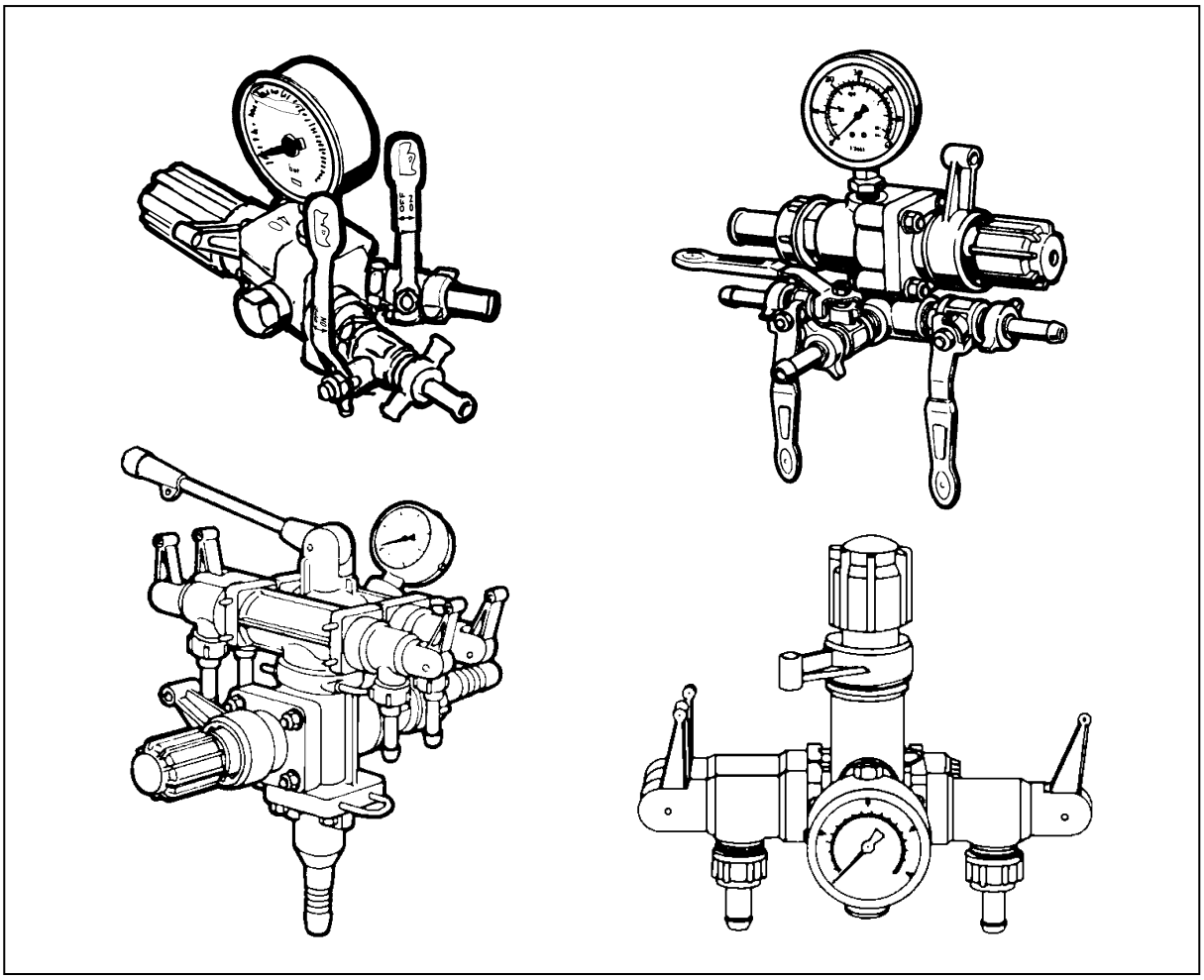
Operator's Manual

MANCTRL-4 Rev E 1/11/08

Control Valves for Diaphragm Pumps
BP 20/15, 60/20, 125/20, 151/20
P 48
APS 41, 71, 96



SAFETY WARNING:	PLEASE READ THIS MANUAL THOROUGHLY BEFORE INSTALLING OR OPERATING THE CONTROL VALVES.

Contents

Introduction

Silvan is an Australian owned company specialising in supply of crop protection equipment to primary producers. A leader in the design of agricultural sprayers, the company was established in 1962 and has grown to become the largest manufacturer and supplier of crop protection equipment in Australia.

This manual covers the installation and operation of Control Valves designed for use in agricultural spraying applications in conjunction with a diaphragm pump. Information is given for Two Outlet Controls, Three Outlet Controls of either ball valve or flip lever type, and Four Outlet Controls with a single operating lever.

The above Control Valves are intended for use with the following diaphragm pumps in specified combinations that ensure compatibility of pressure and flow characteristics. Refer to the Features and Specifications section of this manual for the approved valve and pump combinations

BP 20/15, BP 60/20, BP 125/20, BP 151/20
P 48
APS 41, APS 71, APS 96.

These Control Valves have been designed and manufactured to provide a high standard of performance and safety and incorporate many innovative features. To ensure their continued efficient performance and safe operation, you need to read this manual thoroughly and fully familiarise yourself with all aspects of operation, maintenance and safety procedures.

Now that you are a proud Silvan owner, all our services and dealer support are available to you should you need them. We assure you of our best attention at all times.

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New Product Warranty

the Silvan Warranty

This warranty is the only warranty applicable to Silvan new products ('Products') and, to the maximum extent permitted by law, is expressly in lieu of any other conditions or warranties expressed or implied in relation to the Products.
Subject only to legislative obligations to the contrary, Silvan shall not be liable for incidental or consequential damage resulting from ownership or use of a Product.
Silvan does not authorize any person to create for it any other obligation or liability in connection with these products.

Silvan warrants its authorised Dealer, who in turn warrants the original purchaser (owner) of each new Silvan product that it will repair or replace the product, or, pay the cost of repair or replacement, as determined by Silvan without charge for labour or any defective or malfunctioning parts in accordance with the warranty limitations and adjustment schedule below.
The warranty period begins on the date the product is delivered to the first retail purchaser for a period of 12 months

This Warranty Covers

Only conditions resulting directly from defects in workmanship or material under normal use and service.

Warranty Exclusions

The Warranty does not cover:

- Conditions resulting from misuse, use of incompatible chemicals, exceeding machine specifications including overloading, impact damage, negligence, accidental damage or failure to perform recommended maintenance services.
- Any product which has been repaired by other than an authorised Silvan service outlet in a way which, in the sole and absolute judgement of Silvan, adversely affect its performance or reliability.
- The replacement of maintenance items such as diaphragms, batteries, V belts and ground engaging components, etc.
- Loss of time, inconvenience, loss of use of the product, liability to third parties or any other consequential damages.
- Incidental costs associated with a warranty repair including any travel costs, out of hour's labour charges, cleaning costs, transportation costs, freight costs or any communication costs.

The repair of a defective product qualifying under this warranty will be performed by any authorised Silvan service outlet within a reasonable time following the delivery of the product, at the cost of the owner, to the service outlet's place of business. The product will be repaired or replaced, using new parts supplied by Silvan. Silvan, in its absolute discretion, may choose to pay the cost of replacement or repair of the product.

The owner is responsible for the performance of regular maintenance services as specified in the Owner/Operator Manual applicable to the product. Failure to carry out regular maintenance may invalidate warranty

Features and Specifications

The Silvan Control Valves listed below are intended for regulating the application of agricultural herbicides using a spray boom or other spraying equipment and are designed for use with Silvan diaphragm pumps in the combinations shown below.

Control Valve Type	**Two Outlet Ball Type**	**Three Outlet Ball Type**	**Three Outlet Flip Lever**	**Four Outlet Single Lever**
Valve Features				
Number of pressure outlets	2	3	3	4
Outlet control - individual lever each outlet	Std	Std	Std	Std
- single lever for all outlets	-	-	-	Std
Screw pressure regulator	Std	Std	Std	Std
By-pass lever	Std	Std	Std	Std
Pressure gauge - glycerine filled	Std	Std	Std	-
- as above, dual stage	-	-	-	Std
Mounting - attached direct to pump	Std	Std	-	-
- remote bracket kit	Opt	Opt	Std	Std
Hose connector diameter (mm) - remote inlet	19	19	19	19
- by-pass	13	19	19	19
- outlet	13	13	13	13
Plastic body with stainless steel valves & seats	Std	Std	Std	Std

Abbreviations Std - standard equipment Opt - optional equipment

Pump and Valve Combinations

Pump Model	**Valve Location**	**Applicable Valve Part No.**			
BP 20/15	Attached	C1204-528			
	Remote	C1204-211			
BP 60/20	Attached		C1204-191		
	Remote		C1204-257	C1204-034R	C1204-332
BP 125/20	Attached		C1204-191		
	Remote		C1204-257		C1204-332
BP 151/20	Remote				C1204-332
P48	Attached		C1204-195		
	Remote		C1204-259		
APS 41	Attached	C1204-457			
APS 71	Attached		C1204-189		
APS 96	Attached		C1204-189		

Valve Maximum Flow Rate and Maximum Pressure

Valve Part No.	**Type**	**Max Flow (l/min) / Max Pressure (Bar)**
C1204-034R	3F	60/20
C1204-189	3B	95/40
C1204-191	3B	125/20
C1204-195	3B	100/30
C1204-211	2B	40/15
C1204-257	3B	125/20
C1204-259	3B	50/30
C1204-332	4L	150/20
C1204-457	2B	50/40
C1204-528	2B	40/15

Valve Type Abbreviations 2B = Two Outlet Ball 3F = Three Outlet Flip Lever
3B = Three Outlet Ball 4L = Four Outlet Single Lever

Safety Information

Before installing or operating the Control Valve read the following safety instructions.

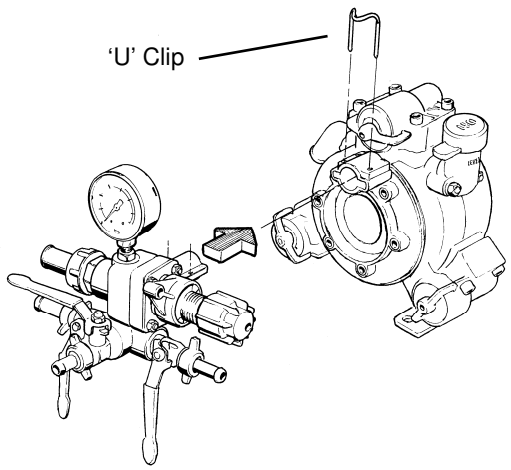
Failure to comply with these warnings may result in serious injury or death.

Whilst Silvan Control Valves have been designed and manufactured to incorporate all necessary safety features it is essential that any person who operates or works on equipment fitted with these control valves is aware of the safety precautions that should be exercised.

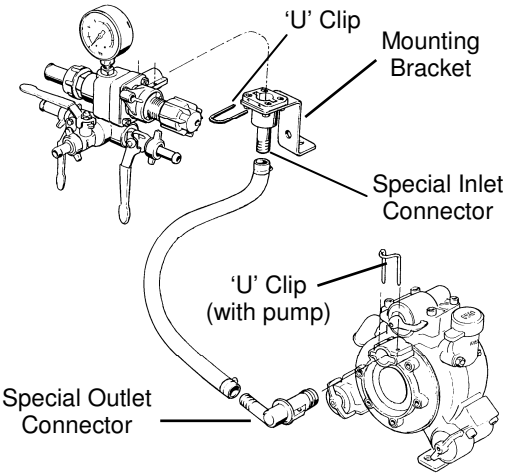
In addition to items that are specific to the Control Valves the following list of safety precautions includes some that are generally applicable when using tractor operated spraying equipment.

- ▲ These Control Valves are designed and manufactured solely for regulating the application of agricultural chemicals in conjunction with a diaphragm pump fitted to a spray boom or other spraying device and should not be used for any other purpose.
- ▲ Before installing or operating the Control Valves carefully read and ensure you understand the contents of this manual and any other manual supplied with the sprayer and associated equipment.
- ▲ Before installing or operating the Control Valves read and follow all the safety warnings which may be carried on the sprayer and associated equipment.
- ▲ Only use the Control Valves with herbicides. The use of fertilisers or aggressive chemicals can damage the valves and seats and may cause malfunctioning.
- ▲ Do not use solvents or cleaning fluids to clean the Control Valves.
- ▲ Do not operate diaphragm pumps at speeds greater than 540 PTO rpm.
- ▲ Never allow an inadequately trained person to install or operate the Control Valves or other spraying equipment.
- ▲ Do not operate the Control Valves or other equipment whilst wearing loose clothing, unrestrained long hair, jewellery or anything which could become entangled in rotating components or limit your vision.
- ▲ If the spraying equipment is to be attached to or operated by a tractor, ensure it is fitted with a roll-over protective structure (ROPS), or a cab incorporating a ROPS, complying with AS1636 or equivalent.
- ▲ Wear ear protection when operating a sprayer on a tractor that is not fitted with a sound proofed cabin.
- ▲ Ensure the PTO power output and towing capacity of the tractor match the power requirement and loaded mass of the sprayer. Refer to the tractor operator's manual for safe working loads and relevant tractor safety instructions.
- ▲ Exercise extreme care when operating in hilly or uneven terrain to ensure proper stability. Refer also to the tractor manufacturer's operating and safety instructions.
- ▲ Do not operate the sprayer without all the tractor and sprayer safety shields in place. Carefully check that the PTO and driveline shields are correctly installed.
- ▲ Do not perform adjustments or maintenance on the spraying equipment without first stopping the tractor engine and removing the key to prevent inadvertent movement or operation.
- ▲ **Before use of any chemicals** refer to the chemical manufacturer's label and safety instructions for safe handling procedures, the correct method of use and the required protective clothing and equipment. **Always use the recommended personal protective clothing and equipment.**
- ▲ **Always wear gloves when carrying out any adjustments to the spraying equipment.**
- ▲ Ensure that all operators and associated personnel are familiar with the legal regulations and codes of practice that apply to the safe use, storage and disposal of spray chemicals.

Installation and Operation



TYPICAL DIRECT MOUNTED CONTROL VALVE



TYPICAL REMOTE MOUNTED CONTROL VALVE
Using Optional Bracket Kit

Installation

Ensure that the control valve is only used with one of the diaphragm pump models listed in the Features and Specifications section so that the pressure and flow characteristics are compatible.

Two Outlet and Three Outlet Ball Type control valves can be mounted either directly to the pump or in a remote location using the optional mounting bracket kit. Three Outlet Flip Lever control valves and Four Outlet valves must be mounted remotely.

To mount the valve directly to the pump, plug the valve inlet connector into the pump outlet and secure with the 'U' clip provided with the pump. Attach a 13mm dia. (1/2") pressure hose to each valve outlet and connect to the spray boom sections, or other spraying device if applicable. Run a hose of specified diameter from the by-pass outlet of the valve to the bottom of the tank to return by-passed solution and provide agitation for the contents of the tank. Refer to the Features and Specifications page for the by-pass hose diameter applicable to each valve. Always use the by-pass connector supplied with the control valve never replace it with one of smaller diameter. Secure all hoses with worm screw clamps.

To mount the control valve away from the pump using the optional remote mounting kit attach the mounting bracket in a suitable location and fit the special inlet connector to the valve. Mount the control valve by placing the inlet connector in the bracket and secure it with the 'U' clip provided in the kit. Plug the special outlet connector into the pump outlet and secure with the 'U' clip provided with the pump. Connect the pump outlet to the control valve inlet using a suitable length of 19 mm (3/4") diameter pressure hose. Fit the outlet and by-pass hoses as described above.

Initial Start Up

When starting the sprayer for the first time after fitting a control valve, conduct a trial using clean water only (no chemicals) to familiarise with the operation of the control and to check that all systems are functioning correctly without leaks.

Attach the sprayer to the tractor and carry out any necessary lubrication and adjustment in accordance with the sprayer Operator's Manual. Check the oil level of the diaphragm pump and if necessary top up with SAE 20-40 multigrade engine oil. Refer to the pump Instruction Manual for further details.

Check that the drain valve is closed and that all strainers and filters are clean and in place, then partially fill the tank with water and set the controls so the sprayer will start without pressure in the system, as described below.

General Operating Procedure

The general operating procedure is common for all control valves. Refer to later pages for specific information on each type.

Before engaging the PTO, the by-pass control should be moved to the by-pass position and the outlet valves should be closed, using either the individual valve levers or the single lever, depending upon control type.

Engage the PTO slowly and allow the sprayer to run in by-pass mode. Once the pump is primed increase the tractor speed to 540 PTO rpm.

The by-pass lever can then be moved to the operating or pressure position and the pressure can be adjusted by turning the regulator knob and observing the reading on the gauge.

Installation and Operation

The diaphragm pumps listed in this manual are designed to operate up to a maximum pressure between 15 bar (218 psi) and 40 bar (580 psi) depending upon the model - refer to the pump identification plate and the Specifications page of this manual for details.

The pressure range used for boom spraying will normally be between 1 and 4 bar, depending upon the application rate and other factors - refer to the calibration information supplied for the spraying equipment. Higher pressures may be required for other applications such as a hand held spray gun on a long hose.

Open the required number of outlet valves to commence spraying.

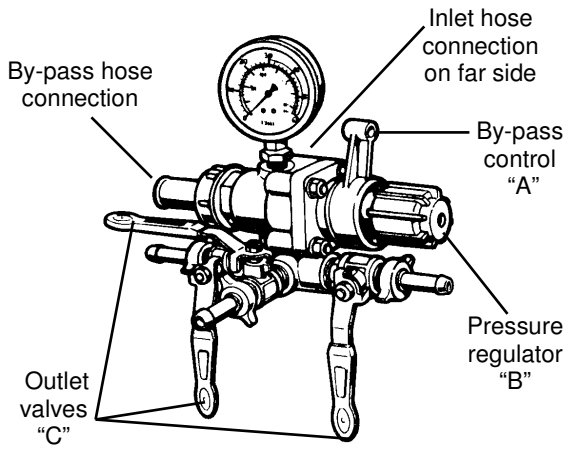
The diaphragm pumps listed in this manual are designed to be driven by a tractor PTO at a maximum speed of 540 rpm. However, under most boom spraying conditions, the tractor PTO speed can be reduced (Minimum 400 rpm) and the pump will still provide sufficient flow to suit the application rate being used. This will save fuel and unnecessary wear on the tractor and sprayer components.

With the sprayer running at operating pressure and with all spraying sections open, check for any leaks and tighten hoses as required.

Chemicals can now be added Refer to Chemical Safety Precautions section of this manual.

Two Outlet Ball Type Control Valve and Three Outlet Ball Type Control Valve

The operation of both valves is the same. The selection of either the by-pass or pressure mode is controlled by rotary lever “A” - refer diagrams. Moving the lever clockwise through its full travel selects by-pass, which recirculates the full flow of fluid from the pump to the tank via the agitator line.



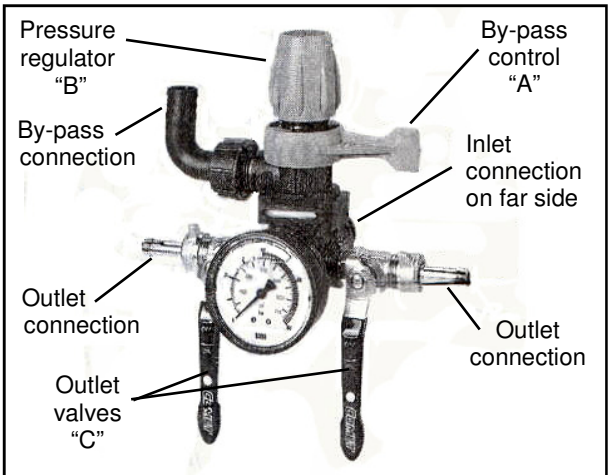
THREE OUTLET BALL TYPE CONTROL VALVE
Used with BP 60/20, BP 125/20, P 48, APS 71 and APS 96 Pumps

Moving the lever its full travel anti-clockwise directs pressurised fluid to the boom, or any other spray device connected to the system, and only the overflow from the pressure control is recirculated to maintain agitation within the tank.

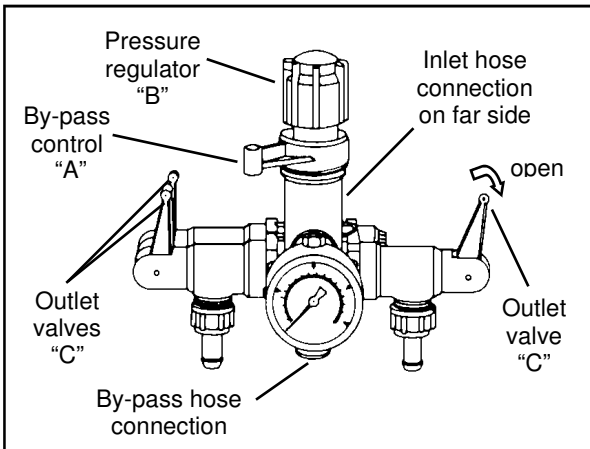
System pressure is regulated by turning the knob “B” and observing the reading on the pressure gauge. Turning the knob clockwise increases the pressure and turning anti-clockwise decreases pressure.

Fluid is directed to the boom lines or other spraying devices by the outlet valves “C”. The outlet valves may be operated individually and are open when the lever is in line with the direction of flow and closed when across the direction of flow.

If you wish to stop spraying but keep the tractor PTO running, close the outlet valves “C” and move the by-pass lever “A” to by-pass mode, <u>but do not leave the tractor while the PTO is operating</u>.



TWO OUTLET BALL TYPE CONTROL VALVE
Used with BP 20/15 Pump.



THREE OUTLET FLIP LEVER CONTROL VALVE
Used with BP 60/20 Pump

Installation and Operation

Three Outlet Flip Lever Control Valve

The operation of this valve is identical to the Three Outlet Ball Type valve described previously except that the outlet valves are open when the levers are vertically down and closed when vertically up, as shown in the diagram on the previous page..

Single Lever Control Valve

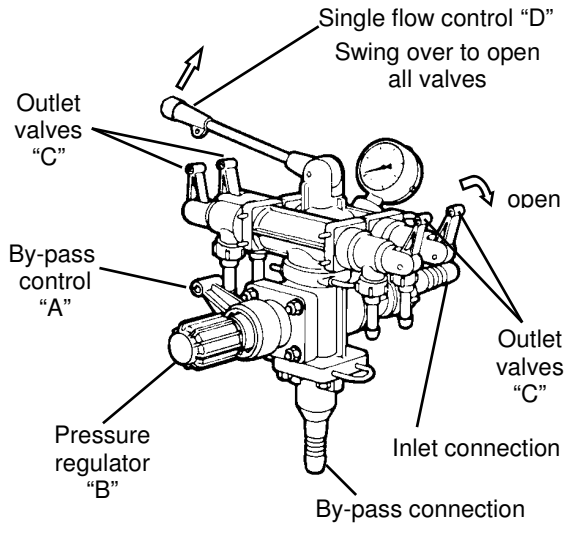
Operation of by-pass control “A” and pressure regulator “B” is the same as that of the two and three outlet controls previously described.

Fluid is directed to the spray lines or other spraying devices by the four outlet valves, which may be operated individually or as a group. The individual valves are open when levers “C” are vertically down and closed when vertically up.

Raising the single lever ”D” and swinging it over to the other side of the valve opens the flow to all valves and swinging it back closes the flow.

Once the required outlets have been selected using the individual valves, spraying may be started and stopped by using the single lever.

If you wish to stop spraying but keep the tractor PTO running, close the single lever and move the by-pass lever to by-pass mode, <u>but do not leave the tractor while the PTO is operating</u>.



SINGLE LEVER CONTROL VALVE
Used with BP 60/20, BP 125/20 and BP 151/20 Pumps

WARNING

Before adding chemicals read and follow the chemical manufacturer's instructions and always wear the recommended protective clothing.

Chemical Safety Precautions

Take care to avoid the spillage of chemicals or mixed solution. Wear gloves, eye protection and the recommended protective clothing whilst mixing chemicals and filling the sprayer. Wash your hands after mixing or filling if they have come into contact with concentrate or mixed solution.

Store unused chemicals and dispose of empty chemical containers, unused solution and rinse water in a safe manner and with correct regard to the environment, as recommended by the chemical manufacturer or relevant authority.

Daily Cleaning Maintenance

At the end of each day partly fill the tank with water and run this through the pump, valves and spray lines to purge them of chemicals.

Rinse the tank through the top opening and empty with the drain valve to remove powdered material. Never leave chemicals in the tank that could settle to the bottom and break into lumps that may block filters or control valves.

To enhance the removal of chemical residue, Silvan recommends the regular use of Selecta “Clean Spray” cleansing agent, particularly during peak season and prior to post season storage.

Dispose of unused chemical mix, rinse water and containers as recommended by the chemical manufacturer or government authority

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