

MICRONAIR

CS-10 & CS-14

Compression Sprayer

Operator's Handbook
and
Parts Catalogue



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1. INTRODUCTION

The Micronair CS-10 and CS-14 compression sprayers are designed for use by professional spray operators. The sprayer is constructed to the highest standards and complies with international standards for vector control equipment. Fabricated from quality grade stainless steel and brass the sprayers will last for many years in the most demanding environments. The CS-10 and CS-14 compression sprayers have been developed for the application of indoor residual sprays (IRS) to combat mosquito borne diseases such as Malaria and Dengue fever. The sprayer can also be used by private pest control operators (PCO's) for control of crawling insects in residential areas as well as for the application of specialist industrial spray treatments that require high quality materials that resist degradation by aggressive chemicals. The sprayer consists of an all stainless steel fabricated pressure retaining tank with 4.2 Bar (60 Psi) for CS-10 and 3.8 Bar (55 Psi) for CS-14 working pressure. The tank has a large filling aperture with over centre cam lock and Viton™ O-ring seal to provide a positive seal to prevent any liquid leakage. Operation of the cam lock to open the tank lid automatically releases any air pressure prior to opening for maximum operator security. A separate air pump with all stainless shaft and handle provides for a robust and durable pump action with cup seal and non return valve. This avoids the need to remove the pump mechanism for filling. The sprayer also incorporates an all brass trigger valve with locking mechanism and stainless lever, stainless pressure gauge with impact resistant glass dial, brass lance, pressure relief valve, stainless or ceramic nozzle tips and pressure control valve (CS-10 only) at the nozzle to ensure a constant discharge and application rate.

2. SPECIFICATION

	<u>CS-10</u>	<u>CS-14</u>
Tank Capacity:	11.4 L	13.6 L
Tank Dimensions:	Dia. 20 cm x H 45.5 cm	Dia. 20 cm x H 53.5 cm
Packing Dimensions:	W 21 x L 21 x H 61 cm	W 21 x L 21 x H 65 cm
Tank Material:	Stainless Steel	
Weight (empty):	4.8 kg	5.1 kg
Max. Working Pressure:	4.2 bar (60 Psi)	3.8 bar (55 Psi)
Pump Cylinder:	Brass with Viton™ non-return Valve	
Pump Handle:	T-Type Stainless	
Pressure Gauge:	0-7 bar (0-100 Psi)	
Pressure Relief Valve:	Operates at 4.5 bar (66 Psi)	
Filler Lid:	Oval 12x9.5 cm with over-centre latch and auto pressure release on opening	
Trigger Valve:	All brass with Viton™ O-rings and stainless lever	
Spray Lance:	57 cm long, brass	
Spray Hose:	150 cm	
Carrying Strap:	Double woven heavy duty, 50 mm wide	
Spray Nozzle:	Teejet™ 8002E stainless. Supplied as standard	

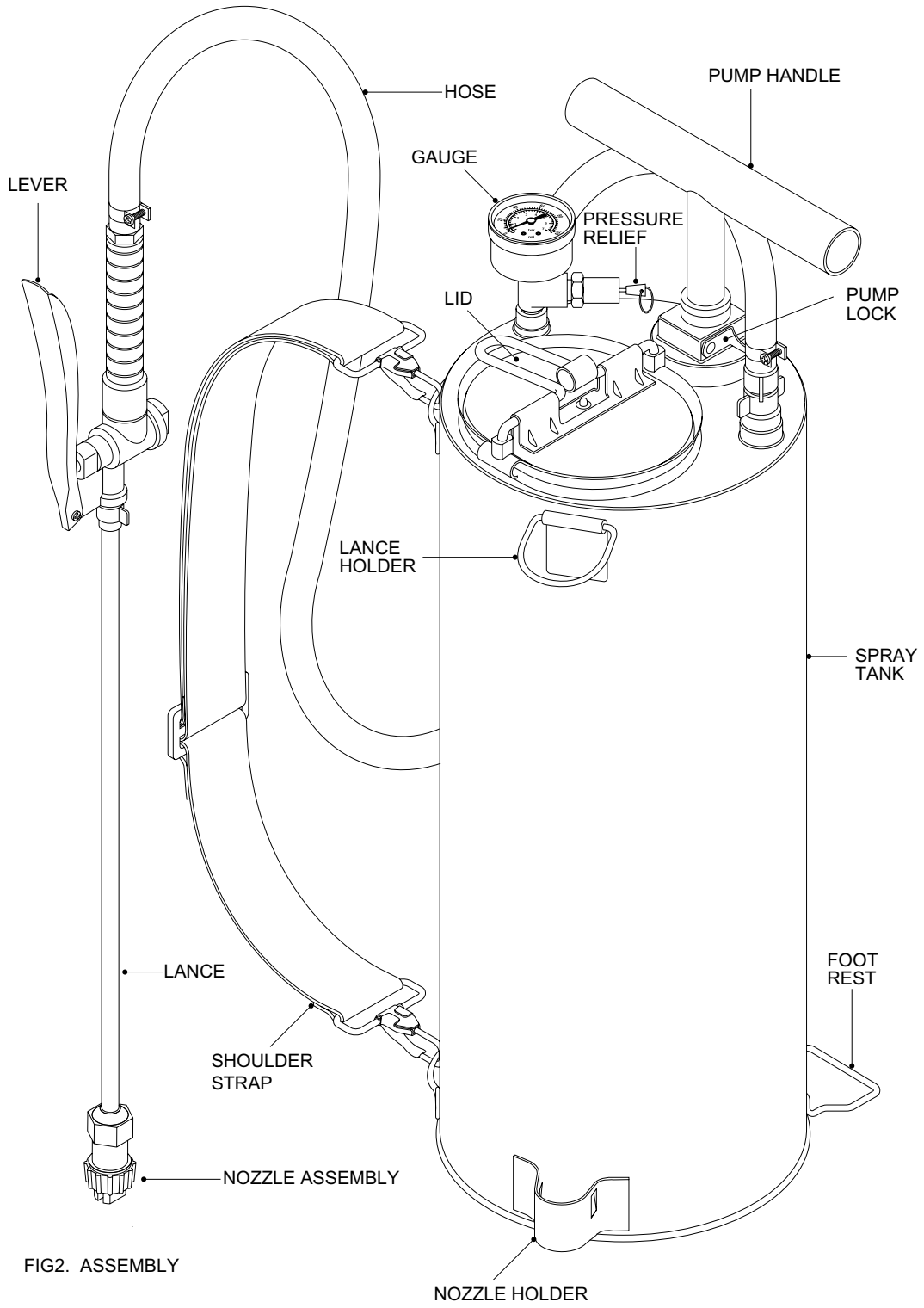
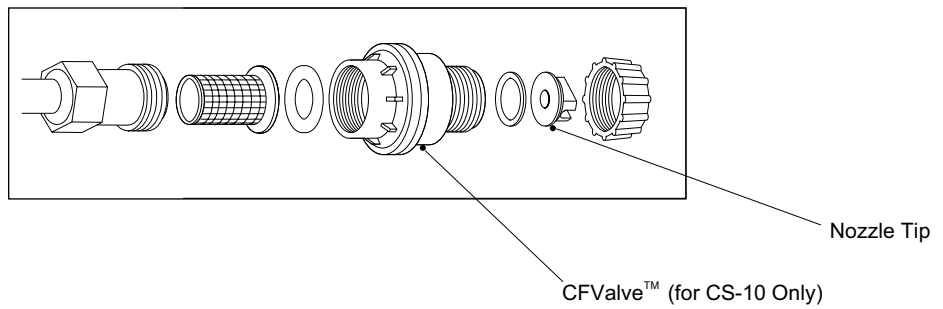
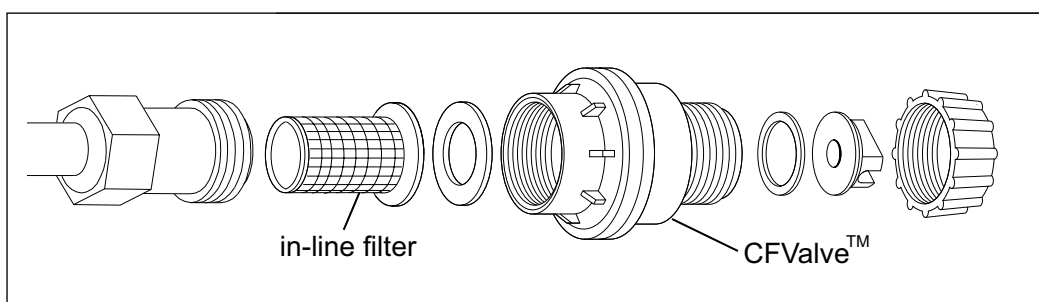


FIG2. ASSEMBLY

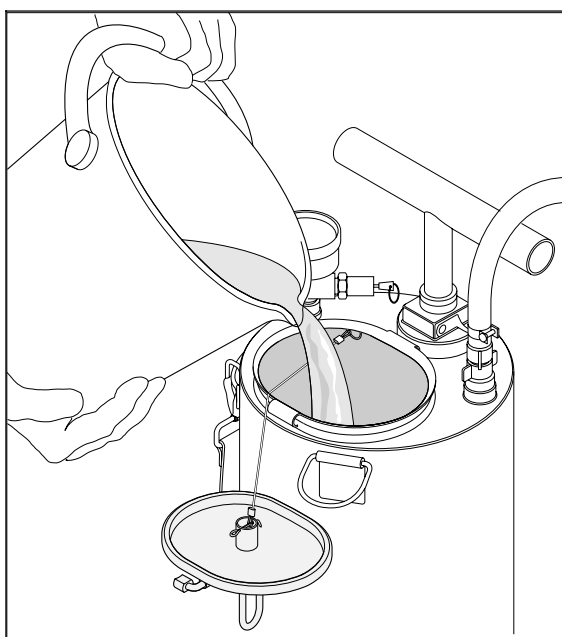


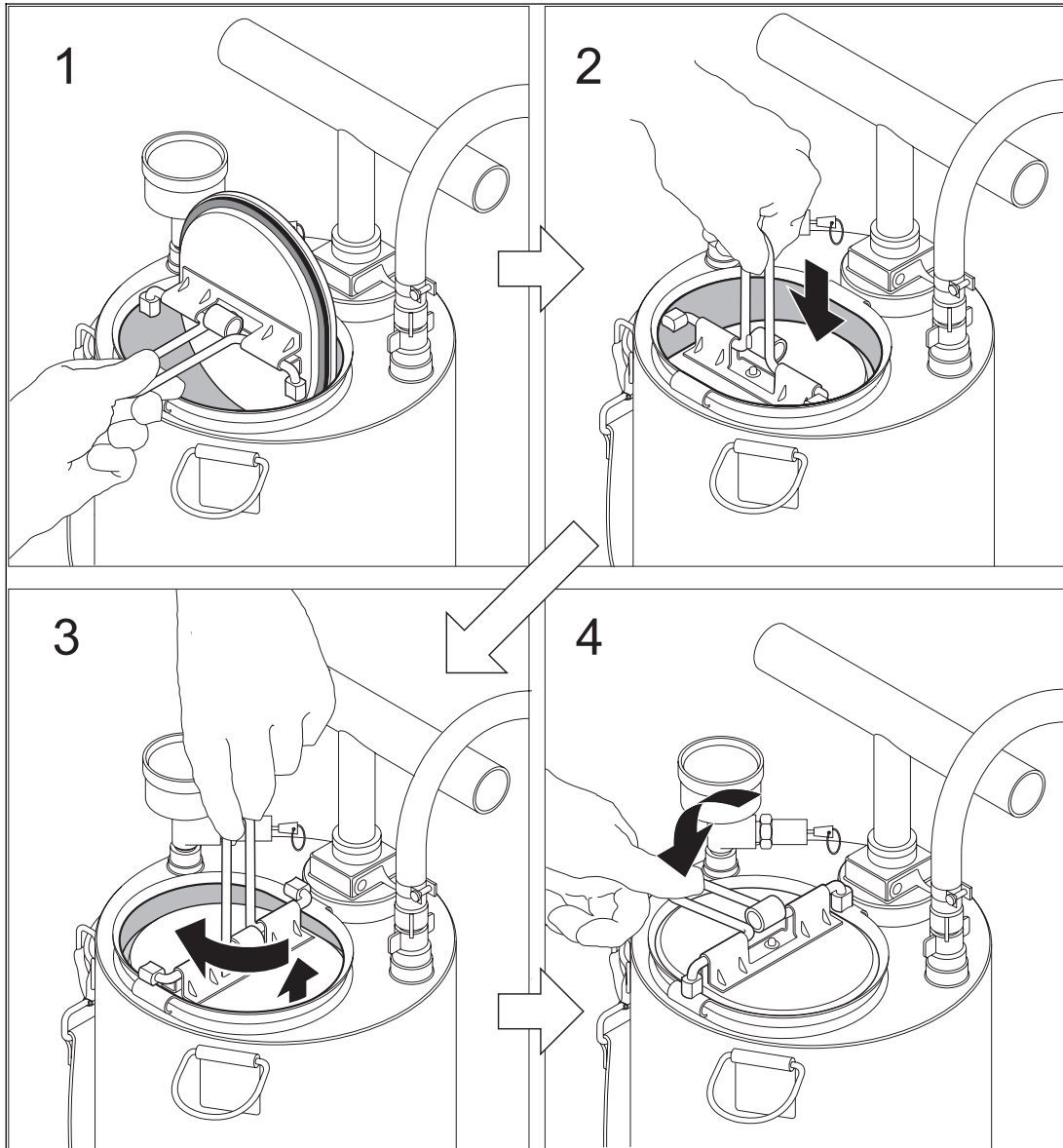
3 INITIAL ASSEMBLY

1. The sprayer is delivered with the hose, lance and trigger valve disassembled.
2. Remove the tank lid. Inside the tank there are 3 different sets of spares kits, the carrying strap and trigger valve and hose.
3. The hose trigger valve and lance should be assembled together taking care to make sure the various threaded joints are secured with the soft polyethylene washers to prevent leakage under pressure.
4. Fit the red CFValve™ pressure control device between the lance end and nozzle cap ensuring that the nozzle is orientated to spray horizontally to treat wall or floor surfaces. (For CS-10 Only).

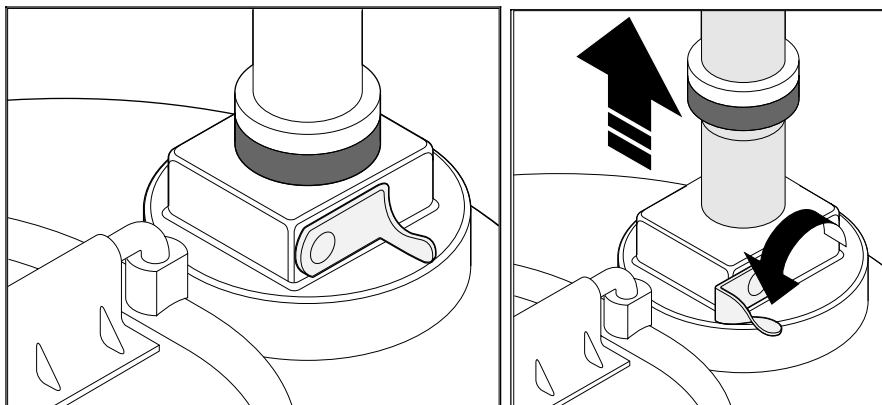


5. Check all fittings are secured tightly. Pull the pressure relief valve out to check the seal closure is aligned correctly and release.
6. Test the sprayers for leaks by half filling the tank with approximately 4 litres of clean water then secure the tank lid.

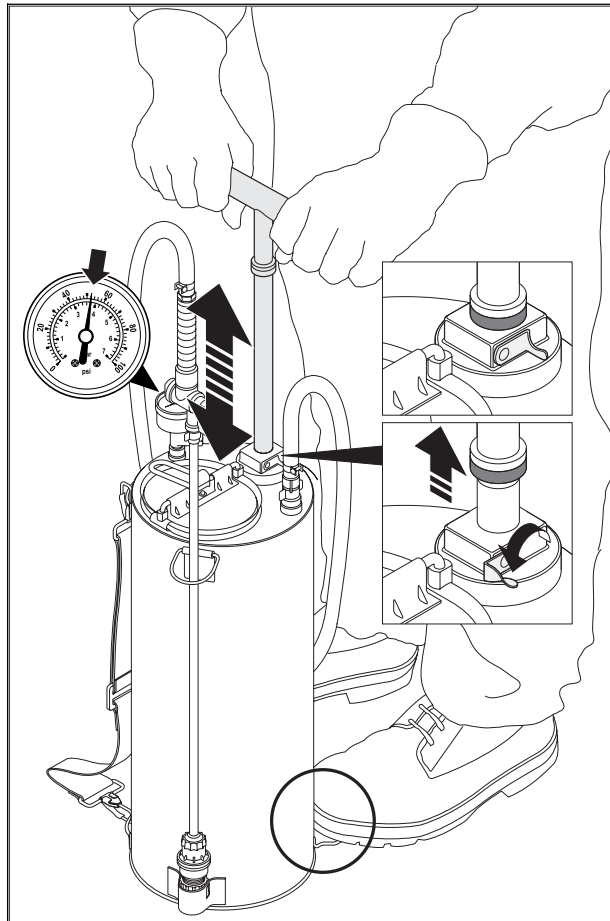




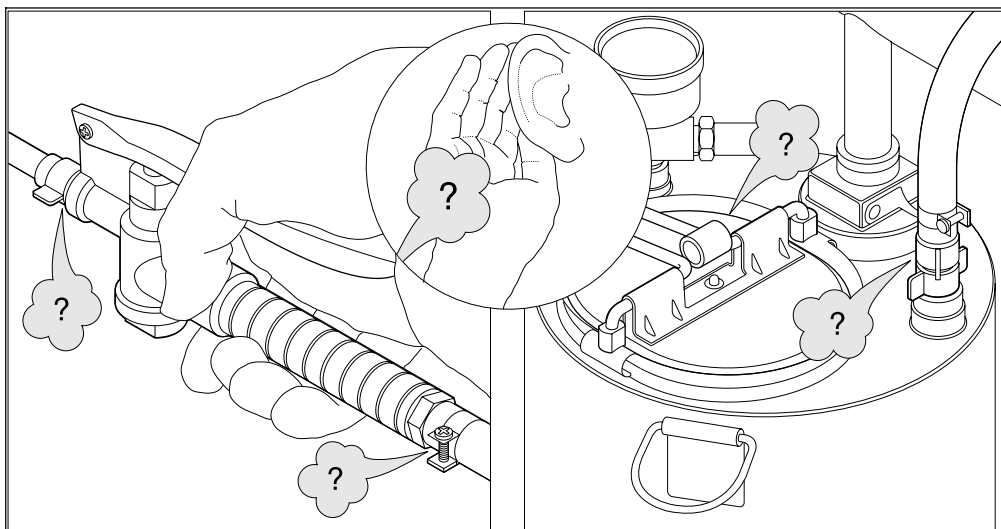
7. Unlock the pump handle by moving the locking device through 180 degrees. The handle should withdraw freely.



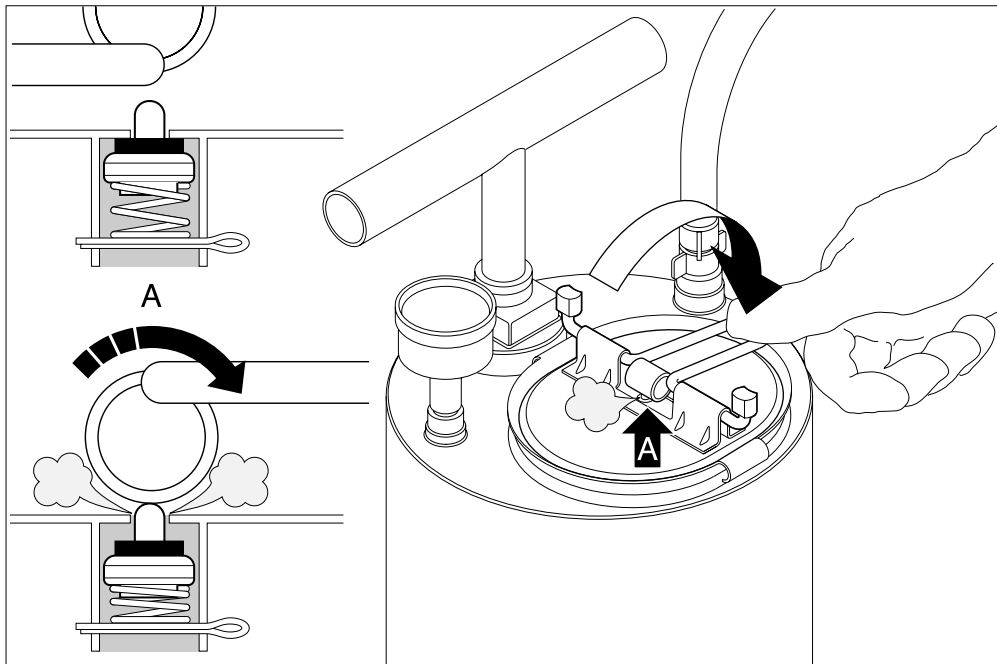
8. Raise the pump handle to the top of its stroke and pump continuously for 40 - 50 strokes to pressurise to 60 Psi (4.2 Bar) for CS-10 and 55 Psi (3.8 Bar) for CS-14 on the pressure gauge. Secure the tank during pumping by standing on the foot rest.



9. Spray into a bucket by opening the trigger valve for a few seconds checking for any leaks. Re-secure any leaking fittings.



10. Once satisfied there are no leaks release the tank pressure by actuating the over centre cam securing the tank lid. This automatically opens the release valve to allow air to escape. Once all the retained air has escaped and the tank no longer pressurised, open the tank lid and empty any remaining water from the tank.

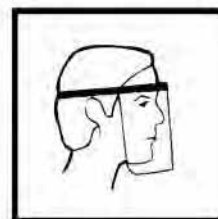


4. SAFETY

Before handling pesticide or other chemicals , **always** read the product label to learn what personal protective equipment (PPE) is required for mixing and spraying operations.

When spraying indoors or in confined spaces it is typically recommended to use:-

- coverall
- rubber boots
- gloves
- face shield or eye goggles
- respirator / mask



5 CALIBRATION

5.1 Mixing Rate

Read the product label to discover the recommended application rate. This will usually be expressed as dose rate of product per m² of wall surface. Some products will be packaged for each fill of the spray tank to treat typically a surface area of 250m².



Note: One 7.5 litre tank fill (product + water) will treat 250m² of surface applying 30 ml/m² of spray with an 8002 nozzle tip and the Red CFValve™ operating at 1.5 Bar.

5.2 Nozzle Output

1. At 1.5 Bar pressure with the Red CFValve™ the flow rate should be around 560 ml/min.
2. The formula to calculate the required flow rate from the sprayer is as follows

FORMULA

$$\text{Flow (ml/min)} = \text{Volume Rate (ml/m}^2\text{)} \times \text{Band (m)} \times \text{lance Speed (m/sec)} \times 60$$

where

Flow	Output from nozzle in 1 minute at constant pressure
Volume rate	Volume in ml applied per m ² (e.g.30 ml/m ²)
Band	Width of spray band 0.7m (75cm less 5cm overlap)
Lance Speed	Speed in m/sec that the lance (wand) sprays up or down a wall. Usually 2m is treated in 4.5 seconds or 0.44m/sec.

NOTE: Units must be correct to use above formula

e.g To apply 30 ml/m² with a 70cm band (75cm less 5 cm overlap) treating a 2m vertical strip every 4.5 seconds we have

$$\begin{aligned}
 \text{Flow Required} &= 30 \times 0.70 \times (2\text{m} / 4.5 \text{ sec}) \times 60 \\
 (\text{ml/min}) & \\
 &= 30 \times 0.70 \times 0.444 \times 60 \\
 &= \underline{560 \text{ ml/min}}
 \end{aligned}$$

Table 1–Application Parameters with 1.5 Bar Red CFValve™ and 8002E nozzle.

Pressure (Bar)	Flow Rate (ml/min)	Spray time	Vol. Rate (ml/m ²)	Band (m)	Speed (m/sec)	Time to treat 2m strip (s)	Total Area* (m ² per fill)
1.5	560	13min 24s	20	0.70	0.67	3.0	375
			30	0.70	0.44	4.5	250
			40	0.70	0.33	6.0	187.5

- N.B. Spray time and area treated based on 7.5 litre fill

If no CFValve™ is used and products are required to be applied at 25-55psi (1.7-3.8 bar) then the following application parameters apply

Table 2 – Alternative Application Parameters if no CFValve™ is used
(N.B. Figures are averaged as pressure and flow varies)

CS-10 with 8002E with nozzle tip

Pressure (Bar)	Flow Rate (ml/min)	Spray time	Vol. Rate (ml/m ²)	Band (m)	Speed (m/sec)	Time to treat 2m strip (s)	Total Area (m ² per fill)
1.7 - 3.8	580 - 880	9 min 29s	30	0.70	0.59	3.4	250
			40	0.70	0.44	4.5	187.5

- N.B. Spray time and area treated based on 7.5 litre fill

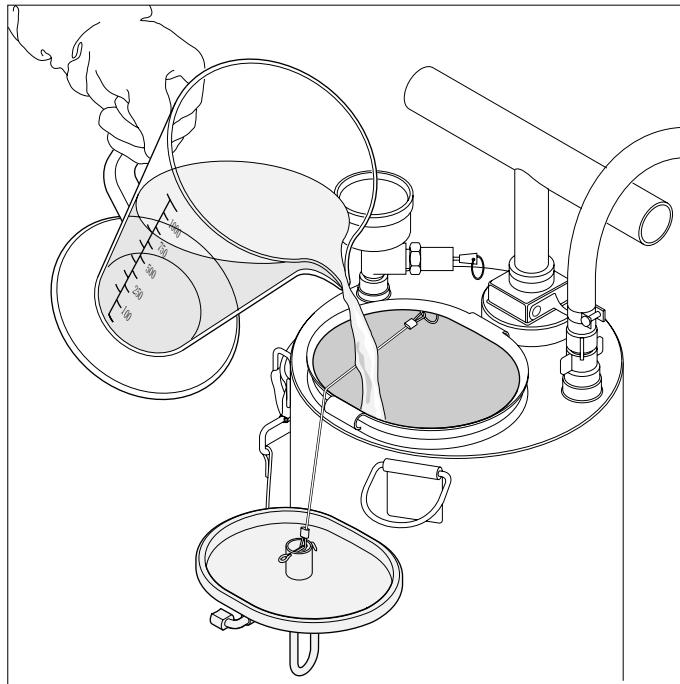
CS-14 with 8002E with nozzle tip

Pressure (Bar)	Flow Rate (ml/min)	Spray time	Vol. Rate (ml/m ²)	Band (m)	Speed (m/sec)	Time to treat 2m strip (s)	Total Area (m ² per fill)
1.7 - 3.8	580 - 880	9 min 29s	30	0.70	0.59	3.4	333.3
			40	0.70	0.44	4.5	250

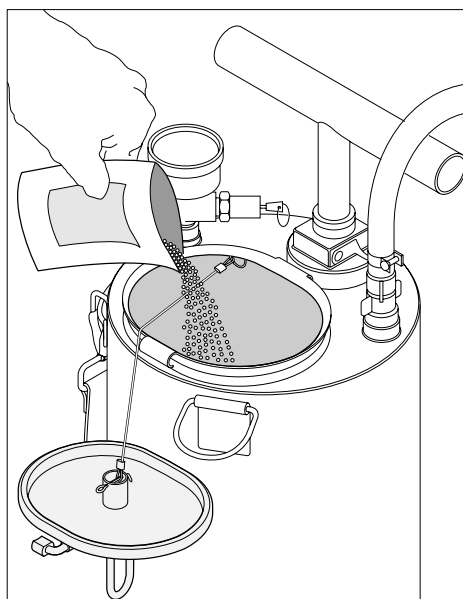
- N.B. Spray time and area treated based on 10 litre fill

6. PREPARING FOR SPRAYING

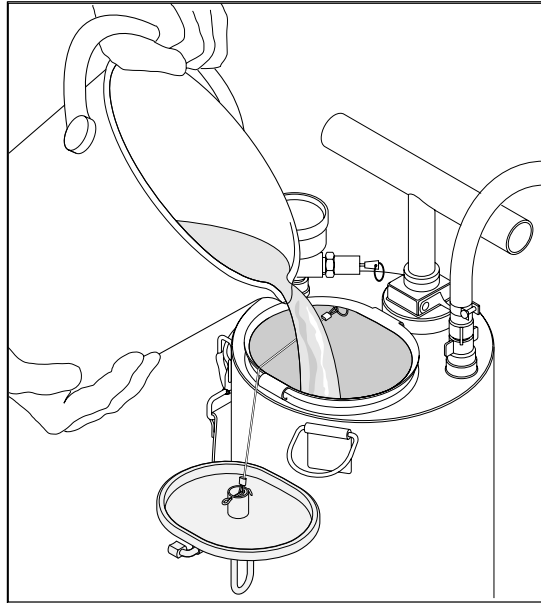
1. First check that all hose connections and fittings are secure. Remove the tank lid by releasing the over centre locking mechanism. Place the tank on a flat surface in a secure well ventilated area away from water sources. Then half fill the tank with about 4 litres of clean water.



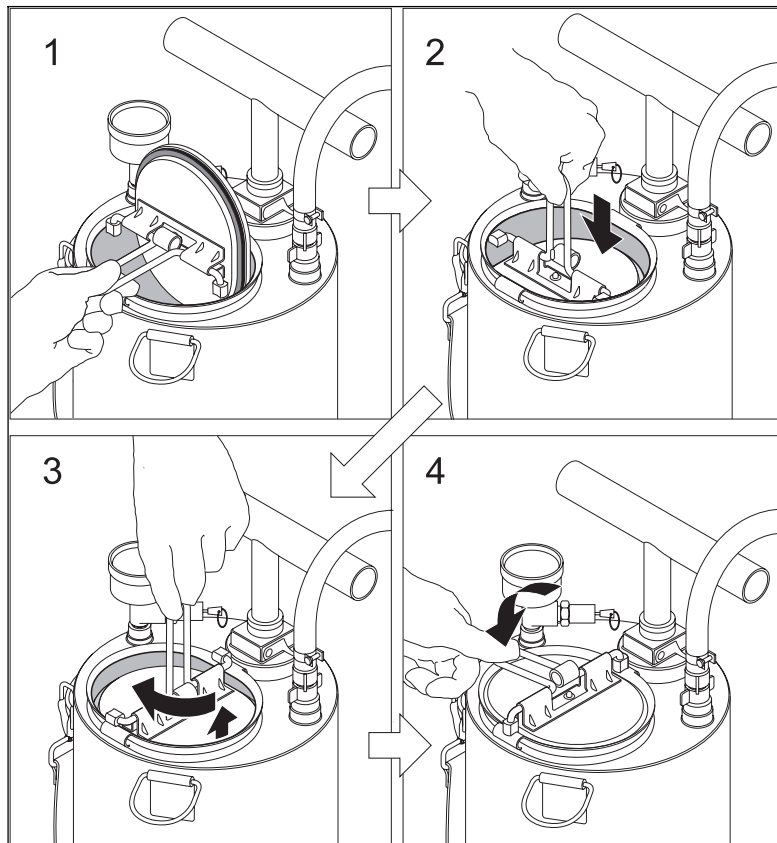
2. Read the product label once more to confirm what quantity of product should be added to treat 250m² of surface typically.
3. Measure the exact quantity of product to be mixed in 7.5 litres of water for CS-10 with Red CFValve™ or 10 litres for CS-14.



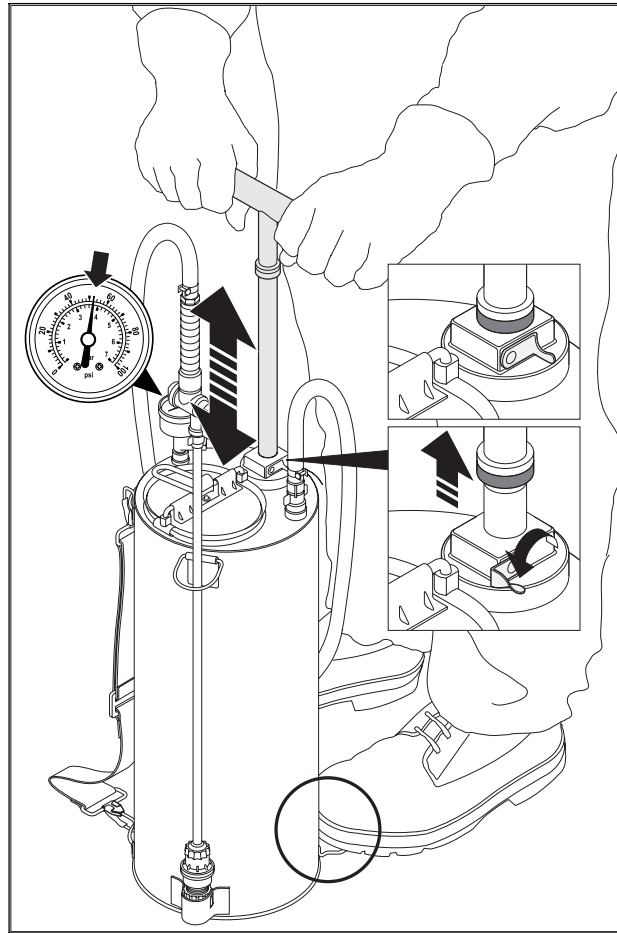
4. Fill the tank with clean water up to the 7.5 litre mark for CS-10 and 10 litre mark for CS-14 indicated on the tank graduations embossed on the side. The graduation marks can be seen through the filling aperture on the inside of the tank.



5. Replace the tank lid



6. Release the lock on the pump handle and pump up the sprayer to 55 or 60 Psi before checking for any leaks as before.

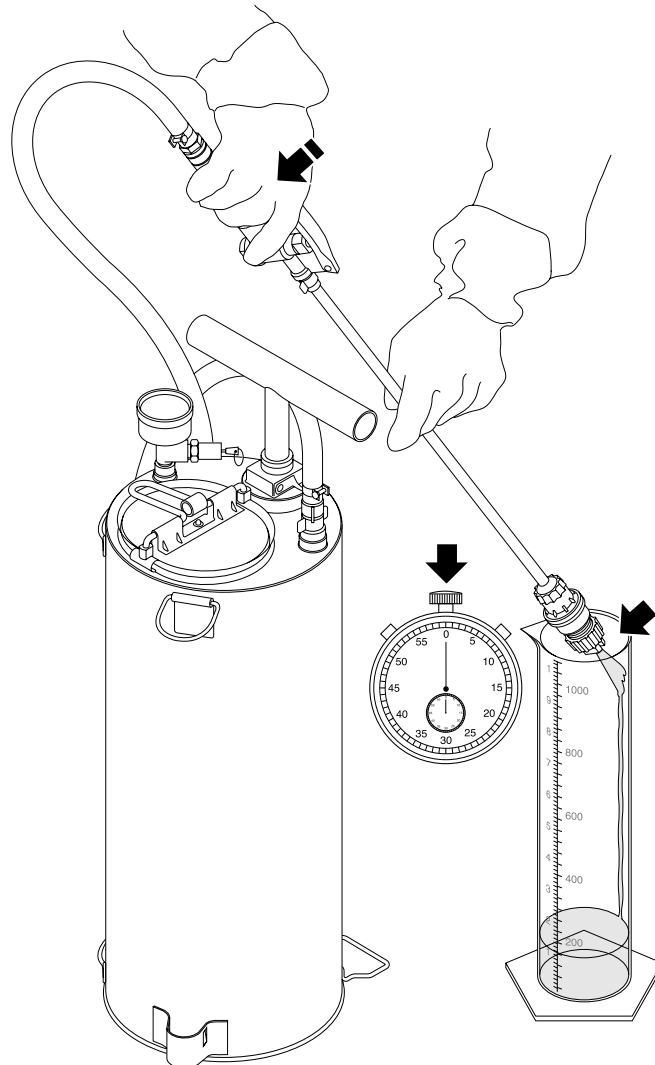


7. Agitate the spray mix by vigorously shaking the tank from side to side.



8. Operate the spray trigger valve by dispensing spray liquid into a container and check the nozzle sprays correctly without any leaks or dripping as before.

9. Check the flow rate from the nozzle by spraying into a measuring cylinder and timing the flow output for 1 minute.



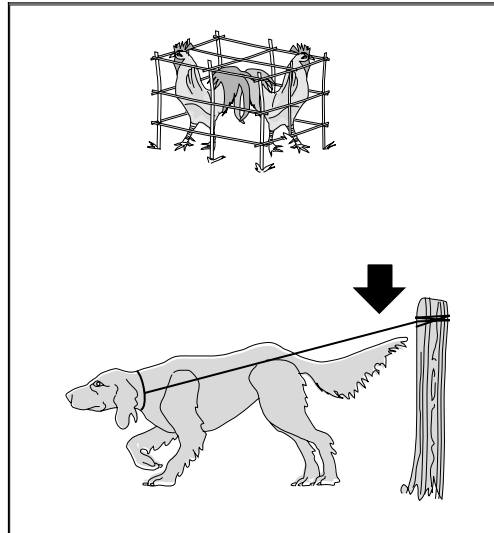
10. Verify the flow rate is within + - 5% of that calculated in the calibration. If the flow varies significantly from that calculated then adjust the spraying speed by using the following formula.



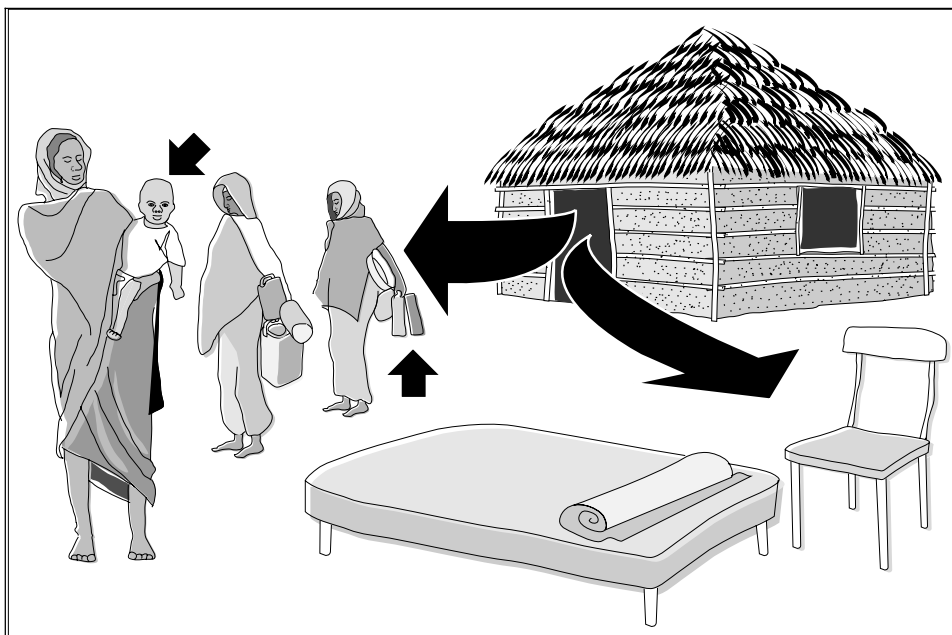
$$\text{Spraying Speed (m/sec)} = \frac{\text{Flow Rate (ml/min)}}{\text{Volume (ml)} \times \text{Time (min)} \times \theta}$$

7 BEFORE SPRAYING

1. Consult with local residents to advise them that spraying will be taking place.
2. Before spraying make sure all animals and people evacuate the house to be sprayed and animals are prevented from re-entry until such time as it is safe to do so.

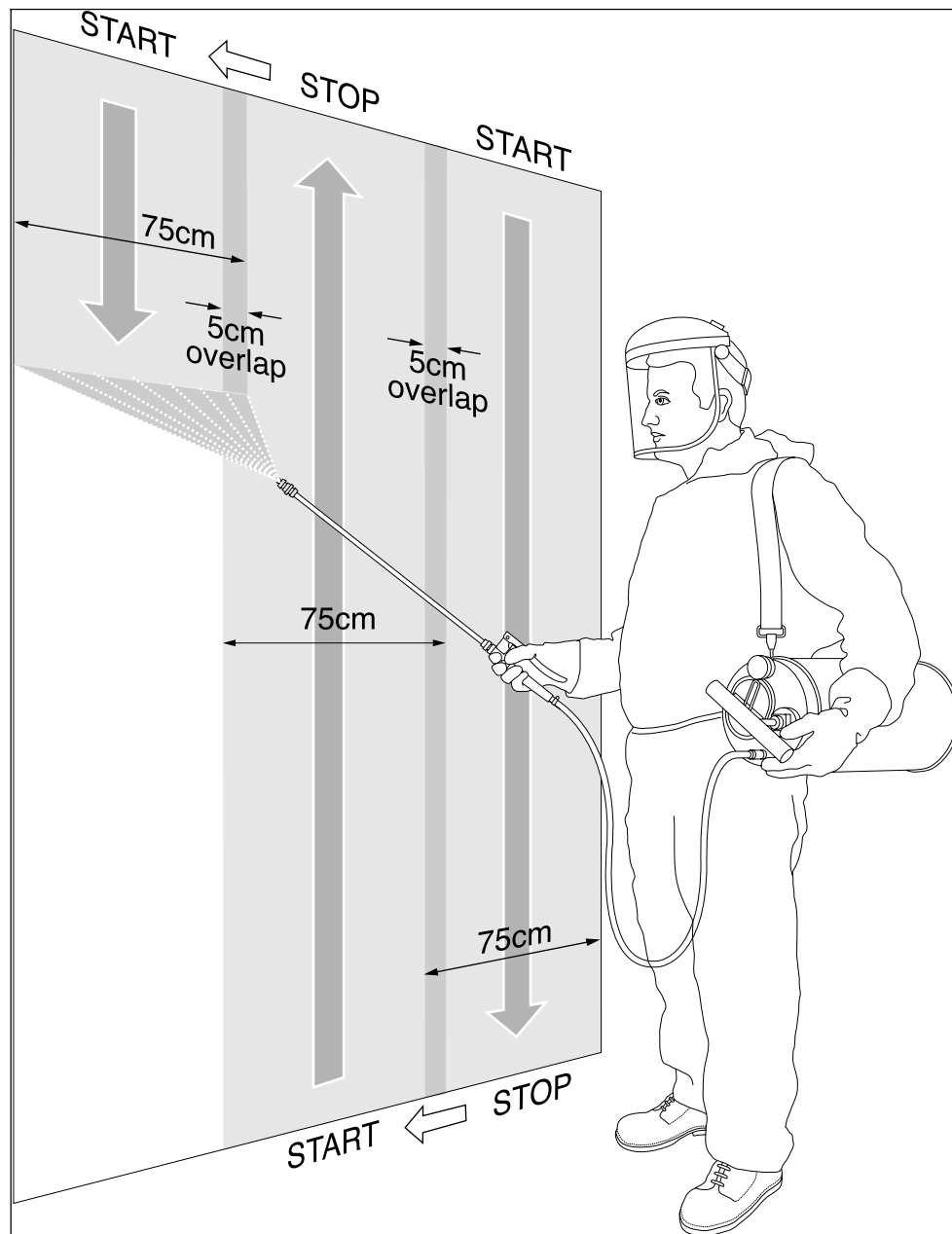


3. Make sure all food stuffs and drinking water is removed from the house before spraying. It is also recommended to remove any loose items such as small tables and chairs, bedding and other objects to facilitate ease of access for spray operators to treat wall surfaces and avoid any unnecessary over spray onto other surfaces. If possible move remaining items of furniture away from wall surfaces so all areas can be effectively treated.



7. SPRAYING

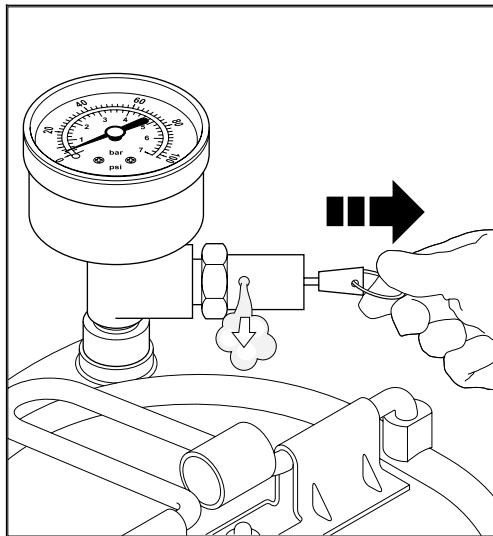
1. Spray all wall surfaces by holding the spray lance approximately 45cm from the wall surface and spraying a strip 75cm wide with each spray pass. Alternate between spraying up and down and separate each spray pass by 70cm so leaving a 5cm overlap with each spray pass.



2. Start spraying at the furthestmost point from the door so that the operator always works towards the door if possible.

8 CLEANING

1. After spraying has finished it is important to clean out the sprayer. Any residues remaining in the spray tank at the end of the day should be sprayed out onto wall surfaces.
2. The sprayer should then be de-pressurised by releasing the over centre tank lid locking mechanism. Alternatively the air can be released by manually opening the pressure relief valve.

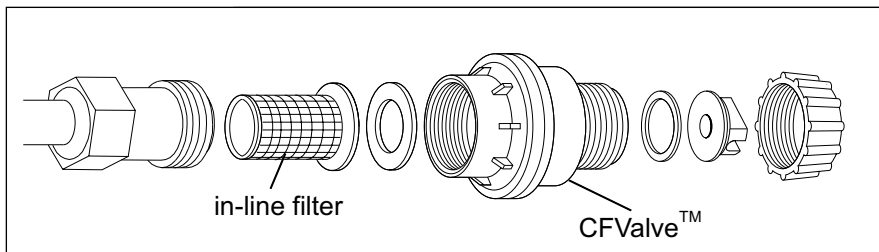
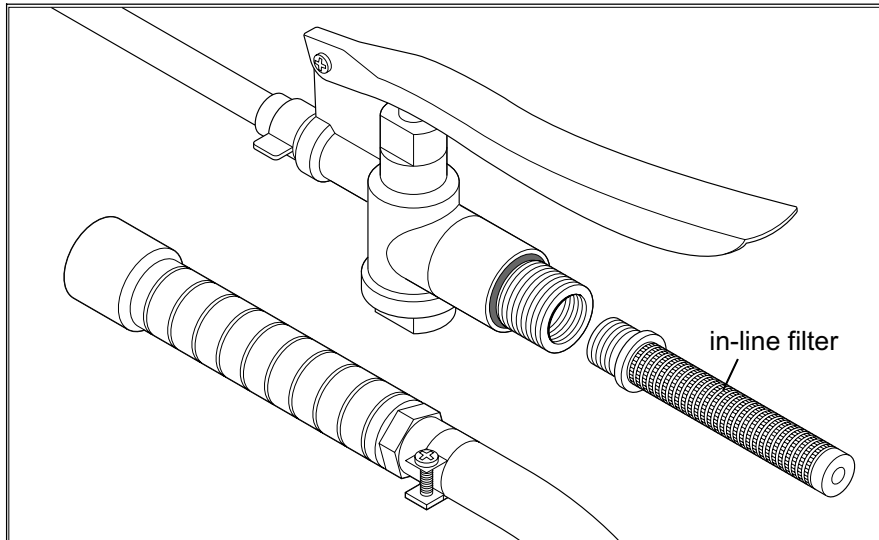


3. Place 3 - 5 litres of clean water in the tank, replace the tank lid then re-pressurise by pumping the sprayer to only 25 - 30 Psi.

Agitate the contents of the tank once more and then spray out the remaining tank washings onto a suitable area such as external walls. Do not spray washings onto plant vegetation or any crops that animals or people could eat.

4. Repeat with a final rinse and spray to thoroughly remove all pesticide residues.

It is important that this procedure is followed after each spray program to avoid chemical deposits forming and blocking nozzles or filters. If working with water dispersible powders or granules it is recommended to unscrew the trigger valve to wash out the in line filter. It is also recommended to remove the nozzle tip, in-line filter in the nozzle body and CFValve™ and immerse in clean water to clean out any deposits or blockages.



Note: When cleaning a sprayer it is important to wear the appropriate personal protective equipment.

Only once the sprayer is thoroughly clean and has been left to dry. Operators should remove their protective clothing. All clothes should be washed. Hands and face should also be washed with soapy water.

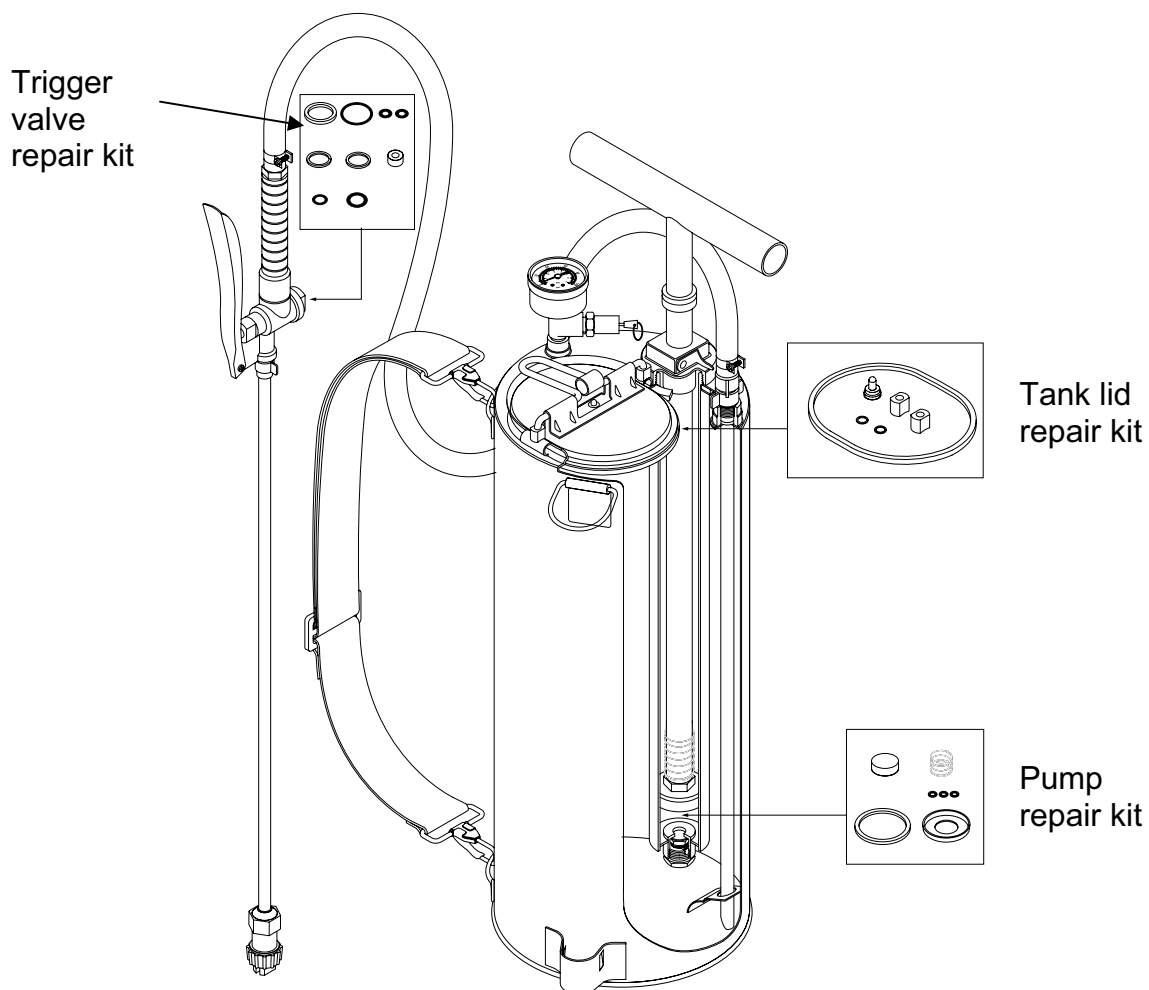


9 MAINTENANCE

9.1 General

After spraying at the end of each day it is important to thoroughly clean out the sprayer with clean water and preferably a small amount of liquid soap to remove all traces of chemical. Operators should also regularly clean the in-line filter in the trigger valve handle and dismantle the CFValve™, in-line filter in the nozzle body and nozzle tip and clean by immersion in water. After cleaning, sprayers should be re-assembled and left inverted by mounting the spray tank on a wall or other structure to dry.

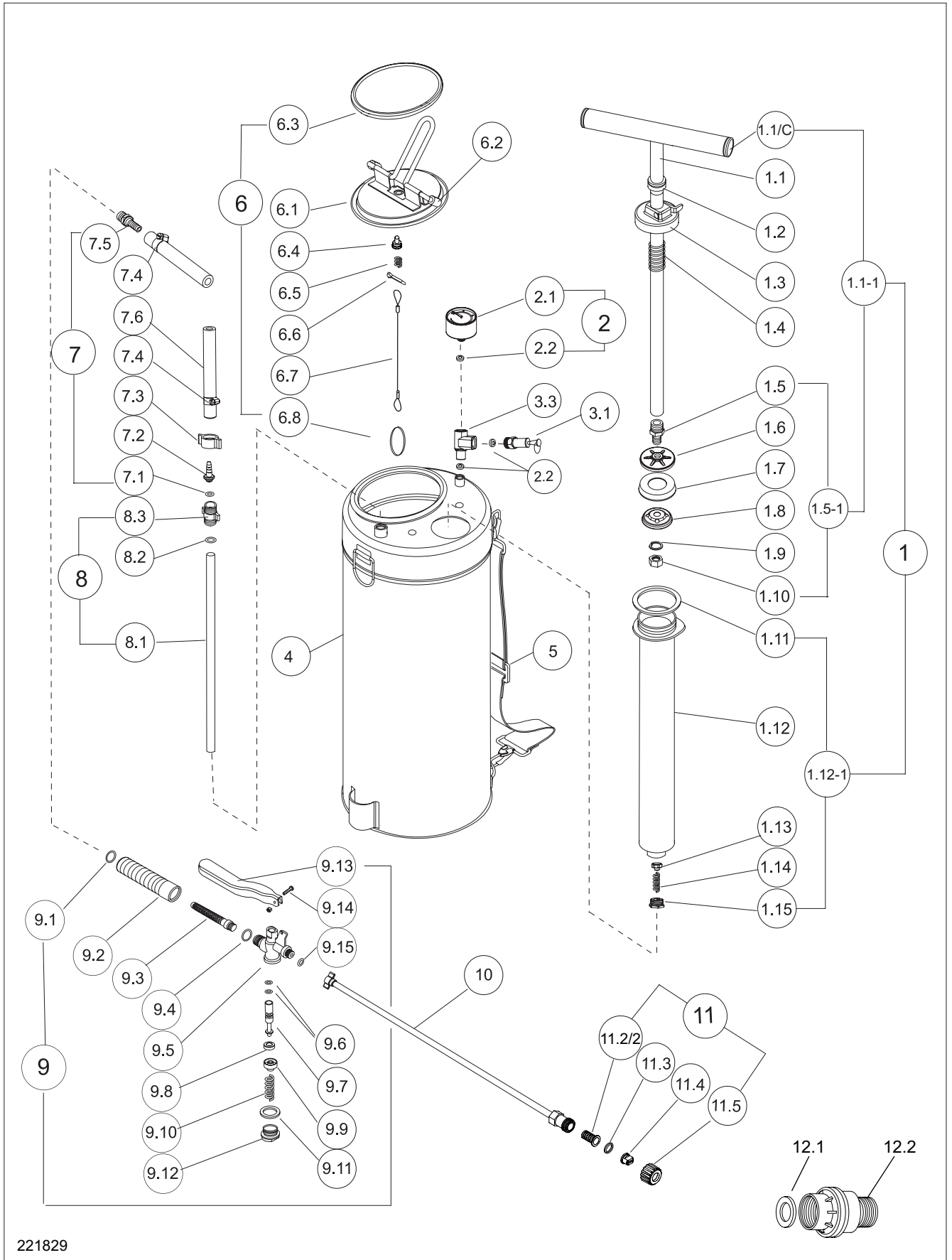
Hoses should be regularly checked for signs of wear and replaced as necessary. Hose connections may require adjustment if leaks are found. Make sure any sand or debris is not present on the connection surfaces. The pump should be dis-assembled regularly (every week) and the cup seal lubricated with silicon or other grease. The tank lid seal should be checked to make sure it is positioned correctly and a light silicone or grease applied. The condition of the tank should be checked routinely to make sure it has not been dropped and distorted. Care should be taken to avoid operators dropping the tank. Consumable items are provided in the service kit of spare parts provided with each sprayer.



9.2 Trouble Shooting

Problem	Possible Cause	Action
Pump does not pressurise	Cup seal is too dry or distorted	Apply grease or replace / reposition
	Non return valve in pump is not operating	Disassemble non return valve assembly. Check condition of spring, ball valves and Viton seal and replace as necessary
Pump operates but tank does not pressurise	Air Leakage at tank lid seal	Reposition seal and grease. Pump vigorously for a few seconds to assist tank pressurising and create a seal.
	Air leakage at pump gasket seal	Tighten the pump assembly onto the tank. Check gasket condition and replace if required.
	Air escapes from pressure gauge fitting	Re-tighten as required.
	Relief Valve is open	Manually reset relief valve by pulling on the valve loop against the spring then realigning to seal on release
Spray through nozzles is uneven and irregular	Partially blocked nozzle tip	Remove cap and rinse in water. If problem persists replace nozzles as required.
Liquid leaks from hose or trigger valve assembly	Leaking connection	Check hose connections are tight and seals are present then check there is no sand or dirt on the sealing surfaces
Tank pressurises but liquid does not flow	Blockage in trigger valve filter and in-line filter in nozzle body	Dis-assemble and clean
	CFV not opening (If fitted)	Check for blockage Check tank pressure exceeds 25 Psi
	Blocked nozzle tip	Remove and clean.

10. PARTS LIST



221829

10. ■ IST - Continued

POS.	PART NO.	DESCRIPTION	POS.	PART NO.	DESCRIPTION
1	50-001-00 0	Hp,Cpl	7.2	510-007-020	Hose Connector
1.1-1	50-001-01 1	Bgr Asemp,Cpl	7.3	510-007-030	Wing Nut
1.1/C	510-001-014	Plug (x2)	7.4	510-007-040	Hose Clamp, x 2
1.1	510-001-010	Rod	7.5	510-007-050	Hose Connector
1.2	510-001-020	Pad	7.6	510-007-060	Hose
1.3	510-001-030	Cap	8	50-008-00 0	10L,Cpl (CS-10)
1.4	510-001-040	Spring	8	54008-00 0	14L,Cpl (CS-14)
1.5 1	50-001-05 1	Hp Cp Asemp	8.1	510-008-010	10L Supply Tube
1.5	510-001-050	Adapter	8.1	514-008-010	14L Supply Tube
1.6	510-001-060	Upper Piston Plate	8.2	505-008-020	O-Ring
1.7	510-001-070	Pump Cup (Hytrel)	8.3	505-008-030	Adapter
1.7	510-001-071	Pump Cup (Leather)	9	6500900 0	Trigger Vlv,Cpl
1.8	510-001-080	Lower Piston Plate	9.1	505-009-010	Sealing Ring
1.9	510-001-090	Washer	9.2	505-009-020	Handle
1.10	510-001-100	Nut	9.3	505-009-030	Strainer
1.11	510-001-110	Gasket (Viton)	9.4	505-009-040	Sealing Ring, Viton
1.11	510-001-111	Gasket (Nitrile)	9.5	505-009-050	Valve Body
1.12 1	50-001-12 1	Hp Cylinder Asemp	9.6	505-009-060	O-Ring, Viton (x 2)
1.12	510-001-120	Pump Cylinder	9.7	505-009-070	Stem Guide
1.13	505-001-130	Non-return Valve	9.8	505-009-080	Sealing Plate
1.13/1	505-001-131	Sealing Plate	9.9	505-009-090	Seat
1.13/2	505-001-132	Valve Seat	9.10	505-009-100	Spring
1.14	505-001-140	Spring	9.11	505-009-110	Gasket
1.15	505-001-150	Nut	9.12	505-009-120	Cap
2	6500200 0	Pressure Gg,Cpl	9.13	505-009-130	Trigger
2.1	505-002-010	Pressure Gauge	9.14	505-009-140	Pin
2.2	505-002-020	Gasket	9.15	505-009-150	Gasket, PE
3.1	505-003-010	Pressure Release Valve	10	510-010-000	Spray Lance, straight, 50cm
3.3	510-003-030	T-Connector	11	50-011-00 0	14L,Cpl
4	50-00400 0	10L Inlet (CS-10)	11.2/2	510-011-022	In-line Filter
4	5400400 0	14L Inlet (CS-14)	11.3	505-009-150	Gasket
5	510-005-000	Carrying Strap	11.4	510-011-041	Fan nozzle, 8002E (S. S.)
6	50-006-00 0	Cover,Cpl	11.4	510-011-042	Fan nozzle, 8001E (VS)
6.1	510-006-010	Cover	11.4	510-011-043	Fan nozzle, 8002E (VS)
6.2	510-006-020	Shoe, x 2	11.5	510-011-050	Nozzle Cap
6.3	510-006-030	Cover Seal (Viton)	12.1	7077	Seal
6.3	510-006-031	Cover Seal (Nitrile)	12.2	6093	CFValve™
6.4	510-006-040	Valve Pin Assembly	1	510-510-010	Instruction Manual
6.5	510-006-050	Valve Pin Spring	2	505-020-010	10L Box
6.6	510-006-060	Cotter Pin	3	514-020-010	14L Box
6.7	510-006-070	Cover Chain	4	510-015-000	Pump Repair Kit
6.8	510-006-080	Ring	5	505-016-000	Trigger Valve Repair Kit
7	50-007-00 0	Base,Cpl	6	510-017-000	Seal/Gasket Repair Kit
7.1	505-007-010	O-ring			

11. CONVERSION FACTORS

1 yard	= 3 feet	= 0.91 metre
1 metre	= 39.37 inches	= 1.09 yards
1 metre/sec	= 2.237 miles per hr	= 196.9 ft/min
1 US gal	= 0.83 Imp gal	= 3.78 litres
1 Imp gal	= 1.20 US gals	= 4.54 litres
1 litre	= 0.26 US gal	= 0.22 Imp gal
1 US pint	= 16 US fl ounces	= 0.47 litre
1 Imp pint	= 20 Imp fl ounces	= 0.57 litre
1 pound	= 16 ounces	= 0.45 kilogram
1 kilogram	= 2.20 pounds	= 35.3 ounces
1 ounce	= 28.35 grams	
1 pound/sq inch	= 0.068 atmosphere	= 0.067 bar
1 atmosphere	= 14.70 pounds/sq in	= 1.01 bar
1 bar	= 14.50 pounds/sq in	= 0.98 atmosphere
1 kilopascal	= 0.01 bar	= 0.145 pounds/sq in

Viton™ is a trademark of Dupont Performance Elastomers LLC USA.
Teejet™ is a trademark of Spraying Systems Inc USA
CFValve™ is a trademark of GATE LLC USA