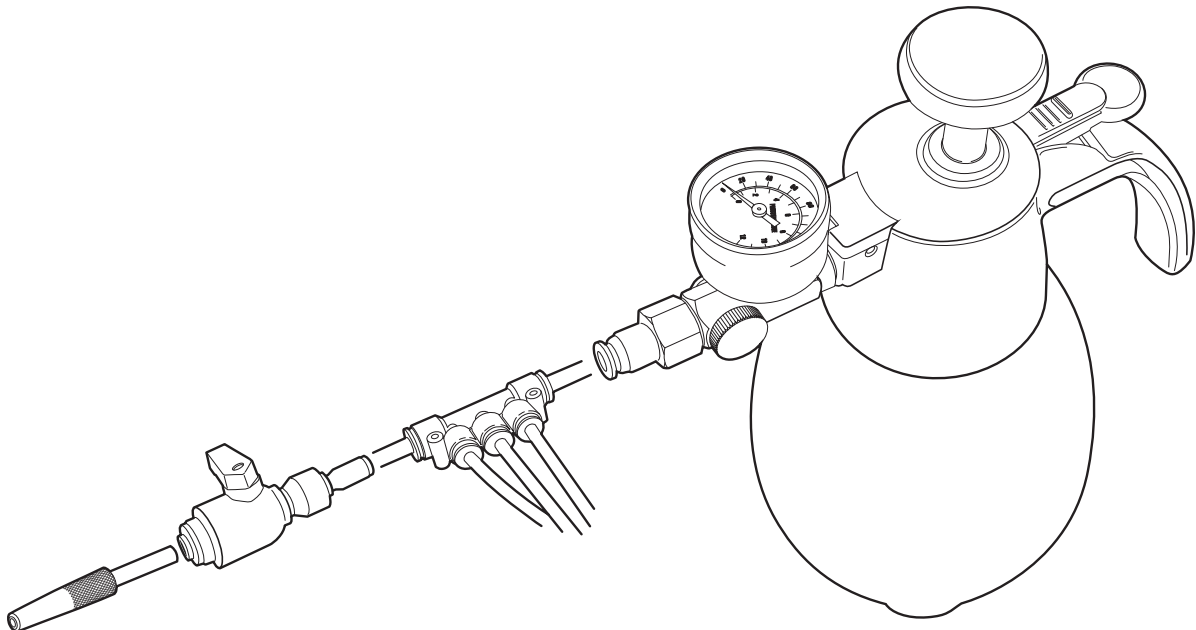


TREE DEFEND

TREE INJECTOR



TREE DEFEND, LLC TREE INJECTOR Instruction Manual

TREE DEFEND® is a tool to deliver nutrients, hormones, or pesticides directly into the vascular tissue of trees for the control of tree diseases or nutrient deficiency. It is important that the health of the tree be evaluated to determine feasibility of injection and proper treatment and dosage.



Parts included in your Tree Defend[®] Kit

The 1-Liter Tree Defend[®] Injector Kit comes with:

- A) 1-Liter Pump Bottle
- C) 3 Manifolds
- D) 9 Valve Assemblies
- E) 9 Injection tubes
- F) 2 Plugs
- Flexible Tubing
- 1 Drill Bit
- 1 Spare Injection Tube
- 1 Bottle Stake

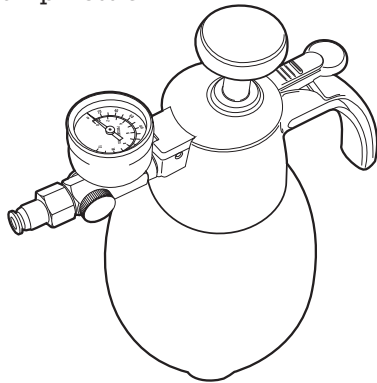
The 2-Liter Tree Defend[®] Injector Kit comes with:

- B) 2-Liter Pump Bottle
- C) 4 Manifolds
- D) 12 Valve Assemblies
- E) 12 Injection tubes
- F) 2 Plugs
- Flexible Tubing
- 1 Drill Bit
- 1 Spare Injection Tube
- 1 Bottle Stake

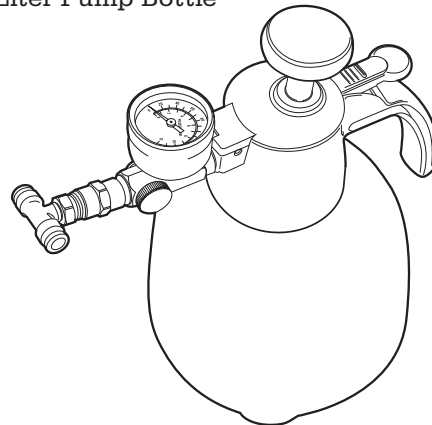
Tools required for use of the injector:

- Measuring tape
- Mallet
- Pliers
- Drill
- Brad Point Drill bit
(1/4" diameter for standard injection tube)

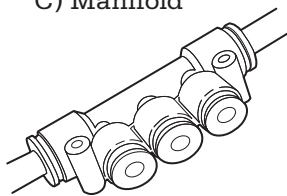
A) 1-Liter Pump Bottle



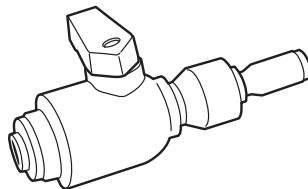
B) 2-Liter Pump Bottle



C) Manifold



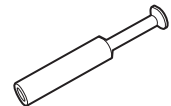
D) Valve Assembly



E) Injection tube

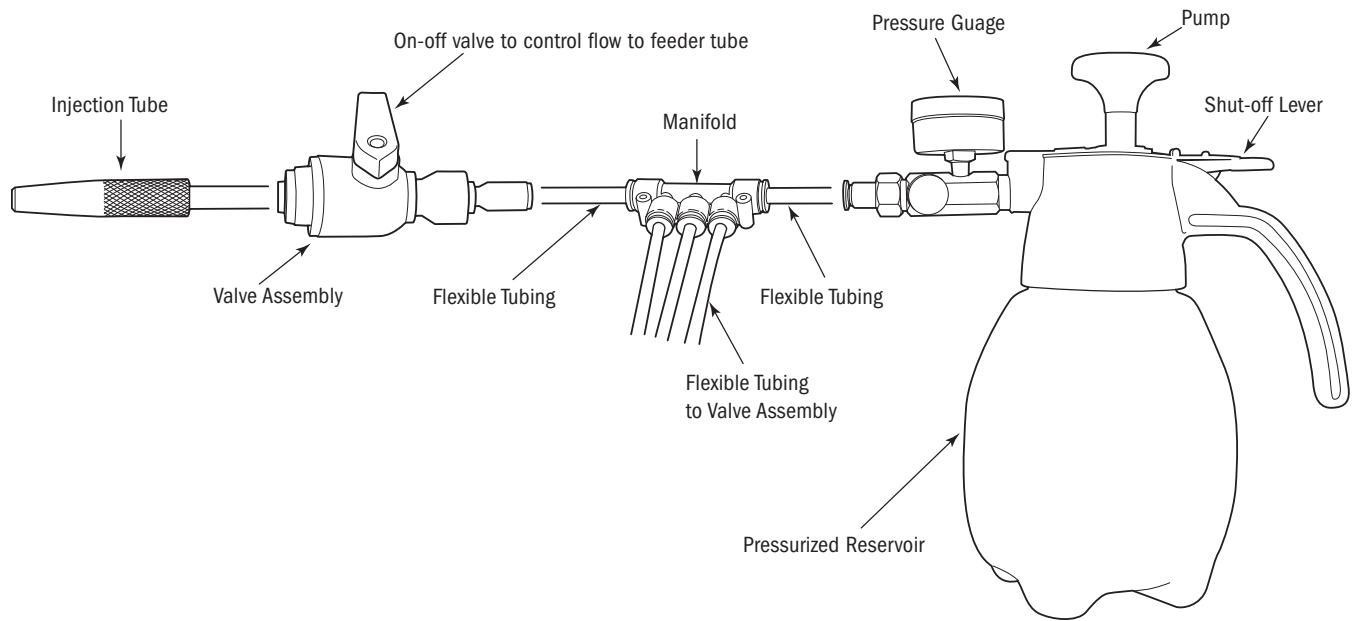


F) Plug

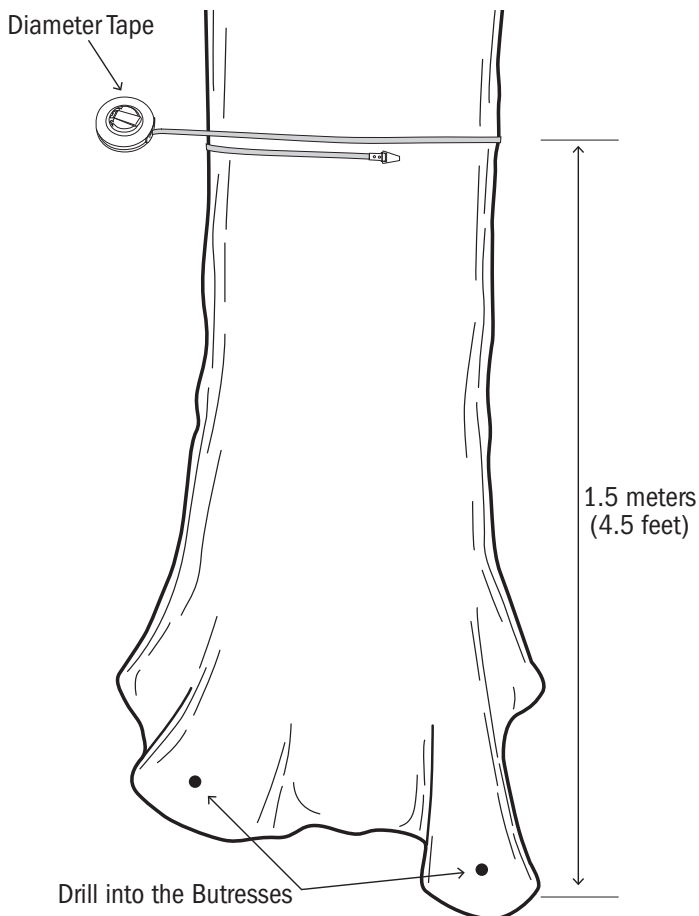


SAFETY EQUIPMENT/PROTECTIVE GEAR:

Wear eye protection, rubber gloves, and any other safety equipment as specified on the pesticide label.



Instructions for Tree Injections



1) Determining injection sites

Once a diagnosis of the tree has been made, measure the trunk of the tree to determine diameter at approximately 1.5 meters above grade (dbh). From this the proper dosage of nutrient or chemical, and the number of injection sites can be determined based on label recommendations.

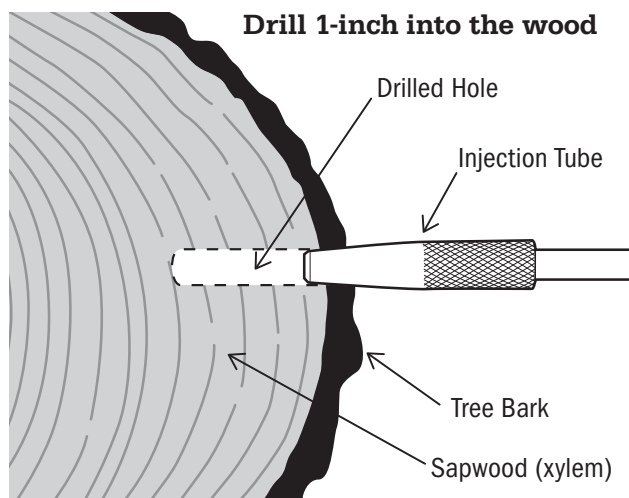
You may use the 1-Liter Pump Bottle, or the 2-Liter Pump Bottle with the double outlet attached depending on the volume of solution required. Injections into the buttress flares at the base of the trunk usually result in the fastest absorption of material. This area is the fastest growing part of the trunk and thus has the largest pores in the vascular tissue. **Always follow label instructions for mixing and applying chemicals.**

2) Injection sites

Once the dosage and number of injection sites have been determined, **drill through the bark and approximately 1-inch into the wood. Drill downward at a slight angle into the wood.** Drilling too shallow may cause the injection tube to bottom out in the hole and reduce absorption into the tree. Drilling too deep may cause excessive wounding of the tree.

Immediately insert the tapered end of the brass injection tube into hole just deep enough to form a seal. Tap in lightly if needed with rubber mallet.

*Avoid over insertion as bottoming out will restrict absorption of material by the tree. **Don't pound the injection tube into the tree too hard, as this could cause slow absorption into the tree.***



TIP:

Don't pound the injection tube into the tree too hard, as this could cause slow absorption into the tree.

DO NOT ALLOW HOLES THAT HAVE BEEN DRILLED IN THE TREE TO SIT OPEN.

3) Fill and pressurize the reservoir

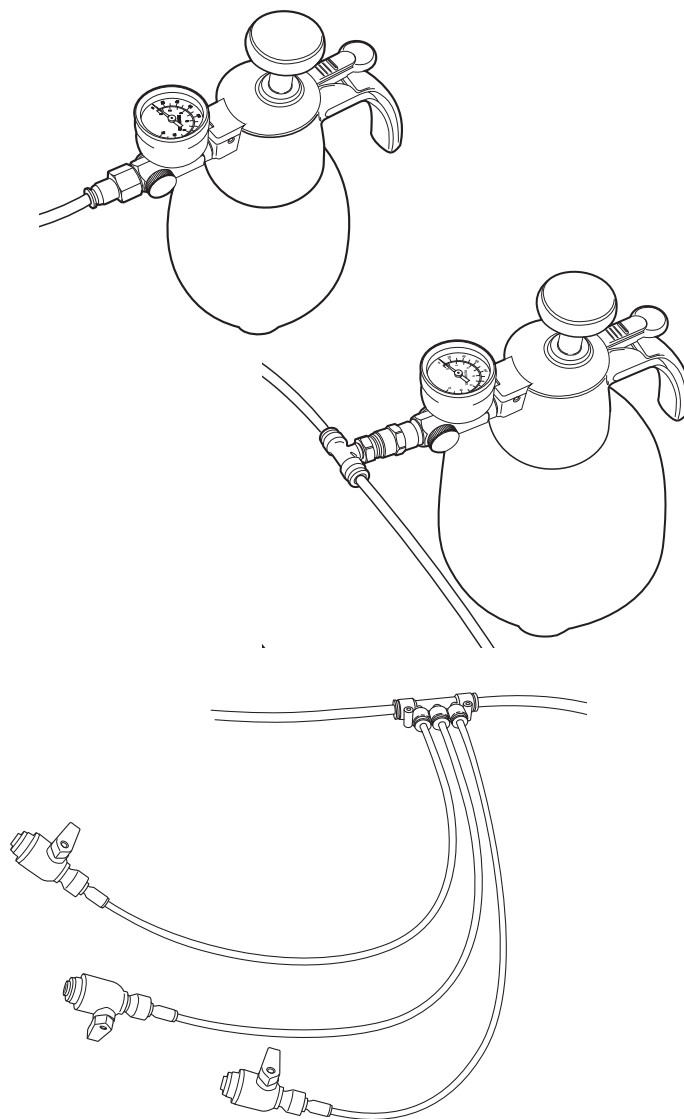
Mix appropriate dosage of materials in the reservoir and use pump to pressurize. A pressure of 15 to 25 PSI usually works well. Always follow label instructions for mixing and applying chemicals.

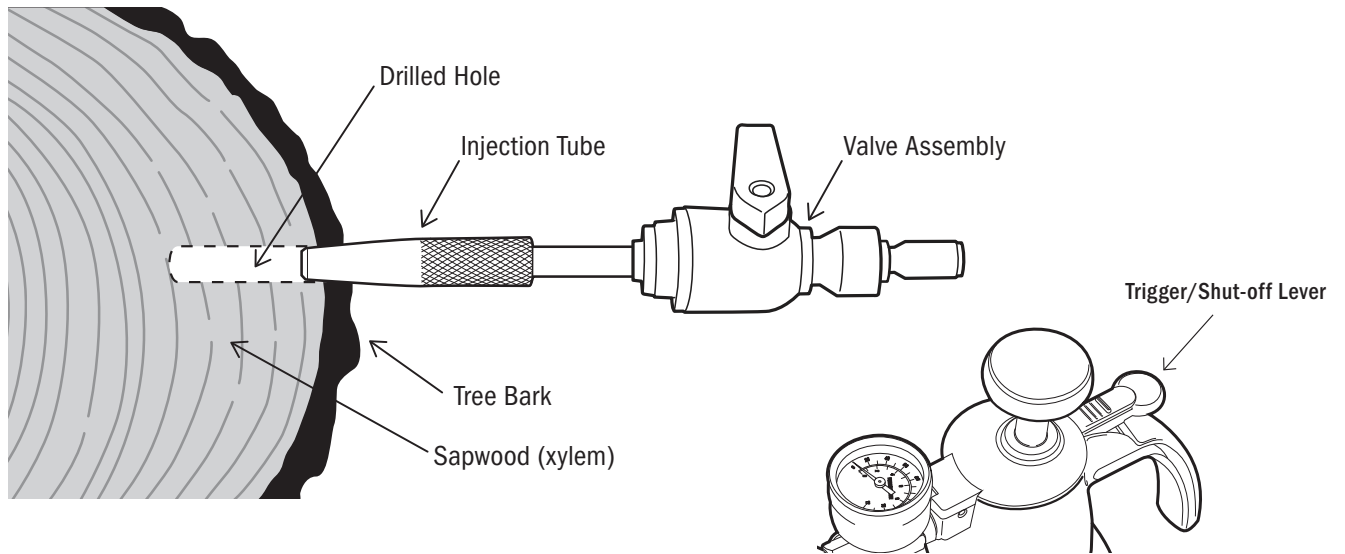
4) Setting up the tubing and manifolds

Connect the required number of manifolds using 6mm flexible tubing, according to how many holes you drilled into the trunk of the tree. The manifolds will distribute the liquid to the injection tubes through 4mm flexible tubing to valve assembly. The advantage of this system is that you can add or subtract the amount of injection tubes/manifolds according to the size of the tree, with ease.

5) Bleeding air from the system

Depress and lock the trigger lever on the reservoir to send pressure into the tubes. Bleed air from the system by turning lever on each valve assembly just enough to allow air to escape, then close valve.





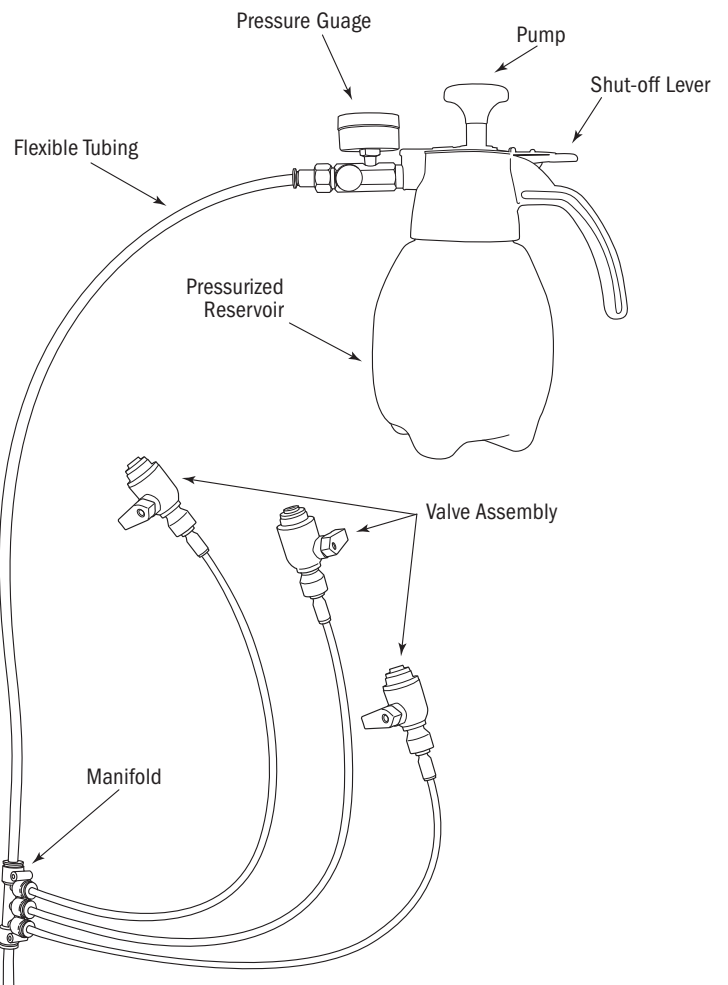
6) Attaching valve assembly to injection tube

The valve is then placed on the injection tube by gently pushing the ¼" fitting (push-lock) onto the tube. Open the on-off valve lever on the valve assembly to allow liquid to flow into the injection tubes. Check all holes for leaks. If liquid leaks out around a injection tube close the valve, remove valve from injection tube and set injection tube deeper into hole to seal it. Connect valve to injection tube and open again while checking for leaks.

7) Completion of injection

When liquid has been absorbed by the tree, valves should be closed as tubing empties of liquid. After all valves have been closed, wait a few minutes for any liquid still in the brass injection tube to absorb into tree, then remove valves from injection tubes on the tree. Depressurize system by unscrewing the black lid from the white bottle.

Brass injection tubes are then removed from the tree (use pliers if needed). **If you are treating oak trees, seal the holes with an appropriate wound dressing immediately upon removal of the injection tube to prevent the spread of oak wilt fungi by sap-feeding beetles.** For other species holes can be left open to air dry and close naturally.



8) Cleaning the equipment

The injection tubes can then be placed in a disinfectant solution to keep them clean until the next use. Rinse the reservoir with clean water and flush through the system.

- Clean sprayer, tubing, and valves after each use with water.
- Clean the screen at the end of the pick-up tube inside the reservoir after each use.
- If a complete cleaning is required, a solution of 50% household peroxide and 50% water to run through the Tree Defend[®] Injector system.
- Check injection tubes for debris after use. Debris can be removed by pushing the wire (supplied) through the tube. Valve assemblies can be cleared the same way in the event of an obstruction.
- Rinse injection tubes in a disinfectant (alcohol, peroxide, or bleach) solution between jobs to prevent the spread of plant diseases. This will also keep them clean for the applicator to handle, as many of the chemicals or nutrients used on trees can make them sticky or slippery.
- Use the chemical manufacturers instructions to dispose of any wastewater, cleaning materials, or chemicals.

SAFETY EQUIPMENT/PROTECTIVE GEAR:

Wear eye protection, rubber gloves, and any other safety equipment as specified on the pesticide label.

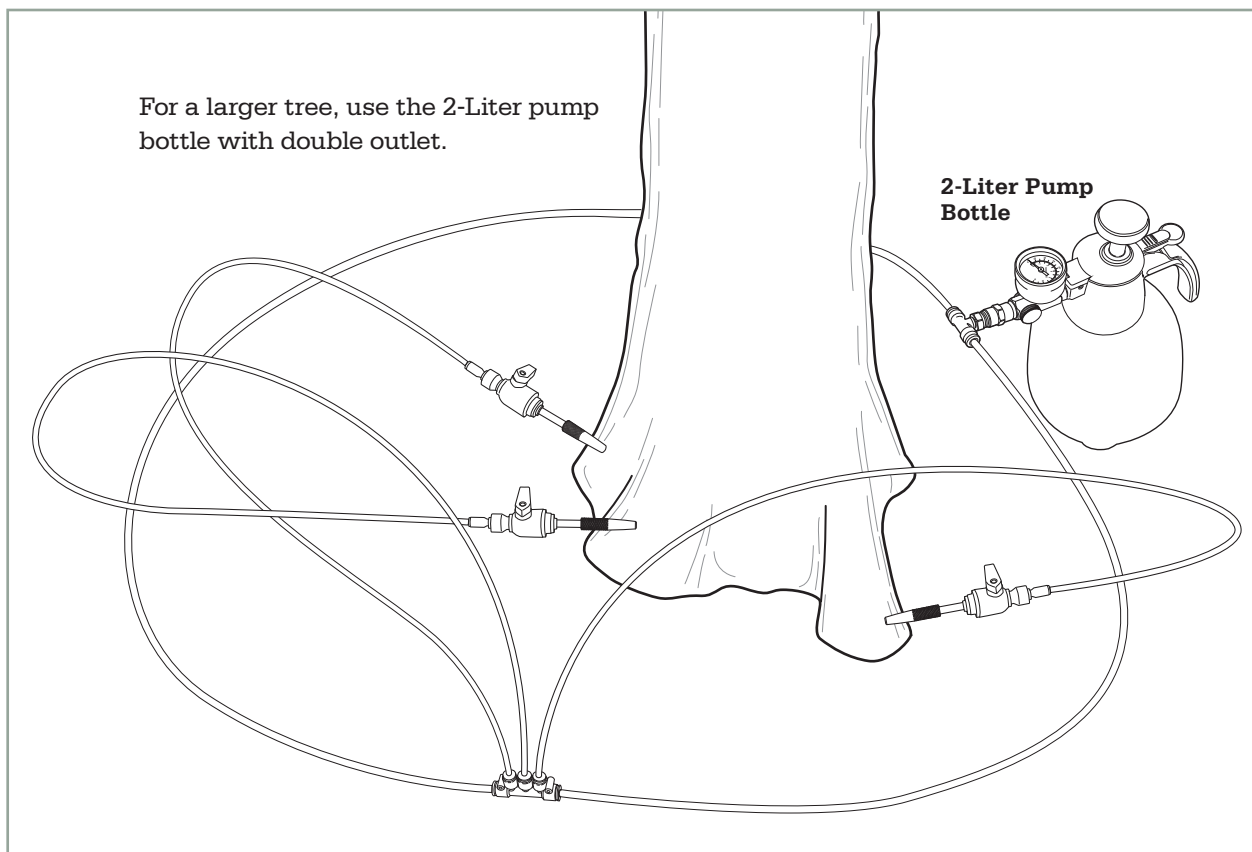
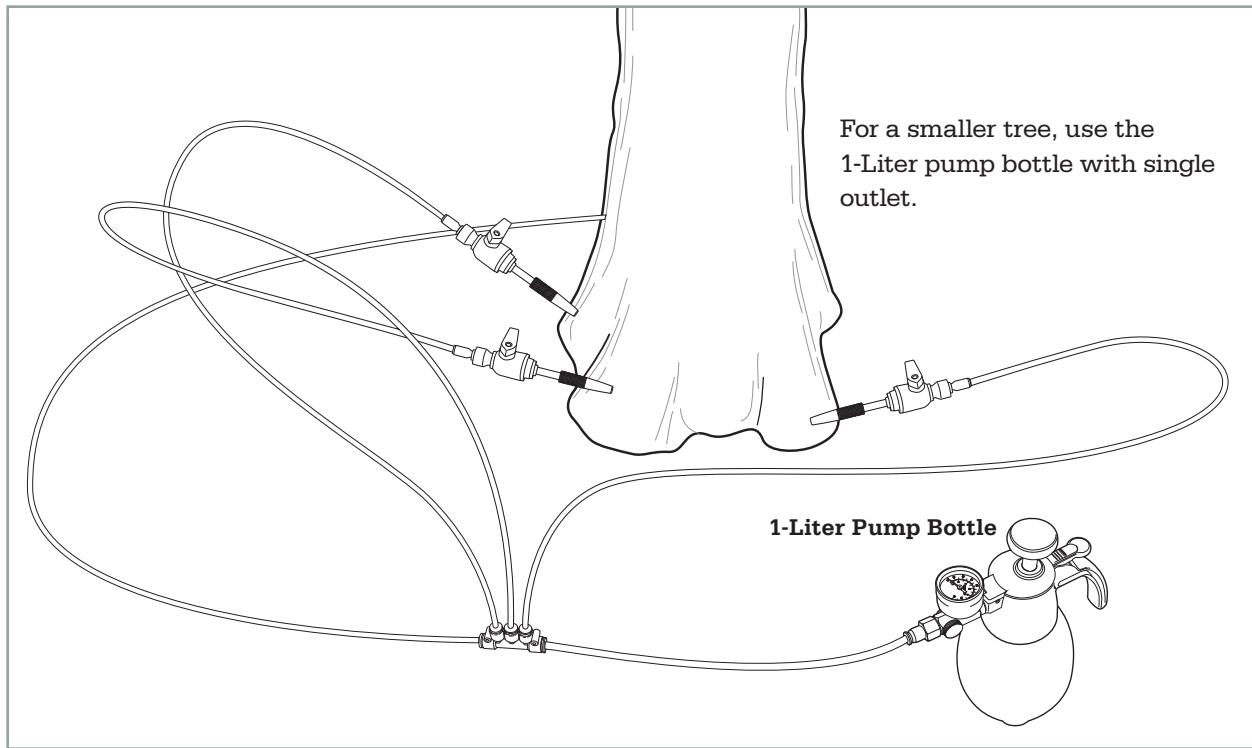
TIPS:

- **Always follow label instructions for mixing and applying chemicals.**
- Start with a low pressure (approximately 15 PSI). If the tree is absorbing the material slowly you can increase it after you start the injection.
- A water-soluble dye can be used in your mixture to make it easier to see the liquid in the tubes.
- Use ribbon or other means to mark the trees that have been treated. The holes are small and not easily visible. This will help you keep track of which trees are completed.

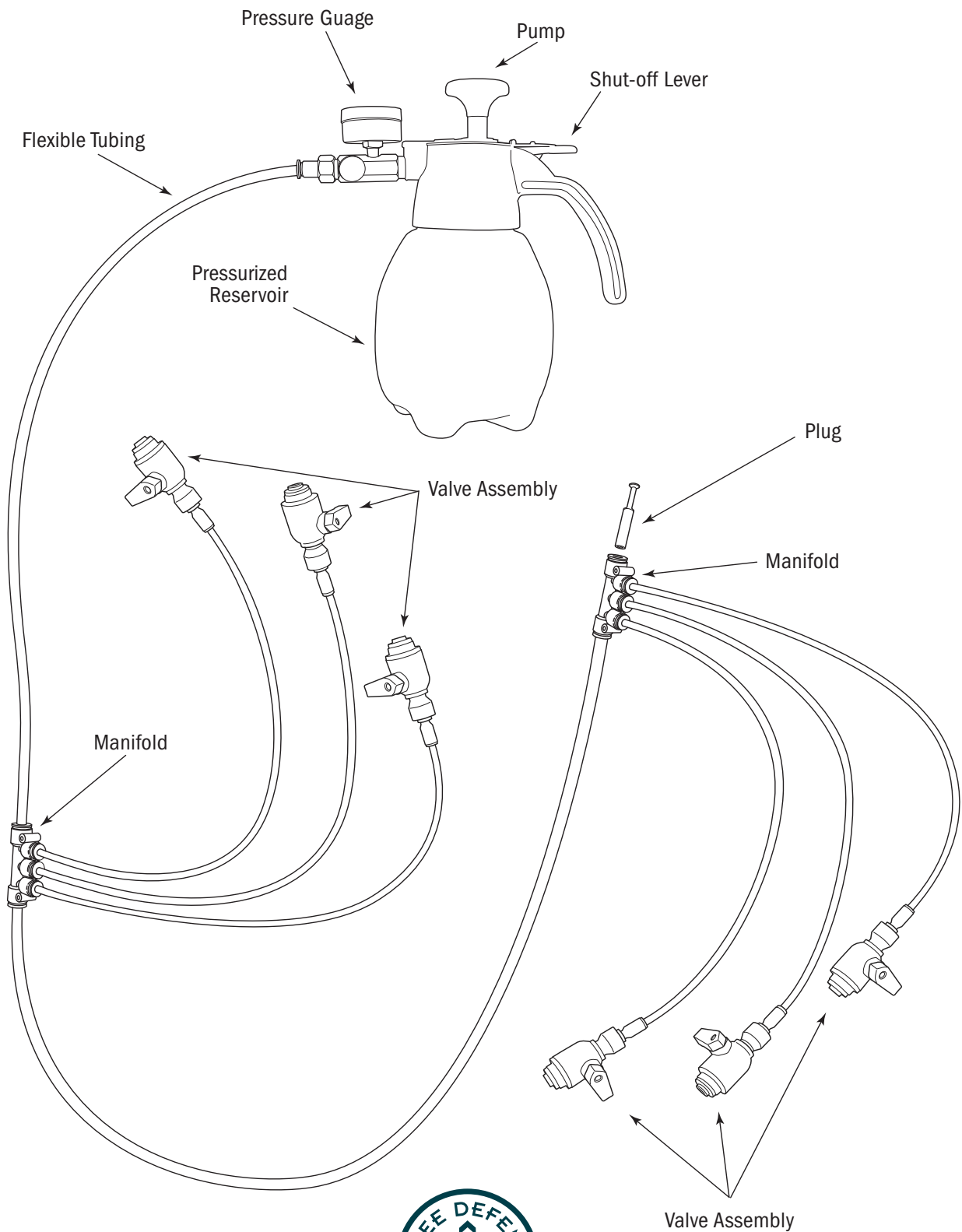
SAFETY WARNINGS:

- **Do not use acid, caustic, or potentially injurious chemicals.**
- Do not fill with flammable materials.
- Do not use with herbicides.
- Do not use liquids with temperatures above 120°F (45°C).
- Do not use disinfectants, solvents unless first tested to ensure they are not harmful to the environment or Tree Defend[®] system.
- Never allow children to use the Tree Defend[®] system. Do not allow adults to use the system without proper instruction.
- Keep the treatment area free of people and pets, especially small children.
- Do not operate Tree Defend[®] system if it has been damaged in any manner. Always have damage repaired before use.

Example of Injection Sites in Tree Buttresses



TREE DEFEND^{LLC}



Tree Defend® reserves the right to change technical specifications without prior or other notice.