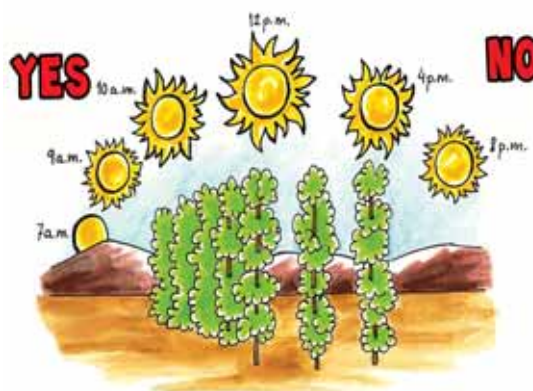


- ✓ It is preferable to use tractors with closed cabins fitted with the appropriate filters to purify the air.
- ✓ It is advisable to use hydropneumatic guns or sprayers, cold nebulisers and in general, automatic machinery or methods that do not require the direct participation of presence of an operator during treatment.
- ✓ Apply the treatment quickly and effectively.
- ✓ Use the specific equipment for each pesticide, fitted with safety devices for the operators applying the product. E.g. equipment fitted with guns for applying weed killer with protective shields to prevent the product from drifting and coming into contact with the lower part of the worker.
- ✓ If using a backpack-type sprayer, wear a waterproof garment between your back and the backpack to prevent leaks or the liquid from soaking your work clothes.

- ✓ If the nozzles become blocked, never blow into them, but use pressurised water or air.

## With respect to weather conditions:

- ✓ Do not apply the treatment when the sun is high, especially in greenhouses. It is advisable to work in cool temperatures (depending on the season); in our latitudes, in the early morning from 9-10 a.m.
- ✓ Do not apply treatments when there is wind. If there is a slight breeze, always work in the direction of the wind.
- ✓ Do not apply treatments in high temperatures (rapid evaporation of the product).
- ✓ Do not apply treatments on rainy days, or when there is a risk of rain.



# 11 Application

## Application:

- ✓ Wear the recommended garments and personal protection equipment recommended in the product safety data sheet.
- ✓ Apply the treatment in the company of at least one other worker.
- ✓ In confined areas with high temperatures, check there is adequate ventilation and wear the appropriate respiratory and dermal protection equipment. Do not work with volatile products in confined spaces or poorly-ventilated areas.



- ✓ Organise your work properly, by rotating the persons applying the product, thereby preventing them from having to do the job for long periods of time. Ideally workers should not be exposed (mixing/loading and application) for more than half a working day.
- ✓ Do not eat, drink or smoke while applying the treatment.
- ✓ Do not drink alcohol while applying the treatment or immediately after, since alcohol heightens the effects of the pesticide.
- ✓ When resting, never stay in the treatment area, So as to be in it for a little time as possible.
- ✓ Do not touch your face or any other part of the body while handling the pesticides.

- ✓ Wash your hands and face each time you rest, before eating, drinking or smoking or going to the toilet (as many pesticides penetrate through the mucous membrane and areas where skin is thinner).

## After application:

- ✓ Change your clothes in the workplace, not at home, to avoid taking the contaminant home.
- ✓ After changing your clothes, wash the garments separately, and shower with soap and water.
- ✓ Before removing your clothes, clean the personal protection equipment and let it dry after each treatment. Keep it in a dry, clean, well ventilated place, separate from other rooms.
- ✓ Never leave equipment or phytosanitary product containers lying around.



## 12 Marking of Treated Areas

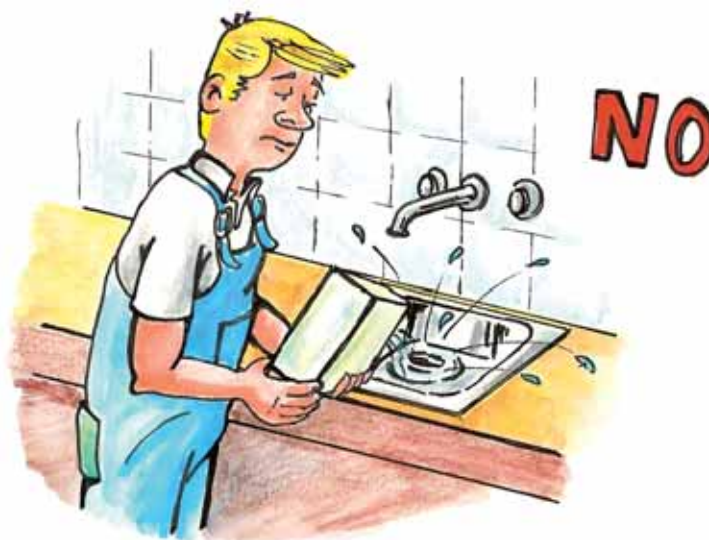
- ✓ Mark the areas where the treatments have been applied properly in a visible manner, and put up a sign forbidding entry to the zone for as long as the pesticide remains there, or within a safety period at least, depending on the nature of the area treated (in confined areas such as greenhouses, the prohibition may last up to one week after treatment, whereas with crops outdoors this period may be shorter, depending on the pesticide and dose applied).



## 13 Maintenance and Cleaning of Treatment Equipment

After treatment, it is important to carry out proper maintenance and cleaning of the equipment used. Consequently:

- ✓ Do not leave any remains of the treatment liquid on this equipment.
- ✓ Clean the equipment at the end of the treatment season, regularly if used often, or whenever the type of pesticide is changed.
- ✓ When cleaning it, be careful not to spill or splash any liquid or remains of treatment liquids on yourself.
- ✓ Wear the personal protector equipment recommended in the safety data sheets.



## 13 Maintenance and Cleaning of Treatment Equipment

- ✓ The place for washing the equipment must be carefully chosen to prevent water from the washing from soaking into the ground or reaching other water courses, wells, etc.
- ✓ To clean the equipment, pump hot soapy water through the equipment or dismantle the nozzles and filters, following the manufacturer's instructions.
- ✓ All other tools used to apply the pesticides must also be cleaned properly.
- ✓ Use special cleaning products (consult the manufacturers).



## 14 Disposal of Containers and Left-Over Treatment Products

- ✓ Pesticide containers, left-over products and water from washing the treatment equipment are all considered toxic, hazardous waste and must not be disposed of with solid urban waste. They must be treated by an authorised waste disposal company.
- ✓ It is prohibited to dump them or dispose of them improperly (by burning, leaving them in the fields, burying them, fly tipping them, etc.).
- ✓ When handling the containers, wear the personal protection equipment recommended in the product safety data sheet.
- ✓ Wash out the containers three times to ensure the pesticide is eliminated or washed off, and then pierce the bottom without damaging the label and crush the container to prevent it from being used for other purposes.



## 14 Disposal of Containers and Left-Over Treatment Products

The instructions for washing out the containers three times are:

1. Tip the contents of the container into the application equipment tank.
2. Fill the empty container with water to one third of its capacity.
3. Close the container and shake it hard.
4. Pour the contents into the tank again.
5. Repeat this operation up to three times.



## 15 Extreme Risk Situations

Extreme risk situations are:

- ✓ Using gaseous pesticides for fumigating.
- ✓ Mixing and loading pesticides that, due to the high concentration of their active ingredient, usually give off particles in the form of dust and vapours that can be inhaled.
- ✓ Treatment with pesticides in the form of powders → dusting.
- ✓ Treatments with sprayers in the form of atomisation or mists, that could be inhaled by the worker.
- ✓ Using formulations that give off vapours, due to the great volatility of their components, pesticides and organic solvents. They are frequently formulations of the **emulsifiable liquid** type.
- ✓ Using pesticides on crops in confined spaces, such as greenhouses, warehouses, silos, facilities, etc...
- ✓ Using pesticides in work environments at high temperatures and with low humidity.





## 16 Personal Protection Equipment

Their purpose is to protect workers from being exposed to pesticides. The recommended equipment is as follows:



PART OF THE BODY TO BE PROTECTED	PROTECTIVE GARMENT OR EQUIPMENT
HEAD	HAT, CAP OR HOOD
FACE AND EYES	PROTECTIVE GOGGLES AND FACE SHIELDS
ARMS, TORSO AND LEGS	PROTECTIVE SUITS AND APRONS
HANDS	GLOVES
FEET	HIGH BOOTS
AIRWAYS	PROTECTIVE MASKS OR HALF MASKS

### 16.1 Protective Gloves

Of all the different manufacturing materials, the most appropriate for chemical risks are **NEOPRENE, NITRILE and certain LATEX gloves**. Nitrile offers the best protection against pesticides.

**NITRILE GLOVES** are the most appropriate for protecting workers from exposure to pesticides

#### When should they be worn?

Gloves must be worn while mixing, applying pesticides or handling the containers in which they are stored and when cleaning those containers, i.e., for any task that involves being exposed to the pesticides.

#### Guidelines for use and maintenance

- ✓ Inspect them carefully before use.
- ✓ If, while applying the pesticides, a worker must raise his arm due to the height of the crop, his sleeves must be over the suit and the gloves fastened with adhesive tape.
- ✓ After exposure, wash the outside first before taking them off and, after taking them off, wash them inside and out.



## 16.1

## Protective Gloves

- ✓ After exposure, wash the outside first before taking them off and, after taking them off, wash them inside and out.
- ✓ Dry them inside out and hanging from their fingers before using them again.
- ✓ Finally, after using the gloves, operators should wash their hands.
- ✓ Replace them when they become worn or torn, have holes or are stretched, as their protective capacity will have been reduced.
- ✓ Even if they appear to be in good condition, they should be replaced regularly.
- ✓ As a general rule, the garments shall be stored in a dry place, and kept out of the air and the sun in bags.
- ✓ In all cases, follow the instructions and recommendations of the manufacturer.



## 16.2

## Protective Suits

**The protective suits to be worn when exposed to pesticides are,  
TYPE 4 AND 6 AND PARTIAL PROTECTIVE CLOTHING**

### Instructions for the use and maintenance of protective suits

- ✓ Inspect them carefully before using.
- ✓ Disposable suits must not be worn again after use.
- ✓ Take off the suit with your gloves on, pulling the sleeves without turning them inside out.
- ✓ They must fit snugly around the boots and gloves.
- ✓ They must cover the whole body, and fit at the neck, cuffs and ankles.
- ✓ Aprons are an added protection to the suit and are worn over it. They are recommended for tasks involving the mixing of pesticides and loading the treatment equipment, when handling concentrated formulations.



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## Protective Suits

- ✓ Aprons shall cover the front part and both sides of the body and be long enough to reach down to the upper part of the boots.
- ✓ Store them separately from other clothes.
- ✓ After exposure, decontaminate them by washing.
- ✓ Never wash them with other clothes.
- ✓ If they can be washed separately, respect the manufacturer's recommendations.
- ✓ Establish a schedule for using and replacing protective suits.
- ✓ Replace them when they become worn, are torn or have holes, as their protective capacity will have been reduced.
- ✓ As a general rule, store the garments in a dry place, out of the sun.
- ✓ In all cases, follow the instructions and recommendations of the manufacturer.



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## Protective Goggles and Face Shields

- ✓ Protect your face and eyes from projected liquid pesticides due to spills, splashing or emanations of gases or vapours. Some pesticides may be acid or caustic, and consequently spills or splashes may cause serious injury to the eyes and face.
- ✓ In the case of face shields, they must cover the whole face.
- ✓ They should have holes for ventilation or a valve to prevent misting.
- ✓ In the case of goggles, these should fit the face perfectly, to prevent the entry of contaminants through either side.

### Instructions for use and maintenance

- ✓ They are for personal, individual use.
- ✓ They must be cleaned after each use.
- ✓ All damages shall be repaired, if possible.
- ✓ They shall be replaced when necessary.
- ✓ They shall bear the EC Mark.



16.4

## Boots

This type of footwear will meet the following requirements:

- ✓ They shall be closed and waterproof.
- ✓ They shall be calf-high.
- ✓ They shall be made of rubber and not rubber coated or with any type of textile coating, since pesticides could enter through the fabric and impregnate it, making it more difficult to clean.
- ✓ They shall bear the EC Mark.

### Instructions for use and maintenance

They are for the individual use of each operator.

The trousers must worn inside the boots, to prevent the pesticide liquid running down inside the boot.

After each exposure they shall be washed inside and out and left to dry for the next use.

They shall be changed when necessary.



16.5

## Protective Respiratory Equipment

It consists of two parts:

- A facepiece: the ones most often used are masks and half masks.
- Filters: their mission is to filter or absorb the molecules of the contaminants present in the air.

### Instructions for use and maintenance

- ✓ They are for compulsory, personal, individual use.
- ✓ Before using them check all the elements: Valves, harness, visor, filters.
- ✓ The time they are used must be controlled, as well as the chemical properties of the pesticides.
- ✓ Clean the facepiece after each use (with soap and water).
- ✓ The filters cannot be washed, blown or regenerated.
- ✓ Repair any damage only if this is possible.
- ✓ Store in bags or boxes, in a dry place protected from the sun and dust and away from the pesticides when not in use as the chemical protection filters continue to act, even when not used, and could become clogged.
- ✓ Do not deform the facepiece.
- ✓ In all cases, follow the manufacturer's instructions and recommendations.

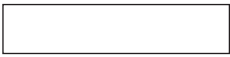

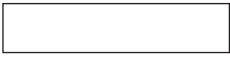


## Protective Respiratory Equipment









### Code and Colours of the Protective Filters

The application of the filter is defined by the combination of a letter and colour strip as shown in the following table.

#### Filters protecting against Particles

Colour	Type	Application
	P1	Low effectiveness, Solid Particles only
	P2	Average efficiency, Solid particles and Liquid Aerosols
	P3	High efficiency, Solid Particles and Liquid Aerosols

#### Filters protecting against gases and vapours

Colour	Type	Application
	A	Organic gases and Vapours. Solvents
	B	Inorganic gases and Vapours. Cyanhydric, Sulphydic
	E	Sulfur dioxide, Hydrogen Chloride
	K	Ammonia
	CO	Carbon monoxide
	Hg	Mercury Vapours
	NO	Nitrous Gases
	Reagent Filter	Radioactive iodine and organic iodine compounds

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## Protective Respiratory Equipment

### ✓ Replace the equipment:

- At the end of the useful life of the filters; do not use them after the expiry date on their containers.
- When it becomes worn, broken, has holes or is not longer airtight.
- When the pesticide is detected by smelling or tasting it, irritation of the mouth, eyes, throat, etc....
- In mechanical FP1, FP2 and FP3 type filters, when there is a sharp increase in resistance to breathing.

### REMEMBER

- ✓ ALL THE EQUIPMENT MUST HAVE THE EC MARK
- ✓ THE EQUIPMENT HAS BEEN DESIGNED FOR YOUR SAFETY AND MEETS WITH THIS PURPOSE ONLY IF USED AND MAINTAINED CORRECTLY
- ✓ THE INCORRECT USE OF THIS EQUIPMENT COULD BE COUNTERPRODUCTIVE AS IT COULD GIVE A FALSE SENSE OF SECURITY
- ✓ TAKE CARE OF IT
- ✓ RESPECT THE INDICATIONS IN THE MANUFACTURER'S GUIDE OR BOOKLET. YOU ALONE STAND TO WIN



17

## HOW TO PROCEED IN THE EVENT OF AN EMERGENCY





## First Aid

First of all, in the event of a suspected intoxication due to pesticides or an accident related to pesticides, take the following steps:

- ✓ Remove the person from the contaminated zone immediately.
- ✓ Take off all clothing that is stained and impregnated with the pesticide, including footwear.
- ✓ Seek specialist medical assistance, by taking the victim to the nearest place where such assistance is offered.
- ✓ Collect all the information possible on the accident or intoxication: containers, label, risks, does, antidote, type of pesticide and quantities, exposure time, how to proceed...
- ✓ If necessary, obtain information on the pesticide and procedure by calling the, **National Toxicological Service on 91 562 04 20**.
- ✓ One of the most important aspects in offering care and first aid to victims of intoxication due to pesticides is to control the vital functions, such as breathing, heart rate and temperature. These functions must be monitored constantly.



## Cardiopulmonary Resuscitation

### MOUTH-TO-MOUTH BREATHING CARDIAC MASSAGE

The rate of mouth-to-mouth respiration to cardiac massage is:

**30 CHEST COMPRESSIONS AND 2 INSUFFLATIONS (100 COMPRESSIONS PER MINUTE)**



- Check that the airway is not blocked.



- Pull the victim's head back.



- Keep the victim's jaw upwards.





## 17.1 First Aid

- ✓ Keep the victim calm and immobilised.
- ✓ If the patient is unconscious, place him in a position that will prevent him from choking by vomiting, by lying him on his left side, with his head lower than the rest of his body, his jaw forwards and head back, to ensure and facilitate breathing, with his feet higher than his head to aid blood circulation and reduce the possibility of vomiting.



Safety position

- ✓ Monitor the temperature of an intoxicated person, and if he sweats profusely, cool him down with water, by passing a cold damp sponge over his body. On the contrary, if the person is cold, cover them with a sheet or blanket to maintain a the normal body temperature.



- ✓ If the victim suffers from convulsions, place a cushioned element between his teeth to prevent him from biting his tongue and immobilise him carefully, to prevent lesions.
- ✓ Wash the pesticide from his skin, eyes and hair with abundant soap and water for at least 10-15 minutes. If possible, wash the eyes with physiological saline solution for 10-15 minutes. Do not rub the eyes, as this could cause skin vasodilation which could damage the skin and let the pesticide penetrate it. If there is no water, use wet wipes or sponges, cleaning gently and disposing of them when used.

- ✓ Do not make the patient vomit unless specified on the label.
- ✓ Never give an intoxicated person anything to eat or drink.
- ✓ Do not allow the person to drink, ingest alcohol or smoke.
- ✓ Do not offer milk or oil or other fats, as this could facilitate and heighten the intestinal absorption of some pesticides.
- ✓ When handling pesticides, always have a first aid kit at handy with the appropriate medical materials.



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## How to act in the event of a Leak or Spill

- ✓ Do not smoke.
- ✓ Wear the personal protection equipment.
- ✓ Avoid direct contact with the spilled pesticide at all times.
- ✓ Keep people and animals away from the affected area.
- ✓ Cover the area with absorbent inert material (sand, kaolin, sepiolite, etc...). If the product is powder, sweep it up and put it in containers.
- ✓ Collect the absorbent material and put it into a container that is appropriate for that type of waste.
- ✓ Do not wash the area with water, especially near water courses.
- ✓ Wash the area with bleach, detergent, soap,....
- ✓ Control the water spilled during cleaning: try to prevent it from entering ditches, rivers or drains.
- ✓ Ventilate the building well.
- ✓ Keep the original containers of the product spilled in a safe receptacle.
- ✓ Leave the spilled product and absorbent material with an authorised waste disposal company.



### If the spill occurs during transportation:

- ✓ Stop the vehicle and switch off the engine.
- ✓ Mark the area and warn the traffic authorities.
- ✓ Clean the vehicle and area, following the above instructions.



## 17.3 How to proceed in the event of a Fire

- ✓ Do not use water.
- ✓ Have dry powder extinguishers available.
- ✓ If the flames cannot be controlled, immediately call the emergency services (fire brigade, police, medics, etc...).
- ✓ After putting out the fire, clean and decontaminate the area and surroundings.



## 18 Risks and General Preventive Measures

In this guide we have described risks and preventive measures from the Industrial Hygiene standpoint, which is the preventive discipline that is most affected by this type of work, but we should not forget Safety and Ergonomics.



## Basic Safety Guidelines

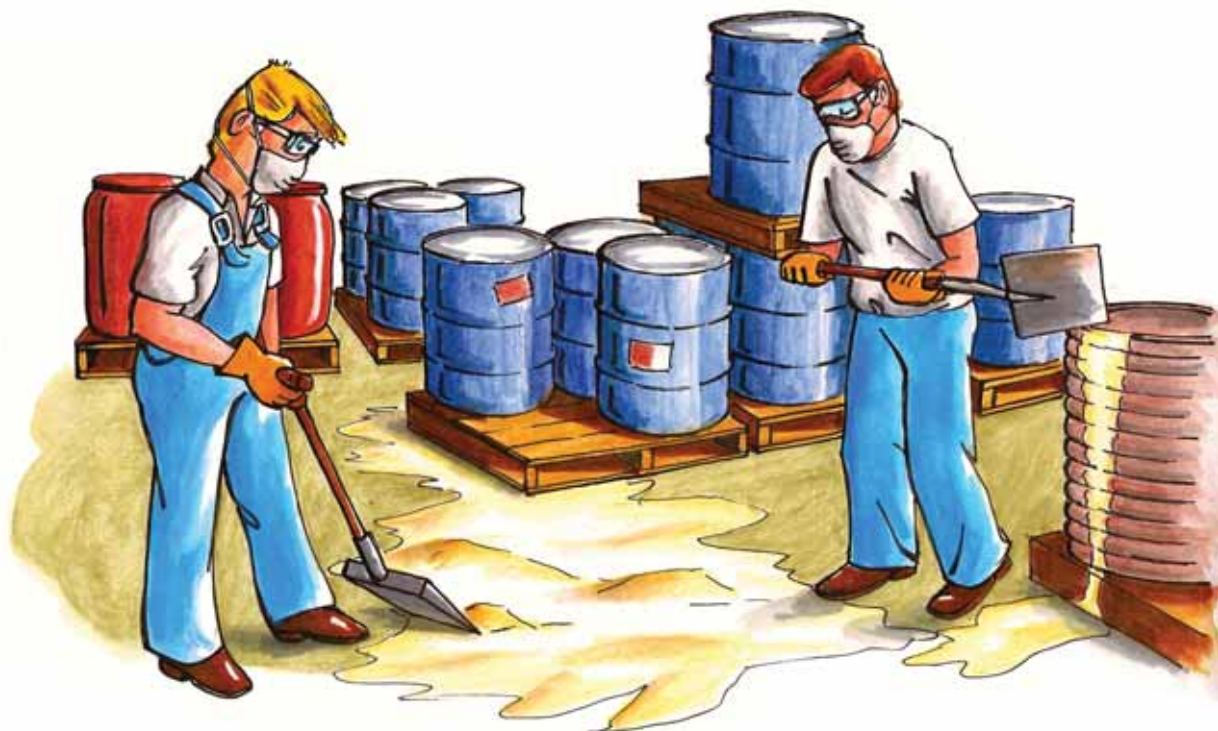
The most common risks to which operators are exposed are:

- ✓ Falls on the same level by slipping or tripping.
- ✓ Bumping into objects left in passageways.
- ✓ Falling objects.
- ✓ Evacuation difficulties in the event of a fire.
- ✓ Becoming trapped in the transmissions and moving parts of application machines.



### Preventive Measures:

- ✓ Keep all passageways, exits and escape routes clear.
- ✓ Mop up spilled liquids immediately.
- ✓ Stored objects must be stabilised.
- ✓ All power transmissions must be protected by a certified protector.
- ✓ Coupling shall be done using the appropriate arms.
- ✓ Calibrating and cleaning shall be done with the engine stopped.



Among the risks arising from lifting heavy objects are the following:

- ✓ Back injuries.
- ✓ Falls on the same level.
- ✓ Falling of handled objects.
- ✓ Cuts to hands.
- ✓ Bumping against objects.

### Preventive Measures:

- ✓ Whenever possible, use auxiliary means to transport objects, such as trucks, pallet machines, etc. especially if the objects are heavy, bulky or are handled quite often.
- ✓ Before lifting an object, check the state of the surface, and in particular whether it has sharp edges, nails, splinters, etc....
- ✓ If the weight is excessive or it is too difficult to lift, ask others to help you.
- ✓ Before lifting it, check you have enough space to handle the object and that the path is clear.
- ✓ Adopt the correct postures and make the right movements, based on the following guidelines:
  1. Get as close as possible to the object.
  2. Ensure your feet are on a firm base, and keep them slightly apart.
  3. Bend down, flexing your knees and keeping your back straight.
  4. Grasp the object firmly with both hands.
  5. Lift the object using the muscles in your legs and not your back.
  6. Keep the object close to your body while carrying it.
  7. Do not make sudden movements with your back, especially when turning.
  8. If you have to turn, move your feet and not your waist.
- ✓ To reduce fatigue, do not maintain awkward postures for long and alternate between tasks that are more and less physically demanding.



## 19 Employers' Obligations Regarding

Employers are responsible for providing workers with training and information, i.e., it is responsible for guaranteeing that its workers receive adequate information, instruction, training and preparation for the use of pesticides, and the adoption of measures and precautions in the work place to protect environmental health and safety.

The employer's responsible is based on the following obligations:

- ✓ Justifying and carrying out treatments with pesticides only when necessary.
- ✓ Evaluating all possible risks to which workers handling pesticides are exposed.
- ✓ Organising the work to prevent and control the exposure of workers.
- ✓ Informing, instructing and training operators handling pesticides on the risks they entail.
- ✓ Carrying out the appropriate control measures to verify whether or not there has been any exposure to pesticides.
- ✓ Carrying out the necessary health controls on workers exposed to pesticides.
- ✓ Checking the protection measures and controls regularly.
- ✓ Purchasing and providing the PPE free of charge, according to the risks involved.
- ✓ Training and informing workers on the correct use of the PPE.
- ✓ Establishing a plan for the maintenance, use and replacement of the PPE (in writing).



## 20 Workers' Obligations Regarding Occupational

Article 29 of the Occupational Risk Prevention Act assigns to workers the obligation to be mindful of over their own safety and health in the workplace and those of other persons that could be affected by their professional activities.

In particular, based on their training and the instructions of their employers, workers must:

- ✓ Apply the protection and control measures that are indicated.
- ✓ Wear and use the personal protection equipment provided by the employer:
  - Gloves.
  - Work suits or overalls.
  - High boots.
  - Goggles or a face shield.
  - Full or half face mask.
  - Waterproof cap or hat.
- ✓ Maintain and store that equipment properly.
- ✓ Take care of their personal hygiene.
- ✓ Immediately inform their direct superior of any fault in the equipment or alteration in the control measures for exposure which, in their opinion, implies a risk to the safety and health of workers.
- ✓ Cooperate with the employer so that it can guarantee safe working conditions that do not pose any problems to the health and safety of workers.
- ✓ Any breach of the risk prevention requirements referred to in the preceding sections, shall be considered a breach or employment contract, for the purposes set forth in article 58.1 of the Workers' Statute.







GUIDE TO HEALTH  
AND SAFETY DURING  
EXPOSURE TO  
PHYTOSANITARY PRODUCTS

I have received the Occupational Safety and Health Guide which includes the risks and basic preventive measures in the use and handling of phytosanitary products and a summary of the obligations of workers set forth in Article 29 of the Occupational Risk Prevention Act.

I.D. Number:

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Date:

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Name and signature of the worker:

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