

Working with pesticides

4.1 This part of the code provides guidance on:

- how to handle, transport and prepare pesticides for use;
- how to use them safely; and
- what action to take after using them.

4.2 Preparing to apply pesticides



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4.2.1 Checks to carry out

It is important to carry out a series of checks before using any pesticide and regularly during the treatment season, as appropriate. Make sure that you have taken the following action.

✓	Had suitable training and, if necessary, gained a certificate of competence to apply the pesticide in the proposed way.
✓	Read and understood the product label and any extra information relating to off-label uses.
✓	Made a suitable and sufficient COSHH assessment, recorded it and checked that it is still valid.
✓	Put in place any measures to control exposure, and keep these measures up to date. Suitable PPE is available.
✓	Carried out an appropriate environmental risk assessment and made sure that you can keep to any measures to protect wildlife and the environment, such as any buffer zones or other restrictions on use, to protect: <ul style="list-style-type: none"> • aquatic life (including any LERAP conditions); • bees and other insects and creatures; and • surface water and groundwater.
✓	Taken account of the need to avoid contaminating feed stores or areas that livestock have access to.
✓	Taken measures to meet any conditions on the label for keeping livestock or people out of treated areas for a certain period.
✓	Got advice and, when necessary, received permission from the appropriate agencies, before using pesticides in areas of special environmental status in or near water, from aircraft and, where necessary, on public rights of way.
✓	<ul style="list-style-type: none"> • Given adequate notice to occupiers of neighbouring properties and members of the public. • Displayed warning notices. • Followed the specific responsibilities for giving notice when spraying from the air and when spraying sulphuric acid. • Given adequate notice to beekeepers.
✓	Checked equipment for applying pesticide to make sure it is in good working order and is working correctly and accurately.
✓	Put emergency procedures in place and make sure operators have: <ul style="list-style-type: none"> • appropriate emergency equipment such as spill kit and decontamination equipment for skin and eyes; • emergency details for the products being used; and • a list of emergency contact details for the environment agencies and medical services.
✓	Make sure the pesticide can be transported safely and legally to the area you are treating.
✓	Got enough of the correct pesticide to complete the job, and checked the calculations of the amount of pesticide needed for each tank, load or run, possibly allowing for an untreated or under-dosed area for disposing of sprayer washings.
✓	Made appropriate arrangements for cleaning equipment and disposing of any waste pesticide and pesticide packaging (such as containers, closures and foil seals) safely and legally.

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4.2.2 Dangerous practices

The following activities are dangerous when pesticides are being used. They should be forbidden by employers and never practised by anyone using pesticides.

- Sucking or blowing (by mouth) any nozzle, pipe connection or device which forms part of the equipment for applying pesticide.
- Continuing to work after being contaminated. (You should immediately remove all contaminated items of clothing, wash the affected skin and put on clean clothing before starting again.)

You should also make sure that you do not eat, drink, smoke or go to the toilet while working with pesticides. You should carry out these activities outside the treated area, after you have removed your PPE and washed your hands and face.

4.3 Handling pesticide containers

Read the product label before opening any pesticide container. Make sure that you follow the precautions shown on the product label and work in line with any instructions given on the label or in the relevant notices of approval.

Even when the product label does not say you need to wear PPE, it is good practice for you to wear basic PPE (such as overalls, suitable protective gloves and boots) at all times when handling pesticides or their containers.

All pesticides should be handled in a well-ventilated area to avoid any possible build-up of vapours. Avoid sparks and naked flames as some pesticides may present a fire risk. These products will be labelled with the appropriate hazard symbol and risk phrase.

If you handle flammable products you should read and understand HSE Guidance booklet HS (G) 51 'The storage of flammable liquids in containers'.

If pesticide containers are damaged, you will need to take extra precautions.

- Wear the PPE stated on the product label or, if this section of the label cannot be read, the appropriate PPE specified in annex G and also that specified on the MSDS.
- Immediately contain any spillage and dispose of any contaminated material safely and legally.

If you cannot safely use the contents immediately, either put the damaged container with its contents in another suitable container or transfer the contents to an undamaged container which has held the same product. Whichever alternative you choose, the container must be clearly labelled with the name of the pesticide, information on possible dangers and the precautions to be taken. Where possible, use original labels. Your supplier should be able to help with this or you may be able to get a label from the manufacturer's website.

Never use an empty food or drink container to hold a pesticide.

Take care when moving pesticide containers in and out of the store and never leave pesticide containers unattended unless they are in a secure store.

4.4 Transporting pesticides

You can get general guidance on how to meet the legal obligations for transporting dangerous goods in 'Working with ADR, an introduction to the carriage of dangerous goods by road', available from the Department for Transport (you can download this from the Department for Transport website at (www.dft.gov.uk/stellent/groups/dft_freight/documents/page/dft_freight_029426)).

The obligations and recommendations for transporting pesticides safely and legally are summarised in 'The carriage of agrochemicals by road: guidance for the agrochemicals industry' published by BASIS (Registration) Ltd.

4.4.1 The law

This section gives guidance on how to transport pesticides safely and meet the laws relating to carrying dangerous goods (see annex A). Most of the legal conditions only apply above certain amounts which depend on how the goods are being transported (for example, in packages, in tanks or in bulk) as well as on their transport category which may be given in The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2004 (see annex A). Agricultural pesticides (see annex C) or plant-protection products (but not sulphuric acid) do not have to meet some of these legal conditions as long as they:

- have been approved under the Control of Pesticides Regulations 1986 (as amended) or under the Plant Protection Products Regulations 2005;
- are transported in or on an agricultural vehicle (see annex C) or any associated trailer;
- are diluted ready for use, or supplied in a ready-to-use form; and
- are being carried from one piece of agricultural land to another within a 50-kilometre radius.

Although transporting pesticide (especially on farms and holdings) will usually meet these conditions, users collecting pesticides from their suppliers or transporting pesticides from their store to other locations (such as contractors, especially in amenity and forestry areas) may not (depending on the type of vehicle being used and the amount of pesticide being transported).

Even if the exemptions above apply, you may still have to meet other conditions applying to transporting dangerous goods, such as the suitability of vehicles and containers for certain dangerous goods. You should check the relevant laws and guidance carefully.

4.4.2 General precautions when transporting pesticides

By following this guidance, you can keep the risk of spillage or similar incidents as low as possible and, if these incidents do occur, make it easier for the emergency services, and other agencies, to deal with them.

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Drivers of tractors, vehicles which tow trailers and crop-protection equipment will need to check that coupling pins and other fastening devices are secure before moving off. Anyone involved in transporting pesticides will need to know the procedures to follow if there is an emergency.

If there is a spillage and a possibility of a risk to other people, animals or the environment, take immediate action to limit the effects (for example, to contain the spill). You should also warn others who may be affected or who have an interest (for example, the Environment Agency).

To protect water from the risks of pesticide pollution, avoid going through water at all times. Wherever possible, avoid crossing watercourses at all. If you cannot avoid water, use a bridge or tunnel.

If a fire breaks out, call the fire brigade, the police and the Environment Agency. You should give them the relevant information about the type and amount of pesticide involved.

Ask the pesticide manufacturer or fire authority for advice on suitable fire extinguishers. Any run-off from putting out the fire could contain high levels of pesticides and so could be as dangerous and polluting as a spillage.

If a pesticide is transported in equipment used to apply it, make sure that there are no leaks or spills. Maintain hoses, nozzles and other fittings in line with the manufacturer's instructions. Make sure that valves which control the flow of pesticide to the spraying equipment are shut during transport to reduce the risk of leaks and drips. Make sure all covers on equipment are securely closed after tanks or hoppers have been filled.

Take care not to overfill equipment as this may cause the contents to spill during transport, especially over rough ground. This could lead to people and the environment being contaminated.

Pesticides which need to be continually stirred should, whenever possible, be added to the sprayer tank at a suitable area close to the site you are going to treat. This is to avoid the need to have the sprayer pump and recirculating system on while the pesticide is being transported.

You should not transport pesticides with children, animals, farm produce or animal feed. When you need to transport mixed loads, separate them appropriately.

4.4.3 Transporting pesticides inside a vehicle

When you are transporting pesticide containers and equipment inside vehicles, keep them separate from the driver and any passengers by a chemical and vapour-proof barrier. Hand-held equipment should be transported empty when possible to avoid the risk of spillage.

To prevent containers being damaged, do not carry them in tractor cabs, tool boxes or in other ways which might lead to them being crushed or punctured.

Secure, leak-proof chests suitable for transporting pesticides are available and you should use one if you are carrying a small quantity of pesticides inside your vehicle.

4.4.4 Loading and unloading pesticides

Take care to prevent damage to pesticide containers and associated equipment when loading or unloading trailers or vehicles. In particular, check whether:

- the containers are stacked as recommended by the manufacturer;
- the trailer needs to have side boards fitted;
- the containers can move about (if so, consider restraining them or putting them in any storage facilities fitted to the vehicle);
- the packaging and label need to be protected from the weather (for example, if they are made of cardboard or paper); and
- machinery is needed or recommended for handling any of the containers (the product label may advise you to use machinery for containers that hold more than 20 litres or weigh more than 25 kilograms).

4.4.5 Further action

After use, thoroughly clean equipment which pesticides have been moved or transported in (including contaminated vehicles), and dispose of the washings in a safe and legal way.

4.5 Filling equipment

4.5.1 Where should I fill the equipment used to apply pesticide?

You should carry out all mixing, filling or loading well away from watercourses, ditches and drains. On farms and holdings it is best to have a specific area for filling all sprayers, but when applying pesticides in other forms (for example, as granules or pellets) it is often necessary to load the equipment in the field. Similarly, in many amenity and forestry areas, where work is carried out at several separate locations, it will be necessary to mix and load pesticides at the site. Whenever you carry out mixing, filling or loading you should make sure that you follow the guidance in this code to prevent pollution of surface water and groundwater.



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4.5.2 What precautions should I take when filling equipment?

You must always follow the instructions on the product label when mixing and loading a pesticide into equipment. You should also take the precautions referred to in table 5 below.

Table 5: Action when filling equipment

Do:	Do not:
use a drip tray to catch any spills and return them to the equipment	use any filling area where the surface is difficult to clean or where small spills are likely to go unnoticed
use the foil cutter supplied with the container (or a suitable tool used only for this purpose) to remove secondary seals on containers	use your fingers to break the seal on a container
follow the instructions on the product label when opening containers designed for use with a closed-transfer system (see the glossary on page X)	try to remove valves and other fittings on returnable containers to remove residual product (these containers are designed and filled to allow for residual product) (Removing seals which show signs of being opened before is unsafe and may result in extra charges.)
re-seal partly-used containers	open more than one container at a time
make sure pesticides cannot run back or be drawn back into any water supply	make a direct connection between any water supply and a spray tank
use an intermediate tanker or system to prevent pesticides being drawn back	take water straight from a stream, other watercourse or pond into equipment
pay close attention to the level of the tank contents when filling (you may find it helpful to use a fill-level alarm, flow meter or pre-set shut-off valve)	leave the sprayer unattended while filling or allow the tank to overflow or to be overfilled
take care when filling equipment with a narrow filler opening (such as some backpacks for use with spot guns and CDA lances). Use a suitable funnel and fill slowly	contaminate the outside of hand-held equipment or knapsack sprayers when filling, as this will result in you being contaminated
use the appropriate size of pesticide container to reduce the need for measuring or weighing	transfer pesticides between containers, measuring equipment and equipment unless you have to
use pesticides in water-soluble packaging where appropriate	try to open water-soluble bags
measure out pesticides accurately using suitable equipment used only for this purpose, rinse it immediately and add rinsings to the sprayer. For pesticides which need to be weighed, use scales dedicated to the task	use measuring and dispensing equipment (for example, jugs, buckets and drum pumps) which is used for products other than pesticides

Table 5: Action when filling equipment (*continued*)

Do:	Do not:
transfer pesticides from small-volume returnable (SVR) containers and intermediate bulk containers (IBC) directly to the equipment using a compatible closed-transfer and measuring system or directly to the pesticide container's built-in transfer device	try to use incompatible transfer equipment, use gravity discharge (flowing out without pumping) from an IBC or transfer a pesticide from a bulk container into smaller containers
make sure you are steady on your feet if you have to pour directly into a tank, preferably on the ground or a platform at the right height	lift containers above shoulder height
use machinery for handling containers if the product label advises this	try to shake large containers before use (the label will provide guidance on how the product should be stirred or re-circulated before use)
use filling devices such as low-level induction bowls or separate mixing hoppers	climb up a sprayer with an open container
use a mechanical rinsing device to rinse containers (and contaminated closures and foil seals) if you can, or manually rinse three times (each time using a volume of rinse water equivalent to 10% to 20% of the volume of the container)	try to rinse non-washable non-returnable packaging, returnable containers not intended for rinsing or packaging which has held gassing powders
pour slowly, with the container opening positioned so that air can enter while you are pouring (take extra care with narrow-necked containers)	cause glugging
put the rinsed foil seal inside each rinsed and drained container or use a single container to collect all the foil seals for rinsing and draining	drop or throw foil seals on the ground
replace caps on containers after rinsing and draining and store them upright in an outer carton	leave empty containers upside down to drain on the ground
avoid foaming by using appropriate induction, stirring or recirculating systems, and fixing any leaks in the suction system. Use an antifoam or defoamer if necessary	cause foaming by sucking air into the induction system, shaking or stirring the product too much, or adding products likely to foam too early when filling the sprayer
make sure valves are correctly re-set after using an induction bowl or other filling device	let the tank contents flow out through the induction bowl or other filling device if the pump is turned off
if mixing two or more pesticides together, follow the correct procedure. Add them to water separately (except where this is not possible for some 'twin-pack' products) and in the recommended order	mix two or more concentrates before or at the same time as loading them into the tank
if pesticides will be applied with other chemicals, follow the instructions on the labels of all the relevant products, and use all the information provided by the supplier	pre-mix a pesticide concentrate with an adjuvant, carrier, marker or any other material if this is not allowed under the approved conditions of use of the pesticide and unless an appropriate COSHH assessment has been carried out

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Table 5: Action when filling equipment (*continued*)

Do:	Do not:
measure out powder and fine granules in sheltered conditions	let fine particles blow away
make sure that the person applying the pesticide has read and understood the product label (and ideally has a copy) if a different person is mixing and loading it	prepare spray solution in bulk for more than one user unless it will be applied using equipment that does not need to be altered to suit individual users (such as stump treatment bottles and spot guns) and does not need to be stirred or shaken constantly
have a spill kit available at all times, know how to use it and what other action to take if there is a spillage	try to hose down any spillage

When mixing and loading pesticides, it is illegal (and may be unsafe) to:

- mix two or more pesticides which are anticholinesterase compounds (this will be shown on the product labels), unless the mixture is allowed under the approved conditions of use (as shown on the product label of at least one of the pesticides); or
- use a pesticide with an adjuvant (a substance that makes the pesticide more effective) unless the adjuvant appears on the authorised list (you can get details from the PSD website at (www.pesticides.gov.uk), and using the pesticide with the adjuvant is in line with both the approved conditions of use for the pesticide and the authorised use of the adjuvant with that pesticide.

If you are applying a pesticide as part of a tank mix, check the following:

- That the products are compatible (refer to the compatibility information on the product label and, if necessary, get further guidance from your adviser, supplier or the product's manufacturers);
- That the intended volume of water and the spray quality are in line with the recommendations for each product, and all other conditions of use for the individual products (such as application timings) are being met;
- That your protection (engineering controls and PPE) reflect the highest obligations stated on the product labels and, where appropriate, any extra needs resulting from your COSHH assessment;



- That your measures to protect wildlife and the environment (such as buffer zones) reflect the highest obligations stated on the product labels and, where appropriate, any extra needs resulting from your environmental risk assessment;
- That you add the products, one by one, to the spray solution in the order recommended on the product labels and taking account of any specific mixing instructions (such as amount of water in the tank when each product is added and the stirring or shaking needed);
- That you watch out for any increased risk of foaming or blockage of nozzles and filters.

If a product label does not give guidance on the appropriate order of adding the products to the spray solution when tank mixing, you should add different types of product (as shown on the labels) in the following order.

- First add water-soluble bags; then
- water-dispersible granules (or soluble granules); then
- wettable powders (or soluble powders); then
- suspension concentrates; then
- emulsifiable concentrates (or oil in water emulsions); and finally
- adjuvants.

4.6 Methods of applying pesticide

4.6.1 Choosing a method

You must use pesticides in line with the conditions of the product approval as stated on the label. For approved uses not specified on the label you must also follow the conditions given on the relevant notice of approval. Unless these documents place a legal obligation on you to use, or not to use, a specific type of equipment to apply the pesticide, you may apply the product using methods other than those recommended as long as:

- the equipment you have chosen is suitable for the intended method of applying the pesticide;
- the COSHH assessment, where appropriate, has shown that the proposed method does not involve an increased risk to health or safety compared to the normal method;
- you have assessed the environmental effects of your intended method of applying the pesticide and your assessment shows there is no increased risk to wildlife or the environment; and
- the necessary control measures are in place to reduce, as far as is reasonably possible, the risks to people, wildlife and the environment.

A glossary of the most common terms used to identify equipment for and methods of applying pesticide is at annex C. Remember, in certain circumstances you will need a certificate of competence which is relevant to the application method you are going to use, unless you are working directly under the supervision of a person holding the relevant certificate.

4.6.2 How you should apply the pesticide to the area to be treated

Before you begin to apply the pesticide you should consider the order in which you are going to treat the area. You should make sure that you:

- do not have to walk, drive or travel through the newly treated crop or area so that you do not contaminate yourself or your equipment; and
- leave an untreated or under-dosed area for cleaning the equipment and disposing of sprayer washings.

By treating turning areas and access routes to the treated area last, you will help to make sure that:

- you do not contaminate your equipment by travelling through newly treated areas or carrying contaminated soil out of the treated area; and
- you and other people can leave and re-enter the area being treated without being contaminated if machinery breaks down, or there is an emergency or other incident which interrupts the work.

4.6.3 Which application methods need special precautions?

The special precautions you need to take depend on the application methods you are using. These precautions will be stated on the product label (and for off-label uses on the notice of approval), when these methods of application are recommended. Some of these application methods are listed below.

4.6.4 Ground-based reduced-volume spraying

'Reduced-volume spraying' is where the concentrate being sprayed is diluted with a lower volume of water than the minimum volume recommended on the label for that dose. This guidance does not apply to:

- application as fogs and mists;
- use as a concentrated solution through weed wipers;
- approved use of pesticides at low volumes through rotary atomisers, or similar equipment; or
- applying a pesticide concentrate (for example, for some products approved for chemical thinning in forestry).

The application methods listed above should only be used when recommended on the product label.

Using reduced-volume sprays may result in smaller droplet sizes (depending on the type of nozzle used), which may result in an increased risk of drift. Also, if the dose of pesticide is not reduced in the same proportion as the water volume, the more concentrated solution can increase the risk to people and the environment. Because of this, you should make sure that you have taken appropriate action to control drift when considering reduced-volume spraying.

You should not use reduced-volume spraying if the label (or the relevant notice of approval):

- bans reduced-volume spraying (for example, if there is a maximum in-use concentration or minimum application volume); or
- states that PPE must be worn when the product is at the dilution ready for use; or
- has 'corrosive', 'very toxic', 'toxic', or 'risk of serious damage to eyes' on the product label.

In these situations, you may reduce the volume only if you also reduce the dose of product so that the concentration of the spray solution is no greater than that recommended on the product label.

In all other cases you may choose to apply a pesticide as a reduced-volume spray as long as:

- the concentration of the 'reduced-volume' spray is no greater than 10 times the maximum concentration recommended on the label;
- you meet all the conditions of the product approval, including the maximum individual dose of the product;
- you fully understand how to use the spraying equipment and know exactly how to control the spray;
- you use a spray quality no finer than 'fine' for ground-based vehicle-mounted or trailed sprayers and no finer than 'medium' for equipment that is hand controlled;
- you have assessed the risk to human beings (made a COSHH assessment, where appropriate) and the risk to other creatures, plants and the environment (based, where appropriate, on advice from a competent adviser), and made sure that the necessary controls are in place; and
- your protection measures are at least as good as those shown in annex G.

4.6.5 Fogs, mists and smokes in enclosed spaces

The reduced-volume spraying advice in 4.6.4 does not apply to these methods of application. Fogs, mists and smoke are treatments normally used in enclosed spaces or indoors, where any possible drift is contained. If you want to use these methods you must meet the label conditions and make your own assessments of risk to human health and the environment. The COSHH assessment must consider the possible risk of breathing in the very small particles or droplets associated with these methods. Fogs (like smokes) use finer particles than mists, and so these stay in the air for considerably longer. If you are not sure whether the equipment you are planning to use is suitable for the relevant method, get advice from the supplier.

If you are using fogs, mists or smokes in an area where people normally work (for example, in a glasshouse), you must make sure that all personal property has been removed from the area before treatment begins. You will also need to make sure that contaminated surfaces (such as unprotected work benches) are thoroughly cleaned after the treatment. It is especially important to remember these precautions when you are using automatic glasshouse misting equipment which works overnight.

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Make sure that nobody is in part of the building or structure being treated when you are using dangerous chemicals in these forms, particularly smokes. Check that adequate notices are clearly displayed, especially at all entry points, to stop people entering the area. Make sure that all entrances are secured throughout the treatment period.



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Consider where any smoke, drifting particles or vapour from the treatment will end up (for example, by penetrating to another part of the building). Make sure that nobody goes into the building unnecessarily by checking that any items people may need (for example, tools) are removed from the building before treatment. Assess the risks to humans and the environment which might arise from any smoke, particles or vapour escaping, and make sure that the treated area is adequately ventilated before anyone goes back into it. The ventilation method will need to be safe (for example, sending an unprotected worker into the building to open windows would not normally be acceptable).

4.6.6 Fumigants

Fumigation is a very specialised task. Because of the nature of fumigants and the risks associated with using them, no-one should carry out fumigation work until they have received proper training. Any fumigation has to be properly planned to prevent the fumigant spreading beyond the area to be treated. You can find guidance on the correct use of fumigants in the HSE guidance document HSG251.

4.6.7 Dusts, granules, pellets and baits

When using pesticides in the form of a dust, apply them only in suitable conditions and take care to avoid breathing in dust or allowing your skin to become contaminated. Take similar precautions when handling and applying fine granules or granules that give rise to a dust which may be dangerous. You will need to take extra care when applying these products by hand (if allowed) or hand-held equipment. Pesticides which some granules release as a vapour (especially in warm conditions) may also be dangerous, particularly in confined spaces. It is important to follow all instructions on product labels and make sure that you use appropriate equipment to apply the pesticide. Clear up and safely dispose of spilt granules or baits. If it is recommended, make sure that granules are incorporated into the soil, compost or so on correctly and within the time specified.

Slug pellets can present a significant risk to wildlife and pets. You can reduce this risk by:

- drilling pellets with seed, if this is appropriate and recommended on the product label;
- applying them at the correct rate;
- clearing up spillages (pellets or pellet and seeds mixed) immediately;
- never leaving packs of slug pellets unattended and not storing slug pellets mixed with seed; and
- checking your field before you leave it to make sure there is no risk to animals, people or other creatures.

Inadequately protected baits for vertebrate control and the dead bodies of pests can be dangerous to wildlife and pets. Make sure that you protect baits to prevent access by other species, remove the bait after use and search for dead bodies so you can dispose of them safely and legally.

Wildlife and domestic animals may be put at risk during test-baiting to check how severe a pest problem is. When test-baiting, make sure that you adequately protect the baits to prevent poisoning creatures you did not intend to treat.

Before using these products in areas that members of the public have access to, assess the risks of accidental exposure and use appropriate controls.

In all situations, take every precaution to avoid spillages (and to completely clean up any that do occur) and overdosing in a particular area.

Take care when you are cleaning equipment designed for applying dusts, pellets or granules. If possible, do not use air lines and take care when brushing to prevent the substance contaminating the air.

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4.6.8 Using vehicles without cabs

Spraying from vehicles without cabs may result in a high level of exposure through your skin or by breathing in the spray. You should take care to keep your exposure to spray drift as low as possible and you must wear appropriate PPE (possibly as well as that specified on the product label).

Similarly, using a vehicle without a cab to apply slug pellets and granules may result in high levels of exposure, especially when the product is dusty or dust is created during the application. You must carry out an appropriate COSHH assessment to identify how to avoid or control exposure.

You can get more guidance on spraying from vehicles without cabs in the HSE Agriculture Information Sheet 33 'Safe use of all-terrain vehicles (ATVs) in agriculture and forestry'. This is on the HSE website (www.hse.gov.uk/pubns/ais33.pdf).

4.6.9 Paved areas and public footpaths

Applying pesticides on hard surfaces may lead to run-off and you should take extra care to make sure that pesticides do not enter drains or watercourses. Run-off can also pollute groundwater. If the area to be treated is designated as a groundwater source protection zone I, you may need to use alternative methods of pest, weed or disease control.

Before you use a vehicle to apply a pesticide on a footpath, consult the local authority and, if necessary, get their permission. When choosing the product and how to apply it, remember that people and animals are likely to be using the footpath. Always drive the vehicle at a speed which is appropriate for the work being done, the local conditions and the safety of people in the area. Be prepared to stop if necessary.



4.6.10 Using hand-held equipment

When using hand-held equipment, you should try to avoid contaminating yourself by walking through the crop or area you have just treated, especially when you are working in a high crop. Avoid working into the wind when you are spraying or applying dusts and fine granules by hand or using hand-held equipment.

When using a knapsack sprayer, you must take care to achieve the intended application rate and to prevent spray drifting off target. Using a suitable spray pressure control valve and nozzle cover may help.

When filling equipment, be careful:

- not to allow the outside of any backpack used with a controlled droplet application (CDA) lance or spot gun to become contaminated (special care needs to be taken when filling narrow-necked backpacks);
- to avoid overfilling the spray tank;
- to make sure that you replace the filler cap correctly and firmly; and
- to prevent spillage (for example, by filling equipment within a portable drip tray or a 'bunded area' sealed off from the ground with raised edges).

Do not prepare a spray solution in bulk for several users unless the equipment you are using does not need to be adjusted to suit individual users (for example, where a dilution rate is stated only for knapsack sprayers).

If you are applying a pesticide which has been prepared by another person, make sure that you have read and understood the product label.

You should not use hand-held equipment while you are riding on an ATV or driving any vehicle.

4.6.11 Seed treatments



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If you are using mobile seed-treatment equipment you should make sure that the seed-treatment product is supplied in containers which are not too large to be carried, handled and used safely.

Take care when you are cleaning seed-treatment or seed-drilling equipment. If possible, do not remove dry or dusty deposits using air lines and take care when brushing to prevent the dust being carried in the air.

Some seed treatments leave a dusty deposit on the seed and a residue in the seed container and drilling equipment. Be careful to avoid breathing in the dust or contaminating your skin, especially when handling treated seed, setting equipment and cleaning equipment after use. Dispose of seed bags, other contaminated material and unused treated seed safely and take care to avoid contaminating people or the environment. Make sure that all the treated seeds you plant are completely covered with the appropriate depth of soil and, if you spill any treated seed, clear it up straight away.

4.6.12 Dipping and drenching treatments

Using pesticides as a dip or a drench may result in high levels of skin contamination from splashes, run-off from the freshly treated material and contact with contaminated debris when cleaning the equipment. Breathing in pesticide vapour may also be a problem when dipping and

drenching. Make sure there is good ventilation for people applying the product, handling the treated material or working in contaminated areas. Follow the conditions on the product label (see also annex G).

Where possible, avoid dipping by hand and make full use of equipment which will reduce your exposure during the treatment process and result in the lowest possible amount of run-off from treated material (for example, using an electrostatic spraying booth for forestry transplants or using foam treatment equipment for onion sets). Using this equipment will also reduce the environmental problems associated with making too much pesticide solution and run-off from freshly treated material.

Always dispose of used or extra pesticide mixtures and unused treated material safely and legally. Make sure that treated material is labelled and not left unattended. When carrying out your COSHH and environmental-risk assessments, remember that workers who plant treated material or handle treated produce may not know what pesticides have been used or the precautions they should take as a result.

4.6.13 Weed control in or near water

Very few pesticides are approved for use in or near water and you must give notice to, and get permission from, the Environment Agency before using a pesticide in these situations. Before using a pesticide in water or in areas immediately next to watercourses, you must have had relevant training and, where appropriate, you must have any certificates of competence for the way you will be applying the pesticide in these situations.



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4.6.14 Applying pesticides from an aircraft

The various legal obligations and general obligations relating to applying pesticides from the air are explained in annex G.

4.7 Spray drift

4.7.1 The effects of spray drift

By law, pesticides must only be applied to the land, crop, structure, material or other area you are treating. Spray drifting off target is a common result of misusing pesticides and causes problems between pesticide users and their neighbours.



Spray drift can also cause damage to the environment and wildlife (both on land and in water) and result in water pollution. In some cases, spraying may be illegal if you do not follow the proper procedures for consulting and giving notice to the appropriate environment or conservation agency.

Remember, pesticides applied as dust or fine granules can also drift. You must take care to apply these products in suitable weather conditions with suitable equipment, correctly adjusted for the product you are using.

4.7.2 What causes spray drift?

A combination of factors may contribute to spray drift, including:

- the speed of the wind;
- the height of the spray nozzles, the design of the equipment and ground conditions;
- the spray quality (which will depend on the choice of nozzles and the spray pressure);
- the type of crop or other vegetation, if any;
- the speed of the vehicle the spray is being applied from;
- local atmospheric conditions;
- the condition of the equipment used to apply the pesticide; and
- the equipment settings.

4.7.3 Weather conditions

Do not apply pesticides in a way which may lead to drift. You should think about:

- if the wind direction and speed would cause the pesticide to drift away from the target; or
- there is a chance that air movement will carry spray droplets or vapour away from the target area.

This is especially important when spraying near sensitive areas.

Check the weather forecast before starting work. The Meteorological Office gives information on wind speed measured at 10 metres above the ground. When spraying a typical field crop or grassland, the wind speed at the correct height of the nozzle (an important factor affecting drift) will be roughly half the value measured at 10 metres. If there is no crop (for example, when spraying hard surfaces in amenity areas) the wind speed at the height of the nozzle may be more than half of the value at 10 metres above the ground. As wind speed and direction will be influenced by a variety of local factors (such as the presence of trees and buildings), it is important to assess the suitability of the conditions at the area you intend to treat.

When you arrive at the area you intend to treat, look for signs to show you the wind speed and direction. If you have a suitable wind-speed meter (anemometer), use this. However, you should take care to make sure that individual meter readings reflect the general situation as you see it.

Remember that hot, dry weather will reduce the size of spray droplets because of evaporation and increase the risk of spray drift.

The safest conditions in which to spray are when it is cool and humid with a steady wind of 2 to 4 miles an hour or 3.2 to 6.5 kilometres an hour (light breeze) blowing away from any sensitive areas or neighbours' land. Avoid spraying in the following weather conditions:

- when there is little or no wind under a clear sky in the morning or evening, when air layers do not mix, as any drift may hang over the treated area and unexpected air movements may move it to other places;
- when there are low winds on warm sunny afternoons when humidity is low;

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- when temperatures are above 30°C, as rising air currents may carry spray droplets and vapour in an unexpected way.

Whatever equipment you use, make sure that you do not use it when the wind will cause the pesticide to drift off target. In general, if you have low-drift spraying equipment, use this to improve the targeting of your pesticide and reduce (to the lowest possible level) the environmental effect.

The table below is a guide to assessing wind speed and recommendations for standard field crop sprayers. The relationship between the wind speed at the height of the spray nozzles and the wind speed (according to the Beaufort scale, measured at a height of 10 metres above the ground) assumes that there is a crop covering the ground. If there is no crop or grass cover, the wind speed at the height of the spray nozzle will be higher.

Table 6: A guide to wind speed and using field-crop sprayers with conventional nozzles

Beaufort scale (measured 10 metres above the ground)	Description	Visible signs	Guide for using a standard crop sprayer	Approximate wind speed at the height of the spray nozzle
Force 0	Calm	Smoke rises vertically	Use only 'medium' or 'coarse' spray quality	Less than 2 kilometres an hour (less than 1.2 miles an hour)
Force 1	Light air	Smoke drifts, showing the wind direction	Acceptable spraying conditions	2 to 3.2 kilometres an hour (1.2 to 2 miles an hour)
Force 2	Light breeze	Leaves rustle and you can feel the wind on your face	Ideal spraying conditions	3.2 to 6.5 kilometres an hour (2 to 4 miles an hour)
Force 3	Gentle breeze	Leaves and twigs are constantly moving	Increased risk of spray drift. Avoid spraying herbicides and take special care with other pesticides	6.5 to 9.6 kilometres an hour (4 to 6 miles an hour)
Force 4	Moderate breeze	Small branches are moved and dust and loose paper are raised	Do not spray	9.6 to 14.5 kilometres an hour (6 to 9 miles an hour)

4.7.4 How can off-target drift be prevented or controlled?

When using pesticides, take all reasonable precautions to prevent drifting off target. Reasonable precautions include using appropriate methods and equipment to apply the product, taking account of the weather conditions, taking account of neighbours' interests and protecting members of the public, wildlife and the environment. Consider the following points:

- Check the weather forecast and the conditions at the site you are treating before you start to apply a pesticide. Do not apply a pesticide if it is likely to drift off target or if there is a chance that wind will carry spray droplets or vapour away from the target area;
- Reducing the dose of the product you apply will reduce the amount of product which will drift off target;
- Use the coarsest appropriate spray quality at all times;
- When using a sprayer, keep the boom as low as possible, providing an even spray pattern at the correct target height. The correct boom height will depend on the spray pattern and the angle of the individual nozzles, the space between nozzles, the flatness of the area being treated and the design of the boom;
- When using a sprayer with hydraulic nozzles, reduce the spray pressure and speed of the vehicle (but make sure you maintain the intended dose, water volume and spray quality);
- Consider not treating an area closest to the downwind border of the area you are treating. For field crops, an untreated buffer zone will be most effective if the crop (or plants of at least the same height as the crop) continues into the buffer zone;
- In orchards, consider having appropriate natural windbreaks, such as other trees, around the treated area;
- Use one of the various spraying systems which are available to help reduce spray drift. Suitable drift-reducing systems may include twin-fluid nozzles, air-induction nozzles, rotary atomisers, pre-orifice nozzles, air-assistance for field crop sprayers, shrouded-boom sprayers for sports turf and other amenity areas, and re-circulating tunnel sprayers for spraying fruit bushes and trees. Sprayers and nozzles meeting the needs for low-drift equipment under the LERAP schemes will give lower levels of drift than conventional systems when used correctly;
- Use an authorised drift-reducing additive to pesticides in appropriate situations (depending on the type of equipment being used and the nature of the spray solution).



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Pesticide manufacturers and suppliers will be able to give you information on their nozzles and spraying systems.

You can get general advice on how to choose nozzles which will apply the pesticide effectively while reducing drift in the Voluntary Initiative stewardship leaflet 'Nozzle selection and maintenance', which includes the Home Grown Cereals Authority (HGCA) nozzle selection chart (see www.voluntaryinitiative.org.uk).

4.8 After working with pesticides

4.8.1 What you need to do after you have applied a pesticide

The following is a brief checklist of what you need to do when you have finished applying a pesticide.

✓	Clean the equipment you have used, inside and out, preferably before leaving the treatment area. Dispose of unused spray solution and sprayer washings safely and legally.
✓	After cleaning, store the sprayer (or other equipment) under cover.
✓	Return any unused pesticide concentrate to your pesticide store.
✓	Keep the appropriate records.
✓	Remove warning notices when they are no longer needed.
✓	If you have given warnings to beekeepers, tell them that you have finished applying the pesticide.
✓	Make sure that you: <ul style="list-style-type: none">• dispose of used PPE safely and legally (if it is not designed to be used again or is unfit for further use); or• where appropriate, clean re-usable PPE before you store it and dispose of washings safely and legally; and• report any faults with engineering controls or PPE.
✓	Let the appropriate manufacturers know (either directly or through the supplier) if you have found any product-related, packaging-related or equipment-related problems when mixing, loading or applying the product.