

PA6a Hand Held Applicators

Hydraulic Nozzle

Diaphragm Pump



The relief valve regulates maximum pressure. It is adjustable with high and low settings (3bar and 1bar).

The tank is not pressurized.

All liquid should be filled through the basket strainer.

The vent prevents a vacuum forming in the tank and so must not be allowed to get blocked or the tank may collapse.

Piston Pump



The pressure relief valve is set at a fixed 3 bar on this CP model.

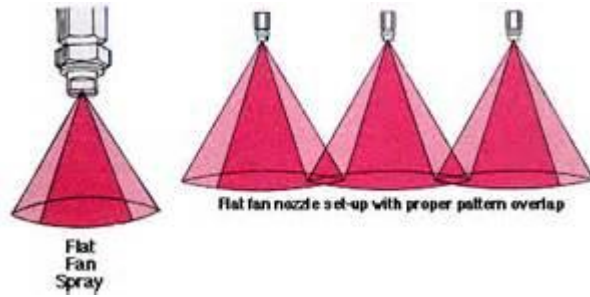
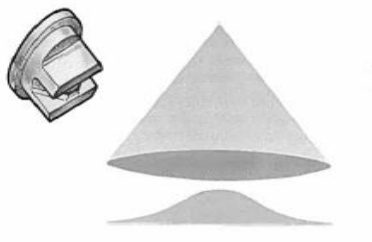
However a spray management valve can be fitted to further regulate the pressure and give a constant flow of liquid through the nozzle.

A yellow spray management valve will shut off at pressures less than 1bar and will restrict pressure to the nozzle exceeding 1 bar, as a result of this the lance needs to be split to depressurise the system rather than just operate the trigger.

Pump handles can usually be swapped from left or right to suit the operator

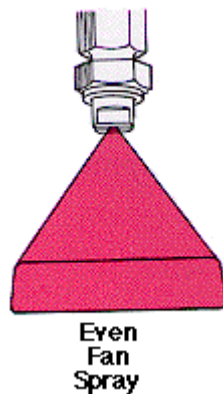
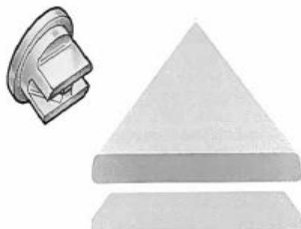
Nozzles

1. Flat fan F



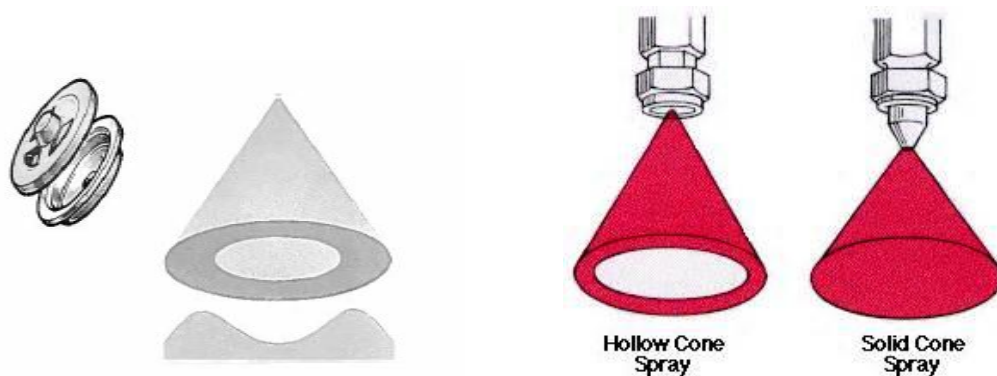
Standard fan nozzles do not spray evenly across their width of application. They rely on overlapping to build up an even distribution. Typically they spray at an angle of 80° to 110° .

2. Even spray FE



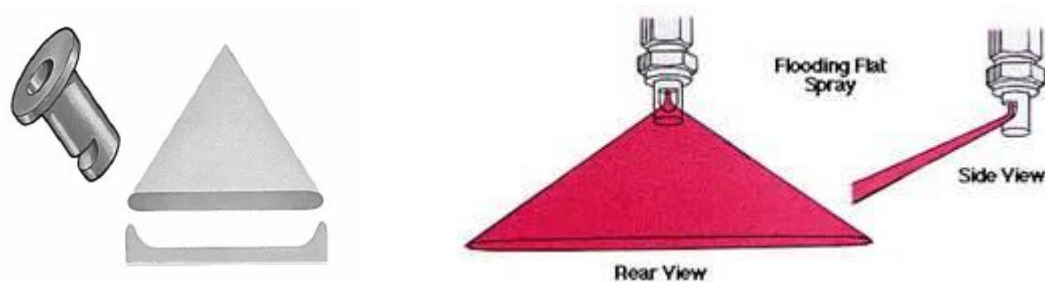
Suited to applicators where a single nozzle is used for strip spraying e.g. Knapsack

3. Cone HC / FC



Cone nozzles can produce hollow cone or full cone spray patterns and are usually of a two piece design to create a swirl chamber. Often used for insecticides or fungicides in horticulture where fine spray may be required.

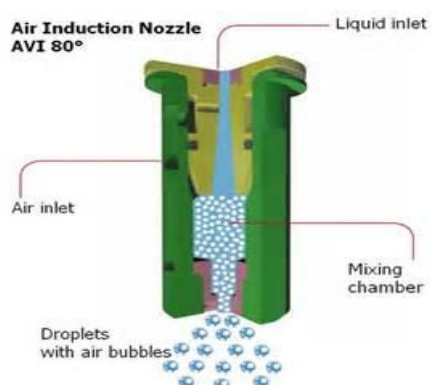
4. Deflector (flood or anvil) D



Wide angled flat spray pattern results from a straight jet hitting a deflector surface. Common on knapsacks giving a medium to coarse spray quality.

5. Air inclusions

Air is drawn into the nozzle to create large droplets which contain air bubbles. They minimise drift but on contact “explode” to produce finer droplets.



6. Low drift fan LD

Produce coarser droplets than conventional flat fan to reduce drift.

7. Variable pressure fan

Maintain a constant spray angle over a wide pressure range. Ideal for machines with automatic rate controllers - agricultural crop sprayers.

BCPC Nozzle Identification Codes

F = Standard fan

FE = Even spray

HC = Hollow cone

FC = Full cone

D = Deflector

BCPC code, Angle / Output / Rated pressure

Example: - F110/1.6/3

Standard fan, 110°, 1.6 litres/min, 3 bar

Nozzle selection

BCPC group nozzles into five categories:-

1. Very Fine
2. Fine – enhanced retention, suitable for contact acting fungicides and insecticides.
High risk of drift.
3. Medium – the default option if no spray quality is indicated on label
4. Coarse – residual/soil applied herbicide
5. Very Coarse

The pesticide label should recommend the spray quality

Nozzle checks

Nozzles wear and may even get damaged. Output can change and spray pattern affected. An unused “test” nozzle should be kept so that the flow rates of the in service nozzles can be checked to that of a new one. If this flow rate is breached by + or – 5% the full set should be changed.

Nozzle cleaning

Blocked nozzles should be cleaned by soaking in water, brushing, or blowing with an air line. Never blow through by mouth, or use wire etc. Ideally carry spare nozzles.

Preparing the Knapsack Sprayer for work

1. **Suitable PPE: - Suite, gloves, boots and face shield. Respirator if necessary (check product label).**
2. **Knapsack should clean, inside and out.**
3. **Depressurised**
4. **Safe, suitable, site.**

Maintenance Checks (Dry) – wearing PPE

Straps- secure and adjustable

Handle – left/right

Lid – vent/seal

Filters – filler basket, handle, nozzle

Nozzle – type, size, condition

Trigger- free

Hose – condition

Connections- tight and good order

Wet Checks - PPE

Half fill tank with water and pressurise system

Check for leaks and trigger function

Spray management valve and pressure relief valve function

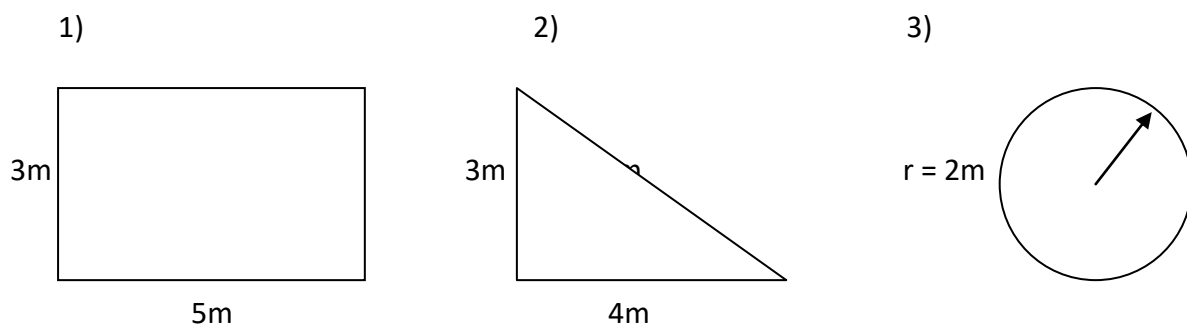
With sprayer on, walk and spray on dry ground to check if the pattern is even and equal

Handling and applying pesticide – Key points

1. The code of practice i.e. PA1
2. Safety – COSHH assessment
3. Environmental assessment – water margins, buffer zones (1 metre from top of bank), wind speed & direction, gardens, etc.
4. Never add pesticide to an empty tank. One third to half water first
5. Water supply hose must not enter tank
6. Filling site – drains or water courses nearby?
7. Concentrate preparation – shake, dissolve, pre-mix? Read label.
8. Top up tank and agitate

Application Procedure

Calculate the area to be sprayed



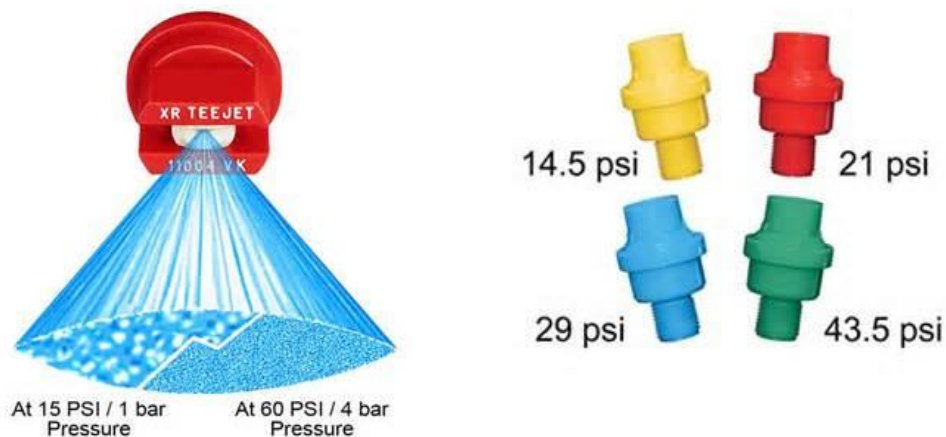
- 1) Length x breadth $3 \times 5 = 15 \text{ m}^2$
- 2) Half base x height $2 \times 3 = 6 \text{ m}^2$
- 3) $\pi (3.14) \times \text{radius} \times \text{radius} \quad 3.14 \times 2 \times 2 = 12.56 \text{ m}^2$

Marking out the area to be sprayed

- 1) Measure your swath width for the appropriate nozzle
- 2) Assess how your swath width fits the area. Could you alter your width to fit the area so as to avoid overlaps or alter your swath width to match lawn mower/roller marks, pavement joins etc.
- 3) If necessary use marker poles or add dye to the spray to aid accurate application and avoid misses or overlaps.

Consistency

- 1) The rate at which the hand pump is operated will affect the spray pressure. This pressure maybe regulated by a pressure relief valve and/or the pressure control valve. However the pump should always be operated at a consistent rate and stroke so as to deliver sufficient pressure to the nozzle. This will maintain the correct flow rate and spray quality.



- 2) Walking speed should be consistent as it directly affects application rate. Consider the terrain and size of area to be treated.
- 3) Spray width – are you holding the nozzle at a consistent height above the target

Spray techniques

- 1) Moving starts and stops – do not stand still and spray.
- 2) Spot treatment with a fan or deflector nozzle should still be made on the move using trigger control.
- 3) Spot treatment with a full cone nozzle should be done standing still with mix being applied using trigger control until it is about to run off the leaves. The rate estimator on the product can be used to create the mix for spot treatments.
- 4) Do not spray around corners- square them off.
- 5) Do not spray around trees, bushes etc. – square them off.
- 6) Be aware of where you walk after applying a total herbicide.
- 7) Be aware that residual herbicide can travel sideways through the soil and kill beyond the initial contact area. Leave a 150mm margin where necessary.
- 8) Observe for people, livestock, weather changes and mechanical problems. STOP spraying if necessary!
- 9) Minimise drift – consider the use of spray shields.
- 10) Plan to walk across the direction of wind.



Cleaning (wearing PPE)

- 1) Dispose of any remaining spray mix following the code of practice and the product label. Ideally find more area to treat. Only go back over the treated area if it's not breaking a condition of approval ie. the dose rate or number of applications.
- 2) Rinse out the tank with at least 3 changes of clean water, operating the pump and recirculating the water within the sprayer. It is more effective to rinse 3 times with 5 litres than once with 20 litres. A cleaning agent should be used if necessary – see product label.
- 3) Washings are not treated as an application and can be applied on to a previously treated area provided the original application has dried on.
- 4) Remove filters and nozzles and clean in water with a soft brush.
- 5) Finally rinse the outside of the tank, hose, straps and lance.

Storage

- 1) Ensure sprayer is fully empty.
- 2) Check all components for signs of wear, aging and cracking: - tank, straps, diaphragm, o rings, hoses, clips etc.
- 3) If full drain is not possible add an anti freeze solution.
- 4) Store securely out of direct sunlight.

Record keeping

Accurate, complete and up to date records must be kept as set out in PA1.

eg. COSHH & Environmental Assessments, Application records, Store records, Maintenance records etc.

KEY POINTS:-

- 1) **FOLLOW THE CODE OF PRACTICE**
- 2) **FOLLOW THE PESTICIDE LABEL**
- 3) **FOLLOW SPRAYER OPERATORS MANUAL**
- 4) **MAINTAIN UPTO DATE RECORDS**

PA 6aw (Applications in or near water)

- 1) Check field of use on the product label. Is there approval for aquatic use and any specific guidelines?
- 2) Contact SEPA to get permission to apply the product.



3) Additions to the COSHH/Risk assessment

a) Terrain, bank stability – erosion/undermined, strong currents



b) Additional equipment – throw line, life buoy, extended lance, quick release straps



c) 2 operators present

d) Mobile phones – emergency contacts

4) Check for sensitive areas

a) Water abstraction



b) Livestock drinking



c) Leisure activity



d) Fish cover, risk of deoxygenating water



5) Work in an upstream direction



6) Assess:

a) Area to be treated

b) Degree of weed cover



c) Speed of flow

