



Lesson 8: Application Technology

The type of application equipment used must suit the type of application. In this module, you'll learn the parts of the most common types of application equipment used by assistant applicators, as well as how to properly use and maintain equipment.

Key Learning Points

- Identify the parts of common types of application equipment.
- List considerations for properly maintaining pesticide application equipment.

Equipment Parts

Applicators need to be familiar with their equipment's components, their purpose, and how to maintain and use equipment. While you won't be calibrating equipment as an assistant applicator, **you need to know when your equipment requires maintenance**. You should also be familiar with your equipment's parts and operation.

Each piece of application equipment is made up of different components that work together to apply the pesticide. Each component has a specific function:

- Tanks and hoppers hold the pesticide.
- Valves both check the flow and allow the pesticide to move; they may also regulate pressure.
- Gauges measure pressure and pesticide output.
- Hoses transport the pesticide through the system.
- Pumps pressurize and move the pesticide mixture.
- Nozzles deliver the pesticide to the target.

No matter what equipment you use, it will have the above components in some form.



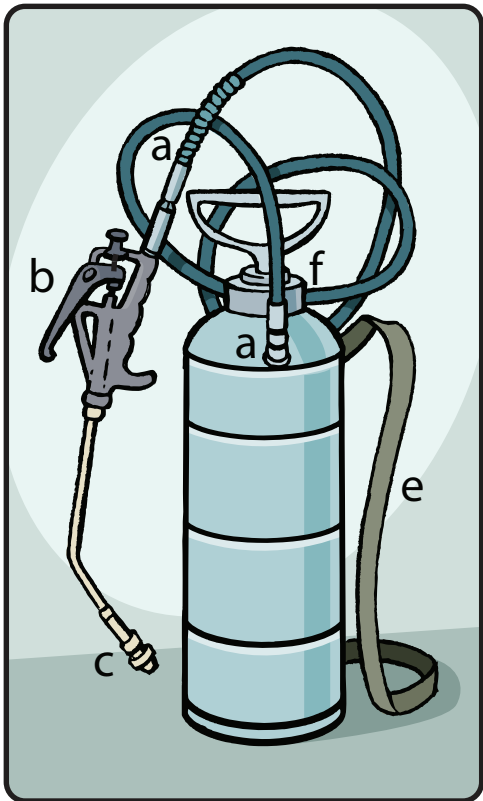
Common Pesticide Application Equipment

Here are three of the most common types of pesticide application equipment. Note the safety features and potential hazard areas in each piece of equipment.

Hand-held sprayer

Hand-held sprayers are often used to apply small quantities of pesticides for small treatments. If the unit leaks, there is less risk to the applicator than a backpack sprayer, since this unit is not worn on the body, and simply carried in the applicator's hand.

Hand-held sprayer



What to look for

- a. Hose flex points
Cracks in hoses tend to develop at these points.
- b. Trigger assembly
Leaks may develop around inadequately maintained seals. If the trigger cannot be locked in the OFF position, it could accidentally be pressed and pesticide sprayed where it doesn't belong.
- c. Nozzle assembly
Some units with multiple nozzle assemblies have an identification code on the side of the assembly. Such a code lets the operator select the nozzle opening without looking directly at nozzle orifices.
- d. Gun mount (not shown)
Some hand sprayers include a safety feature that permits the applicator to affix the gun to the side of the tank when the gun is not in use.
- e. Support strap
If straps are worn, they can break and result in a pesticide spill. It is unsafe for the support strap to be made of material that will absorb chemicals.
- f. Tank filler seal
Worn or improperly seated seals can make it difficult to pressurize the sprayer and can result in pesticide leaks.
- g. Pump check valve (not shown)
Hand sprayers will include a pump check valve. A worn check valve may make it difficult to pressurize the sprayer and could result in pesticide leaks.



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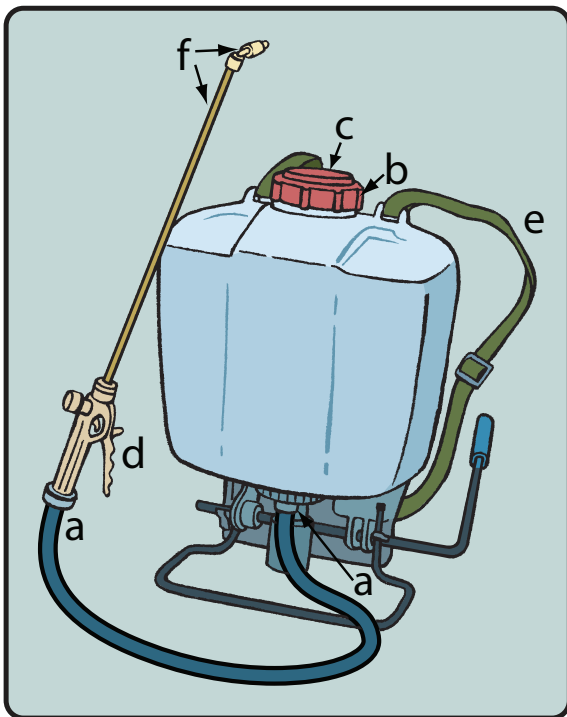
Backpack sprayers

These units are carried on the back. They typically carry larger quantities of liquid than hand-held sprayers.

A hand-operated pump is employed to generate pressure inside a pressure cylinder which is often located within the tank. The whole tank is not under pressure.

Backpack units are more hazardous than hand-held varieties because of the possibility of body drench if the sprayer leaks or the tank contents are spilled.

Backpack sprayer



What to look for

- a. Delivery line connections
These may come loose due to frequent flexing and use in rugged terrain.
- b. Cap
These are often made of plastic. Sunlight and some chemicals can cause deterioration of plastic materials. Worn cap seals can allow pesticides to leak.
- c. Air bleed hole
Designs without baffles or check valves are more hazardous than those that have such safety features. Even with such features, pesticide can leak out of these holes if the operator bends over and tips the tank.
- d. Trigger assembly
Connections at the trigger assembly may leak due to inadequate tightening or faulty gaskets.
- e. Support straps
These must be capable of supporting the weight of the unit. Absorbent straps are hazardous, as they can absorb pesticide.
- f. Wand and Nozzle
Depending on the design, these may drip pesticide still contained in the wand after the trigger has been released. The operator must be aware of this tendency and take the necessary precautions to prevent contamination.



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Truck Mounted (Power Hose) Sprayer

A power hose sprayer is typically mounted on a truck or trailer. They generally carry large amounts of pesticide mix.

These sprayers are equipped with a power-driven pump to provide pressure to the pesticide in the hose rather than in the tank.

Because a power sprayer carries a large quantity of pesticide, there is an increased risk should there be a spill.

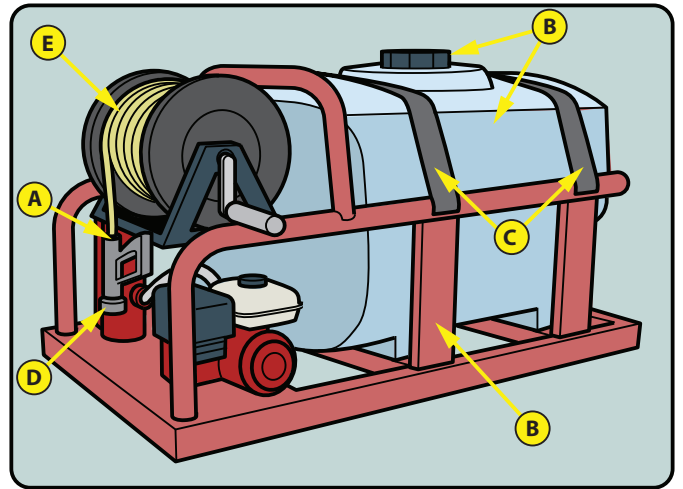
What to look for

- A. Look for **clamp** failure. Clamps are used throughout the sprayer to connect hoses to other equipment parts. The standard screw clamps need to be tightened every few weeks. Look for one-eared clamps, and stainless steel construction. These last longer.
- B. Check for cracks in the **tank** and **frame**. Special attention should be paid to plastic tanks and caps, as sunlight and chemicals can cause deterioration.
- C. **Tank securing mechanisms** need to be appropriate for the weight of the full tank and terrain.
- D. Check that **nozzle tips** appropriate for type of spraying and targets. Ideally, these should be adjustable at the gun. Make sure the guns are not dripping freely onto the ground. You can keep the guns in a plastic “holster” made from a non pesticide container to catch any drips or leaks.
- E. Check the **hose reel fittings** on both ends (from discharge area and to handgun). These fittings are often swivel fittings, and they wear out over time. It may help to reverse the hoses every year so the reel end becomes the gun end. This will allow the hose to wear more evenly over time. Note that hose fittings can loosen over time from vibration. Tighten any loose fittings. They will eventually leak and drip due to wear, so they may need replacement.

Also look for:

- **Agitator**: Is the agitator working correctly? Run sprayer with water and check for leaks and proper operation.
- **Ball valves** may leak if not tightened on properly, or the seal becomes worn.
- **Filters** may leak if the seals becomes worn.
- On the discharge there can be a **by-pass valve** and a **pressure gauge**; these fittings may leak due to seals weakening or chemical causing deterioration. Also ensure the pressure regulator is operating in the proper range.

Truck Mounted (Power Hose) Sprayer





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NOTE: there are many types of spray systems other than what is shown in this diagram. Also, since these sprayers are mounted on a vehicle, vehicle checks should also be performed as per vehicle operator's manual recommendations.

Calibration of Sprayers and their Spray Patterns

Once your supervisor has determined the recommended sprayer output for the pesticide, they should calibrate the sprayer so that it will deliver the correct amount of spray mixture per unit area or volume.

As an assistant applicator, you should know that the equipment you use needs to be calibrated before you begin spraying. The calibration is your supervisor's responsibility.

You are responsible to check and ensure that nothing seems wrong with your equipment every time you use it.

Do you notice:

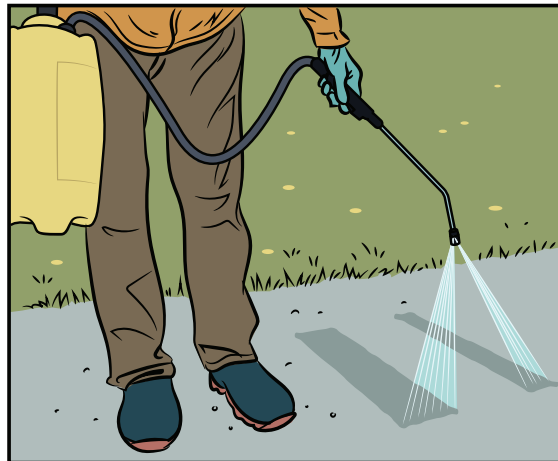
- an uneven spray pattern?
- you can't get enough pressure in your sprayer?
- the nozzle seems plugged?
- the equipment needs maintenance—you notice cracks, leaks, or a disconnected hose?

If you notice something is not right with your equipment, you should stop working, and talk to your crew supervisor.

This is what an even spray looks like.



If your spray pattern looks more like the image below, your nozzle may be blocked.



Watch the video [Blocked Nozzle and Even Spray Pattern](#) for what a sprayer with a blocked nozzle looks like, and then what an even spray pattern looks like. If you're working offline, remember you can go back to the Module 8 web page and download or stream the video from there.



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There are a number of adjustments that you can make to application equipment to ensure that it applies the proper amount of pesticide. Check with your supervisor for guidance on the following:

- Selecting the nozzle with the best flow rate, spray pattern or spray angle for the job.
- Adjusting the distance of your nozzle from the target.
- Adjusting the pressure at which you apply the pesticide.
- Altering the speed at which you move while spraying.

Safety Check Your of Equipment

Set up routine inspections for your application equipment. Make sure you know whose job it is to inspect each piece, and when it should be done. Record when spray equipment was inspected.



To see a complete backpack sprayer safety inspection, watch [Equipment Safety Check](#). If you're working offline, remember you can go back to the Module 8 web page and download or stream the video from there.



Equipment that is not maintained properly may lead to problems—such as the blocked nozzle on the backpack sprayer that you saw in the video.

- Use a soft brush and clean water to clean your nozzle.
- If the sprayer needs to be drained, do so into a collection container, so the spray mixture can be reused or disposed of safely.
- Never blow out a nozzle with your mouth.
- Don't use sharp objects to remove the blockage, or you might damage the nozzle.



When working on equipment, there is the possibility of pesticide leaking onto the ground and dripping or splashing onto bare skin. Check the label, and wear the protective equipment specified on the label, including at least gloves, goggles, boots and long-sleeved shirts and long pants while doing repairs.



Maintenance

A proper equipment maintenance program should include an internal and external cleaning, a check of hoses, hose connectors, hopper or spray tanks, pumps and all moving parts *every day the equipment is used*. Damaged or worn parts should be replaced or serviced immediately.

At the end of the season, there should be a complete overhaul and cleaning of the equipment before it is placed in storage. The equipment operator's manual usually outlines maintenance procedures.

TIP:

A good maintenance routine will result in less downtime for repairs during application periods, and increase the service life of the equipment.

Cleaning Equipment

Sprayers are typically emptied and thoroughly cleaned, inside and out, after each day of use. Ask your supervisor for direction on how to properly clean equipment. Never leave pesticides in your application equipment—the chemicals could penetrate and damage hoses, gaskets or other parts. Damaged equipment could lead to a pesticide emergency or poor pest management.



Watch the following video to see the proper order in which to clean up and store equipment after an application. (Note the record keeping will be done by your supervisor, though they may require your input to complete their records.)

[Concluding an Application: Cleaning and Record Keeping](#)

If you're working offline, remember you can go back to the Module 8 web page and download or stream the video from there.

Note the applicator in the video follows these steps to clean the equipment:

- If possible, clean equipment at the site to help prevent contamination of other areas.
- Clean tank and wand/nozzle with fresh water and soap.
- Rinse the equipment.
- Save the rinse water in a labelled container for use at her next application.
- Return containers, sprayer and measuring equipment to the locked storage area.

Summary

Lesson 8 explained the importance of correctly checking, using and caring for application equipment. You also learned terms common to application equipment.



Lesson 8 Practice Activity

1. What is the purpose of equipment calibration?
 - a. To check and adjust the amount of pesticide to be applied
 - b. To check and adjust the gauges on application equipment
 - c. To check and adjust the delivery rate of application equipment
 - d. To check and adjust the size of the treatment area
2. How often should application equipment be cleaned as a minimum?
 - a. Every hour it is used
 - b. Twice a day when in use
 - c. Every day it is used
 - d. Every week it has been used
3. Where should application equipment be cleaned after an application?
 - a. In the mixing area
 - b. Near the pesticide storage area
 - c. In the treatment area
 - d. In a covered area where it can be washed
4. Which of the following are good reasons for maintaining application equipment?
Select all that apply.
 - a. Poor maintenance can lead to increased 'down time' of equipment
 - b. Poor maintenance can lead to increased repair costs
 - c. Poor maintenance can lead to pesticide spills, leaks and drift
 - d. Poor maintenance violates the Transportation of Dangerous Goods Act
5. Which of the following are basic objectives of any application procedure? (Select all that apply.)
 - a. Keep the pesticide away from non-target sites
 - b. Dispose of waste pesticide as quickly as possible
 - c. Apply the pesticide at the correct rate
 - d. Apply the pesticide uniformly to the target
6. Who will calibrate the equipment before use?
 - a. The assistant applicator
 - b. The supervisor
 - c. The equipment owner



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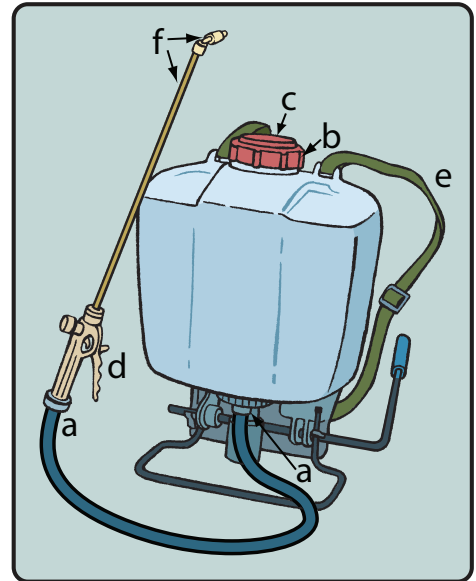
7. What should you do if you encounter an uneven spray pattern? (Select all that apply.)
- a. Stop using the equipment
 - b. Check with your supervisor
 - c. Clean your nozzle with a soft brush
 - d. Try to blow out the nozzle.

8. What should you check for at “a” in the diagram to the right? (Select all that apply.)

- a. loose connection
- b. absorbent material
- c. leaking
- d. worn cap

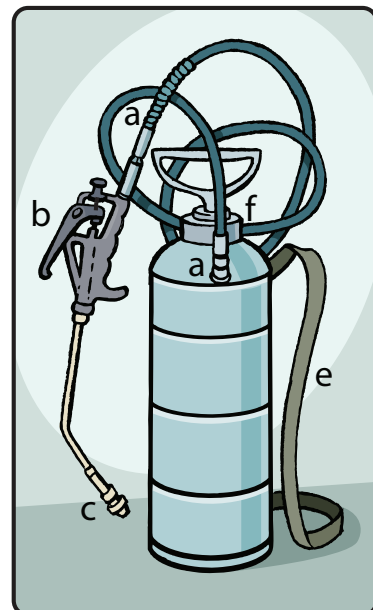
9. What should you look for at “c” in the diagram to the right? (Select all that apply.)

- a. is there a baffle or check valve?
- b. absorbent material
- c. will pesticide leak out of the hole?
- d. loose connection



10. What should you look for at “c” in the diagram to the right? (Select all that apply.)

- a. worn seal causing leaks
- b. identification code on the side of the assembly
- c. gun mount safety feature
- d. worn check valve

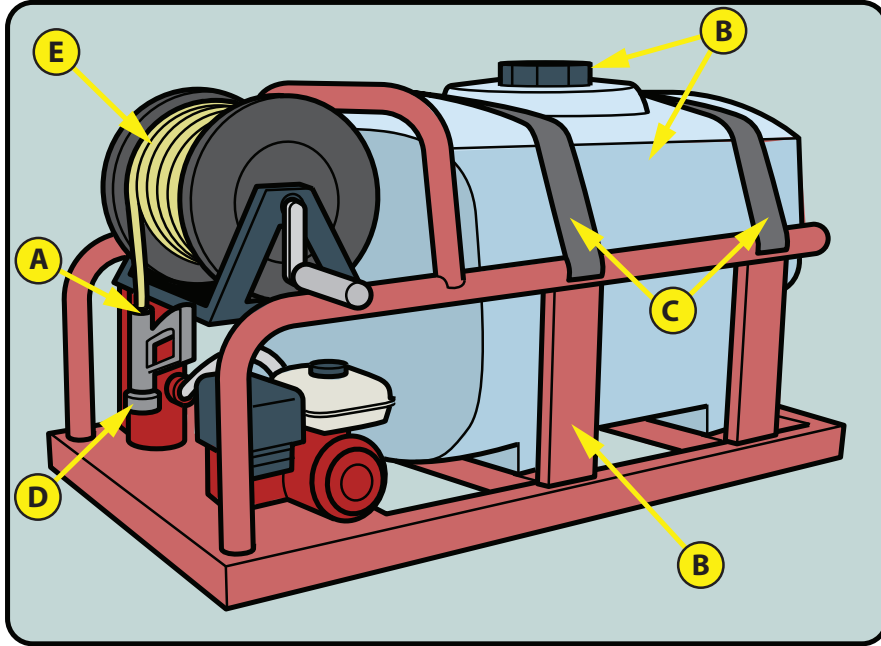




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11. What should you look for at “E” below?

- a. loose hose fittings
- b. dripping gun nozzle
- c. pressure gauge not working
- d. leaking ball valve



12. What five steps do you take to clean your equipment after application?

1. _____
2. _____
3. _____
4. _____
5. _____



Practice Activity Answer Key

1. c. To check and adjust the delivery rate of applicaton equipment
2. c. Every day it is used
3. c. In the treatment area
4. a. Poor maintenance can lead to increased 'down time' of equipment
b. Poor maintenance can lead to increased repair costs
c. Poor maintenance can lead to pesticide spills, leaks and drift
5. a. Keep the pesticide away from non-target sites
c. Apply the pesticide at the correct rate
d. Apply the pesticide uniformly to the target
6. b. The supervisor
7. a. Stop using the equipment
b. Check with your supervisor
c. Clean your nozzle with a soft brush
8. a. loose connection
c. leaking
9. a. Is there a baffle or a check valve?
c. Will pesticide leak out of the hole?
10. b. identification code on the side of the assembly
11. a. loose hose fittings
12. The five steps for application equipment cleanup:
 1. If possible, set up your cleaning station at the site.
 2. Clean tank and wand/nozzle with fresh water and soap.
 3. Rinse the equipment.
 4. Save the rinse water in a labelled container.
 5. Return containers, sprayer and measuring equipment to the locked storage area.