

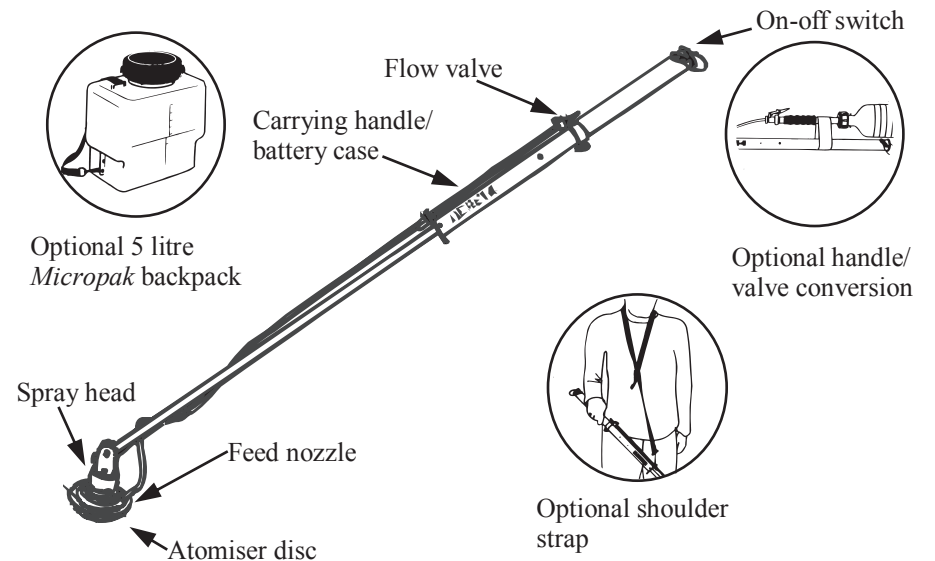
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DESCRIPTION

The HERBI-4 is a simple robust hand-held spinning disc Controlled Droplet Application (CDA) sprayer powered by 4 torch (D-cell/R20) batteries, with one set of good quality batteries giving over forty hours spraying time. It is designed to apply herbicides in a 1.2m wide band at low volumes (10 to 30 litres/hectare). A governed electric motor spins the atomiser disc at a constant 2,000 rpm to produce uniform spray droplets of around 250 micron; large enough to minimise any risk of spray drift. Liquid is fed by gravity through colour coded feed nozzles. The HERBI-4 can apply herbicides to borders, pathways, ditches and larger areas by making a series of consecutive spray passes. The weight of the machine ready to spray, with the *Micropak* 5 litre backpack, is 7kgs.



Specially designed Micron *Micropak* backpacks and a shoulder strap are available for use with the HERBI-4. The sprayer can be supplied with a handle/valve conversion as the HERBI-4 Extra (see page 14) which allows Micron spray bottles to be directly fitted to the sprayer.

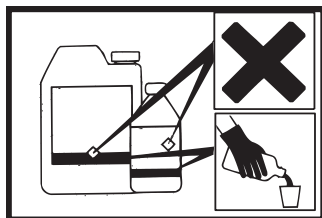
SAFETY

Using agrochemicals is a hazardous process. Operators should comply with all relevant legislation and/or regulations governing the use of agrochemicals and should use appropriate personal protective equipment (see 'OPERATOR PROTECTION'). **Never** use the HERBI-4 in potentially explosive atmospheres or spray flammable liquid through it.

The HERBI-4 can be used with most conventional herbicides, as well as specific CDA formulations (only available in some countries) to provide a closed transfer system to improve operator safety.

Always read the product label carefully to discover:-

- ◆ approved applications
- ◆ maximum dose rates
- ◆ maximum number of treatments
- ◆ operator protection required
- ◆ necessary environmental protection measures



N.B. 'Dose rate' refers to the amount of chemical applied per hectare.

Never eat, drink, or smoke when working with agrochemicals. After using agrochemicals or handling equipment wash your hands thoroughly. Keep people (especially children) and animals out of areas being sprayed.

Always store agrochemicals safely to protect people and animals, and to safeguard the environment (take special care to avoid water pollution). See 'SPRAYING' sections for guidelines on safe use of the HERBI-4 in operation.

OPERATOR PROTECTION

Always wear the protective clothing items listed on the product label for mixing and filling. The **minimum** protective clothing required for **spraying** with the HERBI-4 is:

- ◆ rubber gloves
- ◆ boots/shoes and long trousers
- ◆ eye protection
- ◆ long sleeved shirt



DECLARATION OF CONFORMITY

Name of manufacturer or supplier: Micron Sprayers Ltd.

Full postal address: Bromyard Industrial Estate,
BROMYARD, Herefordshire

Country of origin: England

Post code: HR7 4HS

Description of Product: Battery powered, hand-held
agricultural spraying
machine.

Name and model number of machine: HERBI-4

Place of Issue: Bromyard, England

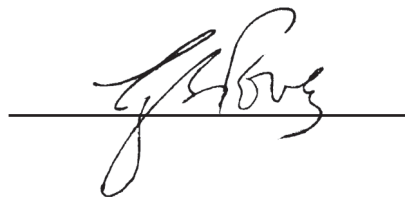
Name of authorised representative: G. S. Povey

Position of authorised Representative: Joint Managing Director

DECLARATION:

I declare as the authorised Representative, that the above information in relation to the supply/manufacture of this product is in conformity with the requirements of the 2006/42/EC Machinery Directive, the EMC Directive 2004/108/EC and complies with the relevant essential health and safety requirements.

Signature of authorised Representative:

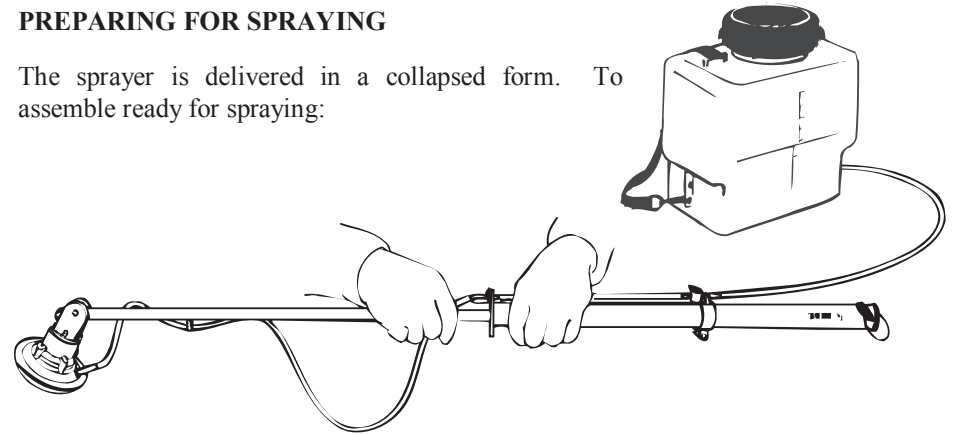


Note:

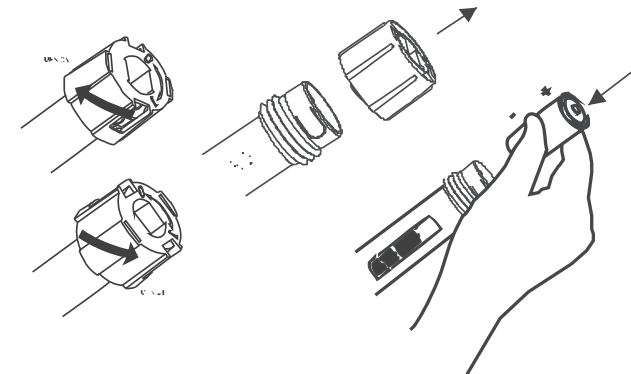
- Acoustic information: the sound pressure level at the operator's ear should not exceed 70 dB(A).
- Vibration: the weighted RMS acceleration value at the hands when using this machine should not exceed 2.5 m/sec².

PREPARING FOR SPRAYING

The sprayer is delivered in a collapsed form. To assemble ready for spraying:



- 1) Extend the sprayer and securely connect the feed tube to the flow valve. Instructions on assembling Micron *Micropak* backpacks are contained in the tank. The shoulder strap (if supplied) should be connected to the battery case end cap. Remove the atomiser protective cover and check by hand that the atomiser disc spins freely.

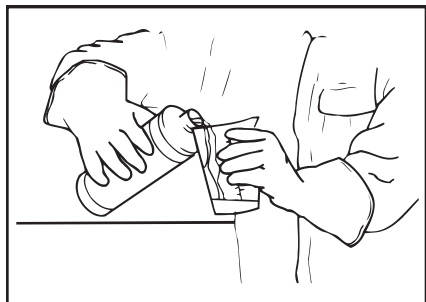


- 2) Remove the switch end piece as shown on the label.
- 3) Insert four batteries (D-cell/R20) negative, i.e. flat, end first.

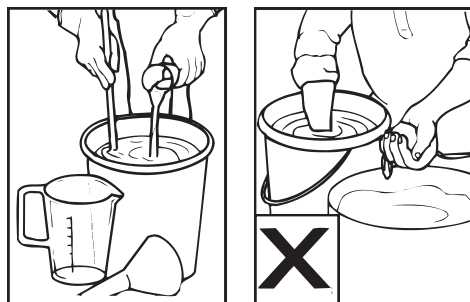
N.B. Before spraying for the first time with the HERBI-4, the spray pattern produced should be checked using only water (see 'BEFORE SPRAYING').

MIXING, FILLING AND CALIBRATION

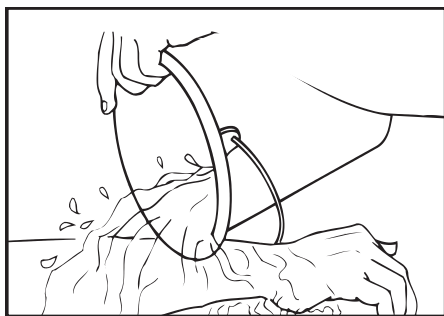
Mixing and filling is generally the most hazardous process in the spraying operation. **Always** follow the label instructions. **Always** use a filter (fitted in the Micron *Miropak* backpacks) and use a funnel if filling a container with a small neck. **Only** mix enough spray for the area to be treated thereby avoiding the need for disposal of unused spray mix.



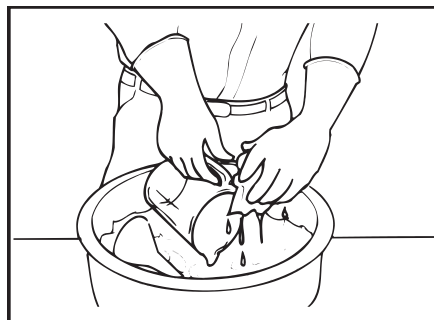
Always wear gloves when handling agrochemicals and equipment.



Always use the correct equipment when mixing and measuring.



Always wash off any skin contamination



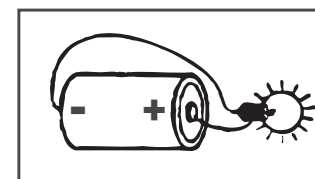
Always clean all equipment after use.

With the HERBI-4 herbicides are usually applied in around 20 litres total spray volume per hectare, except for glyphosate which can be applied at volumes as low as 10 litres per hectare. These are lower volumes than recommended for high volume application with knapsack sprayers.

TROUBLESHOOTING

- A) Atomiser disc spins but does not spray or sprays irregularly. Check:
- The feed nozzle. If the feed nozzle is blocked remove and soak in soapy water. **Never** blow through the nozzle with your mouth. Check that the feed nozzle gives a flow rate within the operating range.
 - The atomiser is clean and undamaged. Clean or replace.
 - The flow valve for blockage. Rinse through with soapy water.
- B) Atomiser disc fails to spin or spins unevenly. Check:
- That the batteries are fitted correctly.
 - The condition of the batteries. Replace if necessary.
 - That electrical terminals and contact points are clean and that electrical wires are not broken or corroded.
 - If the atomiser disc is rubbing on the motor base plate or the motor shaft is bent. Replace the disc or motor if necessary.
 - The motor for corrosion or obvious signs of wear. Replace if necessary.

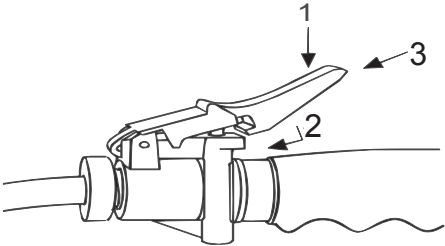
N.B. Battery condition can be checked with a torch (or a torch lightbulb and electrical wire).



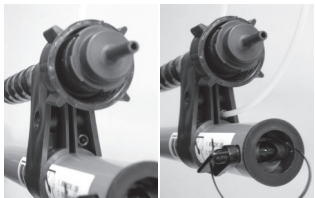
HERBI-4 EXTRA



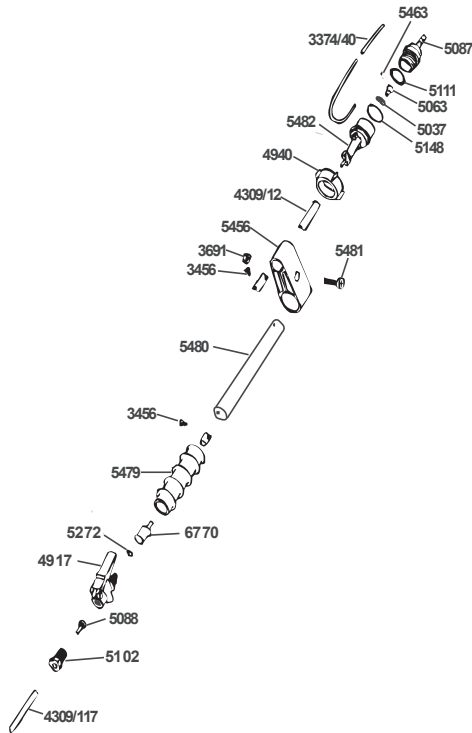
To fit the bottle to the Handle/Valve, fill the bottle to the required level and place it on a level surface. Fit the Handle/Valve into the bottle ensuring that the bottle handle is in line with the flow control valve. Tighten the bottle securing cap and pass the air bleed tube through the bottle handle. This is important to ensure that the air bleed system functions correctly.



Press lever down (1) for treating small areas. Press down and forward (2) for continuous spraying. To stop flow, pull back lever and release. N.B. for safety, valve can be locked in off position by pushing lever forward (3)



When using the backpack connector the air bleed tube must be fitted to the bracket as shown



HANDLE/VALVE PARTS LIST:

DESCRIPTION	PART NO.
TUBE, (NYLON) 3/16" O.D.	3374/40
SCREW, NO.6 X 1/4" S/T (B)	3456
NUT, 6MM	3691
TUBE, (PVC) 3/16" I.D. - 0.12M	4309/12
TUBE, (PVC) 3/16" I.D. - 1.17M	4309/117
BOTTLE SECURING CAP	4940
FILTER GAUZE	5037
DEFLECTOR, AIR BLEED	5063
BACKPACK CONNECTOR	5087
VALVE/HOSE CONNECTOR	5088
'O' RING (BS215) - NITRILE 70	5111
'O' RING (BS125) - VITON	5148
HANDLE BRACKET	5456
NUT, UNION	5102
VALVE/HANDLE ADAPTOR	6770
PIN, BRASS, 1MM X 10MM	5463
VALVE, TRIGGER	4917
'O' RING (BS108)	5272
GRIP, PVC	5479
HANDLE, ALUMINIUM	5480
SCREW, M6 X 25, POZI PAN	5481
BOTTLE HOLDER	5482

Do not use herbicide concentrations greater than the maximum recommended on the label (unless specific training or recommendations have been given) if the label:

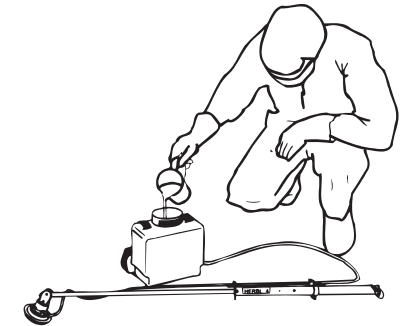
- specifically prohibits use of 'Reduced Volumes' i.e. increased concentrations;
- has a statutory requirement for use of personal protective equipment when using the diluted product at high volumes (N.B. this will appear in the statutory box on the label);
or
- carries one of the following hazard ratings: 'very toxic', 'toxic' or 'corrosive' or carries the warning 'risk of serious damage to the eyes' e.g. paraquat (Gramoxone) which is classified as toxic should not therefore be used through the HERBI-4 at concentrations greater than recommended on the label.

Micron do not generally recommend using spray mixes of more than ten times the maximum concentration recommended for high volume application with knapsack sprayers. The safest product and lowest dose rate appropriate for the treatment should be used at all times.

To prepare the spray mix first read the product label to determine the quantity of product to be applied per hectare e.g. 2 litres of glyphosate per hectare. Then determine the total spray volume to be applied per hectare with the Herbi-4 i.e. 10 or 20 litres per hectare. Calculate the ratio of product in water e.g. 2 litres glyphosate + 8 litres water = 10 litre mix = 1: 4. Use this ratio to prepare the correct dose for the spray tank or bottle e.g. with a 5 litre backpack mix 1 litre glyphosate with 4 litre of water.



Measure out the exact amount of product.



Half fill the tank with clean water. Check for leaks. Add the measured product.

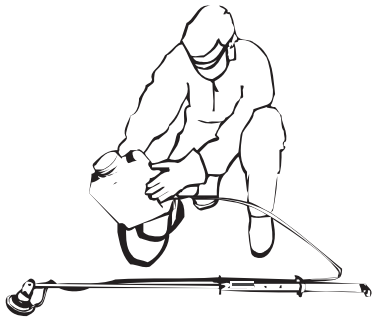
Never use leaking equipment. Take care to avoid spillage when filling or lifting the tank.



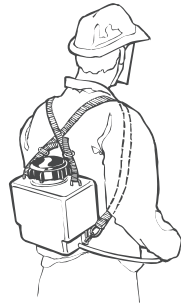
Fill the tank.



Wipe the tank with a dry cloth



Mix well by gently shaking the tank.



Place the tank on the operator's back.

Examples of mixing spray – for 1 hectare

a) glyphosate (360 g/l) 2 litres
 add water: +8 litres

Total volume: 10 litres
 i.e. 1 part glyphosate : 4 parts water

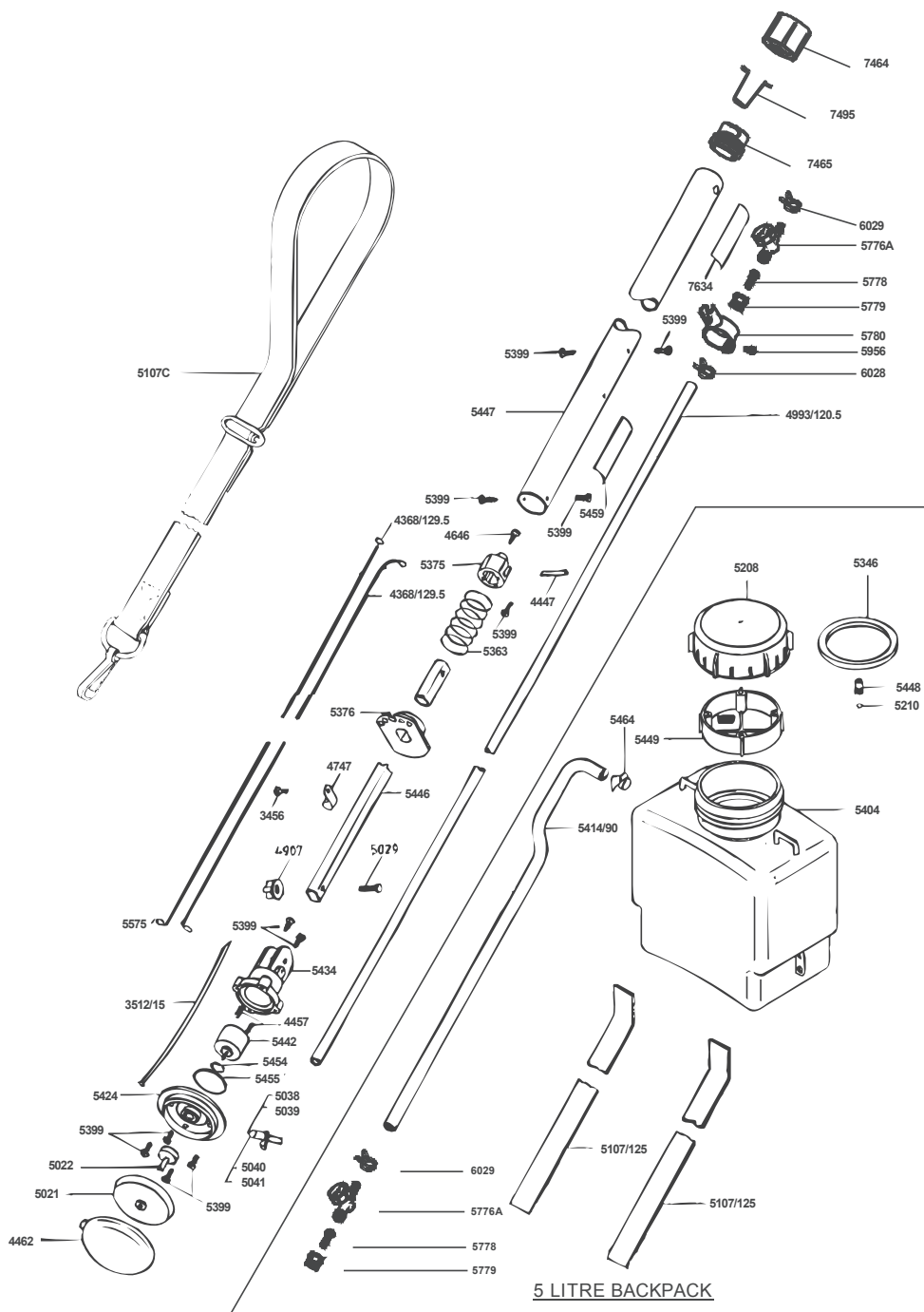
b) 2,4-D (500 g/l) 3 litres
 add water: +17 litres

Total volume: 20 litres
 i.e. 3 parts 2,4-D : 17 parts water

HERBI-4 (BASIC) PARTS LIST

DESCRIPTION	PART NO.	DESCRIPTION	PART NO.
SCREW, NO.6 X 1/4" S/T (B)	3456	HOSE CONNECTOR, 6MM	5778
TUBE, (NYLON) 0.125 O.D. X 0.058 I.D. – 0.20M	3512/20	UNION NUT	5779
ELECTRIC WIRE, BLACK (THICK) - 1.245M	4134/ 124.5	VALVE CLAMP	5780
ELECTRIC WIRE, RED (THICK) - 1.295M	4368/129.5	SCREW, M5 X 12, POZI, PAN, PT	5956
SPRING HOLDING PIN	4447	CLIP, HOSE, WIRE 9.1MM	6028
SPRING, 0/32" TERMINAL CONNECTING	4457	CLIP, HOSE, WIRE 11.1MM	6029
ATOMISER PROTECTIVE COVER (GREEN)	4462/GREEN	MOTOR HOUSING, GREEN	6125
SCREW NO.6 X 3/8" S.T.	4646	'O' RING, BS611, NITRILE	7289
TUBE CLIP	6804	SCREW SWITCH PLUG	7464
NUT, WING	4907	SCREW SWITCH SLEEVE	7465
TUBE, (PVC) 6MM I.D. X 9MM O.D. – 1.205M	4993/120.5	CONNECTOR SCREW SWITCH	7495
ATOMISER DISC	5021	LABEL, BATTERY ON/OFF	7634
SLINGER/DUMMY SHAFT	5022		
SCREW, M5 X 25MM HEX	5029	<u>OPTIONAL EXTRAS:</u>	
FEED NOZZLE, BLUE	5038	SHOULDER STRAP	5107C
FEED NOZZLE, YELLOW	5039		
FEED NOZZLE, ORANGE	5040	<u>MICROPAK 5 LITRE BACKPACK PARTS LIST</u>	
FEED NOZZLE, RED	5041	STRAP - 1.25M	5107/125
SPRING, BATTERY CASE	5363	CAP, BACKPACK - BLACK	
CENTRE CONNECTOR	5375	BALL, 3/16" DIA., POLYPROPYLENE	5210
BATTERY CASE END CAP	5376	CORK GASKET SEAL	5346
SCREW, NO.6 X 3/8" S/T POZI PAN/HEAD B	5399	BACKPACK, 5 LITRE	5404
FRONT PLATE	5424	TUBE, 8MM ID X 12MM OD - 0.90M, PVC	5414/90
MOTOR, HERBI	5442	AIR BLEED VALVE BODY	5448
EXTENSION TUBE, 1.15M	5446	FILTER (BACKPACK)	5449
BATTERY CASE	5447	HOSE CLIP, NO. 12, WINGSCREW	5464
'O' RING, BS 365-30, NITRILE	5455	TAP	5776A
LABEL, HERBI-4	5459	HOSE CONNECTOR, 6MM	5778
TERMINAL RING	5575	UNION NUT	5779
TAP	5776A	CLIP, HOSE, WIRE 11.9MM	6029

DIAGRAM – HERBI-4



The table below indicates the relationship between total spray volume, flow rate and walking speed for the HERBI-4 as per the following formula:

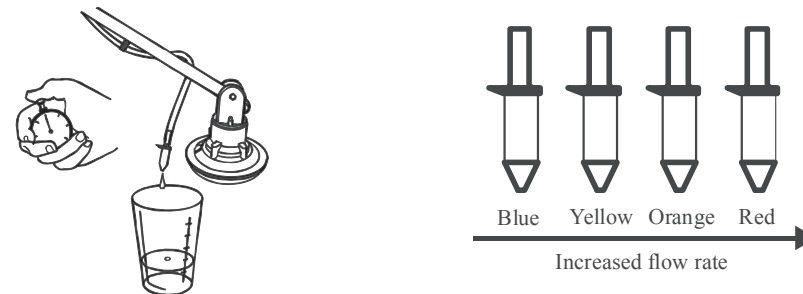
$$\text{Flow rate (ml/min)} = 6 \times \text{total spray volume (l/ha)} \times \text{walking speed (m/s)} \times \text{band width (m)}$$

Total spray volume (l/ha)	Band width (m)	Feed nozzle	Flow rate (ml/min)	Walking speed (m/s)
10 (i.e. glyphosate)	1.2	Blue	72	1
20 (i.e. other herbicides)	1.2	Blue Yellow	72 144	0.5 1

Note: The flow rates in this table were measured with the spray head 65cm below the level of the liquid in the tank, using water only. The flow rate will vary with differences in this height and the viscosity of the spray mix (for very viscous spray mixes it may be necessary to use a larger feed nozzle).

CALIBRATION

Choose and fit the feed nozzle that is likely to be required. The actual flow rate should be checked holding the HERBI-4 in the spraying position. Remove the feed nozzle from the spray head by twisting and pulling out, then, once liquid has reached the feed nozzle, allow the liquid to flow into a suitable container for one minute and measure the volume dispensed. If the flow rate is **not** in the recommended flow rate range of 60 to 150 ml/min change the feed nozzle and repeat the above procedure. N.B. It is preferable to walk more slowly to achieve the required spray volume than to use higher flow rates.



Example: Required spray volume rate = 20 l/ha; Flow rate measured = 100 ml/min

$$\text{Walking speed (m/s)} = \frac{\text{Flow rate (ml/min)}}{6 \times 1.2 \times \text{total spray volume (l/ha)}} = \frac{100}{7.2 \times 20} = 0.7$$

i.e. 0.7 m/s or 42 metres in one minute (0.7m x 60s)
Mark out a distance of 42 metres and practice walking it in one minute.

BEFORE SPRAYING

Check the wind speed and direction (below 5 kph) is safest. Take special care to avoid drift by keeping the spray head as low as possible. **Never** spray into the wind and avoid walking into the spray. **Always** keep the spray head at least 60cm from any part of the body to avoid direct contamination by the spray.

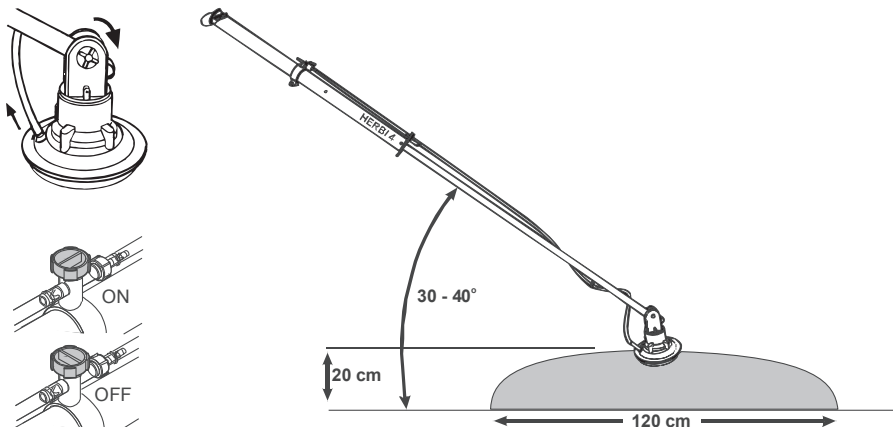
Before spraying for the first time use water **only** to check the spray pattern produced. Put some clean water in the tank and add a small amount of detergent. Check for leaks. Switch on the sprayer and **then** open the flow valve. Spray on one spot, preferably on clean dry concrete, for around 30 seconds with the spray head held about 20cm above the ground; a wet ring 1.2m wide should appear on the ground. Practice using the sprayer by walking along a few metres and then stopping spraying (see 'TO STOP SPRAYING').

N.B. To help aid the balance of the sprayer, while using the 2 1/2 L Bottle, a Shoulder strap is provided.

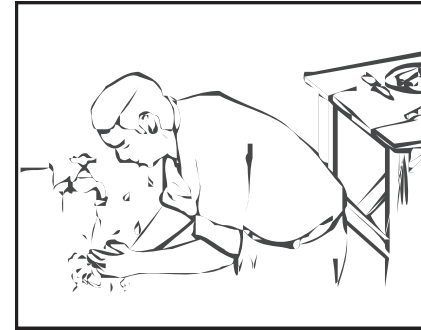
TO START SPRAYING

Hold the spray head about 20cm above the ground or weed foliage. Switch on the sprayer, check the atomiser disc starts spinning (**never** touch the atomiser disc when spinning or hold the spray head too close to the operator) and **then** open the flow valve. Start walking immediately the spray liquid reaches the feed nozzle. N.B. with the HERBI-4 Extra both flow valves must be opened.

The HERBI-4 is normally held at an angle of around 35° to 40° to the ground with the head inclined slightly away from the operator. **Do not** spray with the HERBI-4 held on the shoulder, since spray may contaminate the operator. N.B. the machine will not spray with the spray head above the level of liquid in the tank.

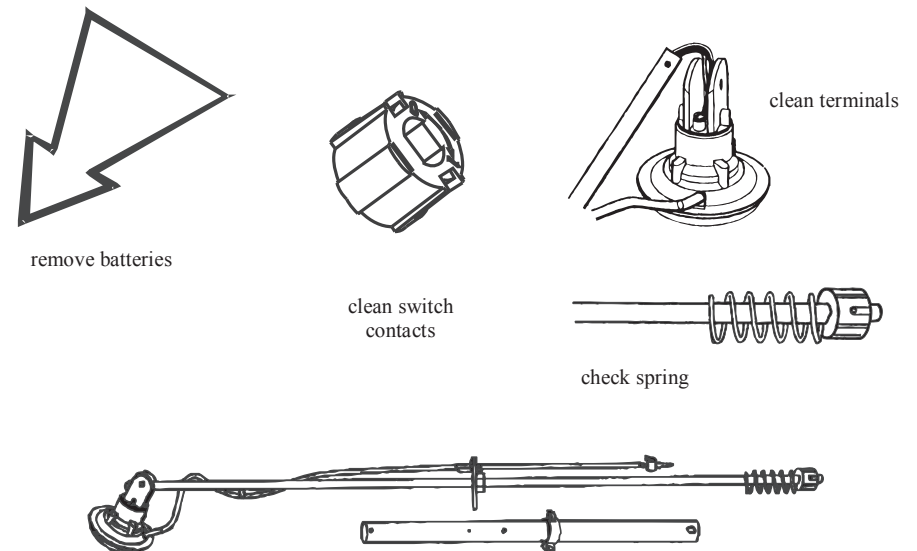


3. After working with agrochemicals, or handling spraying equipment, **always** thoroughly wash hands and exposed skin. All protective clothing should be washed separately from other clothing and stored. Contaminated gloves should be washed inside and out.



STORAGE

Before storing the HERBI-4 for long periods disassemble the sprayer by removing the four screws in the battery case and clean all electrical contacts with a wire brush or similar. Reassemble and with the sprayer in the collapsed position i.e. batteries removed, store in a dry place away from direct sunlight. Batteries should be stored in a dry cool place.

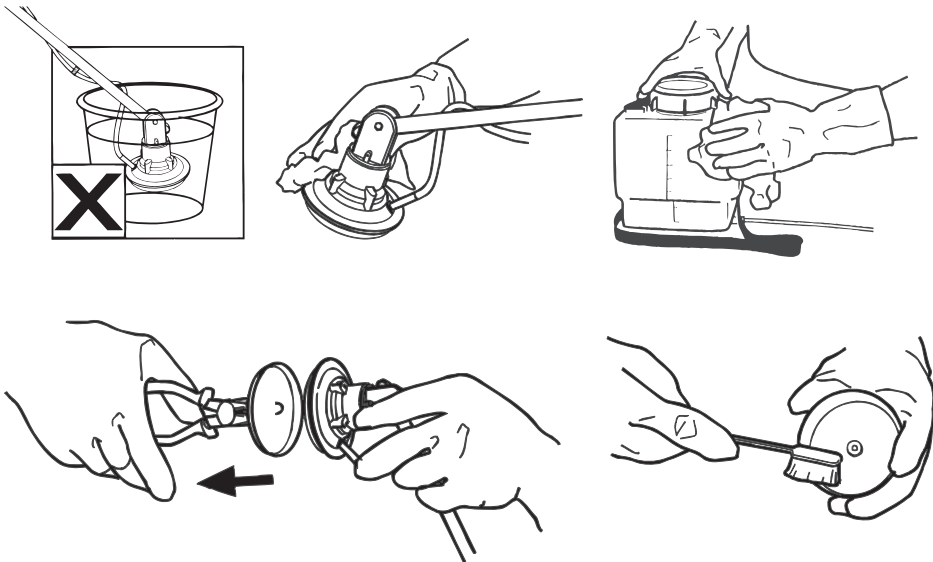


AFTER SPRAYING

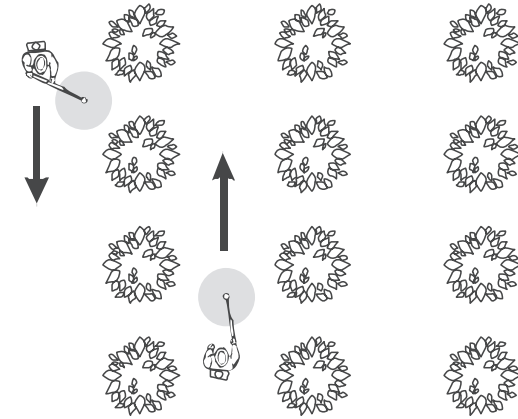
1. Dispose of any surplus spray mix according to the product approval. Store products safely, locked up and out of the reach of children.



2. It is **essential** to clean the sprayer and tank thoroughly using water and detergent after use. **Never** immerse the spray head in water or under a tap, since this will destroy the electric motor. A water and detergent mix should be put in the tank, swilled around, and then sprayed out onto the treated area of waste ground. The sprayer and tank should be wiped down externally using a cloth. Periodically remove the atomiser disc with a pair of pliers and clean with a soft brush.

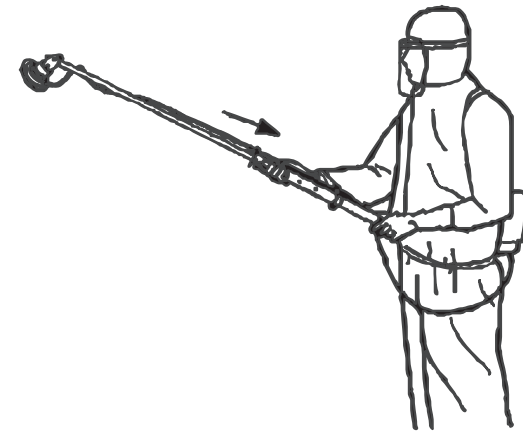


It is best to hold the HERBI-4 to the side or the rear so that the operator does not have to walk over the treated area.



TO STOP SPRAYING

Close the flow valve and then switch off the sprayer. When the atomiser disc has stopped spinning raise the sprayer to an angle of 45° (see below). **Never** raise the spray head until the atomiser disc has stopped spinning. Then open the flow valve and drain any remaining liquid in the feed tube back into the tank (by raising the feed tube above the level of liquid in the tank). Then close the flow valve.



For ease of transport the tank can be disconnected (use the flow valve to isolate any liquid left in a backpack) and the sprayer collapsed (by removing the batteries).