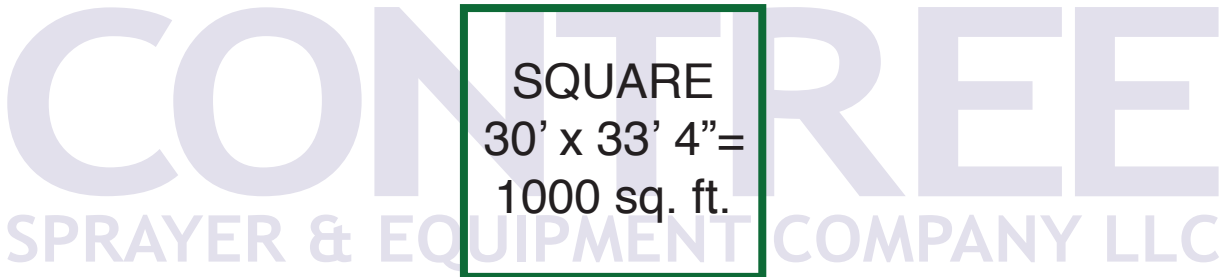


Calibration of Handgun Sprayers



1. Measure out a 30' x 30' 4" rectangle on flat dry pavement.
2. Fill sprayer with clean water and set unit at a desired spraying pressure.
3. Bleed out any air that may be in the handgun hose.
4. With a stopwatch, measure the time it takes you to spray the 1000 square foot rectangle at a comfortable walking speed. ***Repeat three times and take an average time.*
5. Next, spray the handgun into an empty calibrated container for the averaged time above. ***Repeat three times and average the water levels in the calibrated container.*
6. This averaged amount is what you will spray on every 1000 square feet.

With this information you will be able to add the correct amount of pesticide to your sprayer for a proper application.



4-CYCLE ENGINE OIL RECOMMENDATIONS

Use a high quality detergent oil classified "For Service SF, SG, SH, SJ" or higher. Do not use special additives.

Choose a viscosity according to the table below.

SAE 30 40°F and higher (5°C and higher) is good for all-purpose use above 40°F.

Use below 40°F will cause hard starting.

10W-30 0 to 100°F (-18 to 38°C) is better for varying temperature conditions.

This viscosity improves cold weather starting, but may increase oil consumption above 80°F (27°C). ***Check oil level frequently at higher temperatures.**

Synthetic 5W-30 -20 to 120°F (-30 to 40°C) provides the best protection in all temperatures, as well as improved starting with less oil consumption.

5W-30 40°F and below (5°C and below) is recommended for winter use and works best in cold conditions.

4-CYCLE GASOLINE RECOMMENDATIONS

Fuel must meet these requirements:

- Clean, fresh, unleaded gasoline.
- A minimum of 87 octane/87 AKI (91 RON). High altitude use, see below.
- Gasoline with up to 10% ethanol (gasohol) or up to 15% MTBE (methyl tertiary butyl ether) is acceptable.

CAUTION: Do not use unapproved gasoline such as E85. Do not mix oil in gasoline, or modify engine to run on alternate fuels. This will damage the engine components and void the **engine warranty**.

To protect the fuel system from gum formation, mix in a fuel stabilizer when adding fuel. See Storage. All fuel is not the same. If you experience starting or performance problems after using fuel, switch to a different fuel provider or change brands. This engine is certified to operate on gasoline. The emission control system for this engine is EM (Engine Modifications).

High Altitude

At higher altitudes (over 5,000 feet), 85 octane/85 AKI (89 RON) gasoline is recommended. High-altitude use may require a carburetor jet kit to improve performance and decrease fuel consumption. See an authorized dealer for more information.

Storage

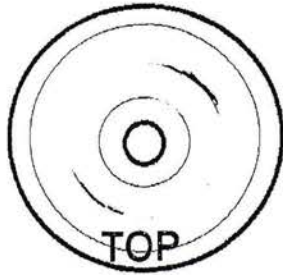
Fuel will become stale when stored over 30 days. Stale fuel causes acids and gum deposits to form in the fuel system or on essential carburetor parts. Prior to storage, if gasoline has not been treated with a fuel stabilizer, it must be drained from the engine into an approved container. Then run engine until it stops from lack of fuel.

When fuel stabilizers are used according to their instructions, there is no need to drain the gasoline from the engine prior to storage. Use a fuel stabilizer, available as a liquid additive or a drop concentrated liquid cartridge. Run the engine for a short time to circulate stabilizer throughout the fuel system. Engine and fuel can then be stored up to 24 months.

If gasoline is drained, the use of a fuel stabilizer in the storage container is still recommended to maintain freshness.



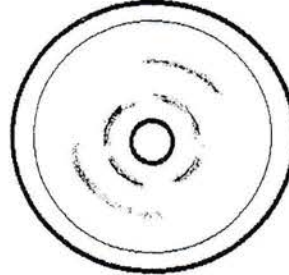
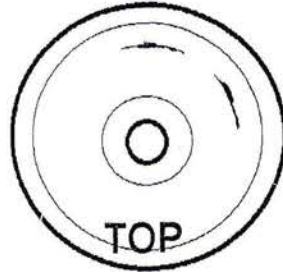
Common causes of diaphragm failure



Two marks in correspondence to valve seat

Causes

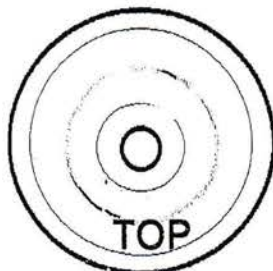
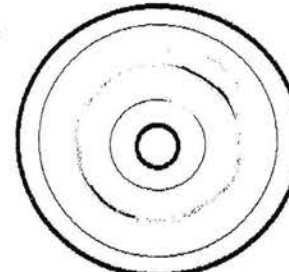
1. Restricted suction. Blocked suction filter. Suction hose blocked or kinked. Suction lift too high. Spray mixture too thick (dense)
2. Pump RPM above specification
3. Suction valve not sealing
4. Cylinder Sleeve holes not in correct position
5. Chemical incompatible with diaphragm material, in addition to one of the above causes.



Fatigued and worn underneath piston retaining disc and two marks in correspondence to valve seat.

Causes

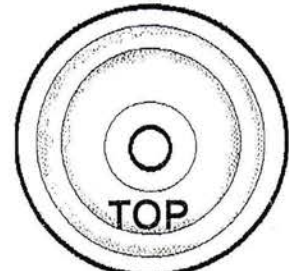
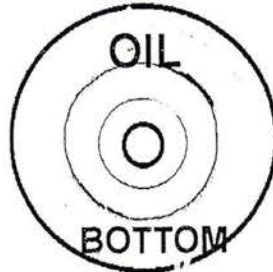
1. Chemical incompatible with diaphragm material
2. Diaphragm swollen and soft
3. Diaphragm soft and spongy (Below 60°)
4. Diaphragm profile distorted
5. Diaphragm shape distorted
6. Increase in external diameter
7. Diaphragm swollen



Circular fracture on piston side of diaphragm that is same size as piston.

Causes

1. Excessive wear between piston and valve
2. Suction has too much pressure (excessive head)
3. Low pump RPM
4. Cylinder sleeve holes not in correct position
5. Delivery valve not sealing
6. Low oil level in pump



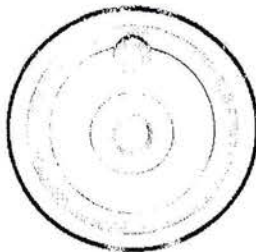
Fracture on external diameter and worn or fatigued under piston retaining disc.

Causes

Fatigue breakage, diaphragm worn out

Remedy

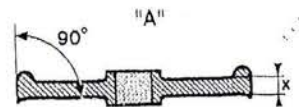
Diaphragm must be checked once a year.



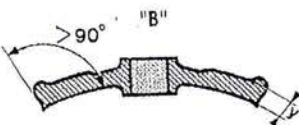
Straight fracture

Causes

Incorrect air bleeding, air trapped under diaphragm



A. Standard shape



B. Diaphragm distorted

B. Swollen diaphragm



Maintenance/Winterizing of Spraying Equipment

Engine:

- Check oil level EVERY DAY.
 - Change oil after 50 hours of use.
 - Use SAE 30 high quality detergent oil classified for service SE, SF, or SG.
 - Change or clean air filter every 25 hours.
 - Replace or clean spark plug every 100 hours.
- *If you have questions, always refer to your owner's manual or call your local engine dealer.*

Pump (diaphragm style):

- Change pump diaphragms and oil for every 500 hours or 3 months of use.
- Flush pump after every use.
- Use NON-DETERGENT SAE 30 weight oil or new specially formulated Hypro pump oil.
- Check oil in pump and gear reduction every day.
- Replace oil in gear reduction every 500 hours, use SAE 80W-90 gear lube.

Sprayer Parts:

- Clean line strainers daily.
- Be sure to remember not to lose the strainer bowl gasket. It is always a good idea to keep an extra gasket, screen and strainer bowl on hand.
- Lube strainer gasket with petroleum jelly to aid in seating.
- Repair leaks as soon as they are noticed to avoid excessive fluid loss.

Hose Reel:

- Check alignment of drive motor sprocket and reel sprocket. If out of alignment, realign or take to a qualified reel repair center.
- Oil chain weekly with a light coat of chain lube, available in aerosol spray cans at most auto parts stores.
- Check reel bearings for wheel bearings for wear and keep oiled. This allows hose to reel out evenly and cause less strain on the reel motor when rewinding hose.

Tanks:

- Clean tanks weekly, inside and out. Household ammonia works well; use ½ gallon ammonia to 25 gallons water. There are the other products on the market, among them is Tank Clean. Ask your chemical dealer for the other available tank cleaning products.

Winterizing:

- Before storage, triple rinse your sprayer. Fill tank ¼ to ½ full for each rinse. Clean tank as mentioned above. Mix 10 gallons of 50/50 mixture of water and antifreeze. Be sure to run it through the hose reel and handgun. Hold handgun valve in ON position until 50/50 mix comes out. (100% RV antifreeze may also be used.)
- If sprayers are not properly rinsed, the chemical residue can damage costly parts of your sprayer and decrease the operational life.

Engine:

Top off / fill fuel tank, using ethanol free, high octane fuel

- Add fuel stabilizer
- Run engine with fuel valve off
- Allow engine to run out of fuel
- Shut off ignition switch

— *This process burns off all the fuel in the carburetor to help prevent varnishing of fuel in the carburetor. Having fuel valve off during storage also helps to prevent fuel leaking into the crank case.*

Reminder check/change oil in the spring:

- Proper oil level
- Color — if Black or Hint of white (condensation) — Change Oil
- SAE-30 detergent oil typically
- 20 oz. for 160 CC (5.5 HP) to 200 CC (6.5 HP) engines

*By following these preventative maintenance recommendations,
your sprayer should operate smoothly for many years!*