



Tree I.V. Micro-Infusion™ System

Training Manual

Revision Date: 1/25/08



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Introduction to Arborjet's Tree I.V. Micro-infusion™

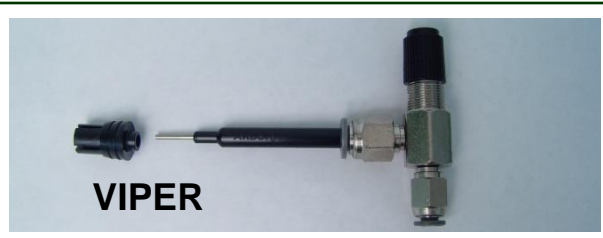
Arborjet's Tree I.V. Micro-infusion™ system was developed to effectively deliver high volumes of injectable product into the sapwood of any type of tree. It enables the applicator to precisely deliver an accurate, measured dose of insecticide, fertilizer or fungicide into the xylem tissue in a safe and environmentally friendly way. The Tree I.V. utilizes either VIPER or STINGER micro-infusion interface technology.

VIPER - "Volume-Injection Pressure-Enhanced Reservoir" (uses Arborplug)

- **Arborplug** is the plug inserted into the **Sapwood**
- **VIPER Needle** is the name of the **Micro-infusion™** Needle
- **VIPER Method** is the procedure for the **Micro-infusion™** using Arborplug and VIPER needle.

VIPER
Best
For:

- Faster Uptake
- Closed Infusion Site
- No leakage
- Faster Wound Closure
- Conifers
- Infection Prone Trees



STINGER – "Stick-Inject-Remove" (Does not use Arborplug)

- **STINGER Needle** is the name of the **Micro-infusion™** needle and tip.
- **STINGER Method** is the procedure for the **Micro-infusion™** using STINGER needle.

STINGER
Best
For:

- Faster Set Up
- Simpler process
- Ring Porous Trees
- Non-Arborists



Parts of the Tree I.V. Kit (2-pack)

Pressure Pump
(010-7081)

Bottle & Cap Assembly
(010-9024)

Tree IV 2 pack Kit – 070-0010
Deluxe Tree IV Kit – 070-0015

Tree I.V. Stands
010-1125

5 Gallon Bucket
(975-00113)

Funnel
(975-00098)

Graduated Cylinder
(975-9040)

CLEAN-jet
½ L (030-2035)
Reorder:
1 L (030-2030)

Training Manual

Tree I.V. Manifold w/ 4 supply lines
(010-7006)

Tree I.V. Tool Kit
(010-4018)

3 Easy Steps for the Tree I.V.



1. DRILL



2. PLUG



3. INJECT

SAFETY REMINDER

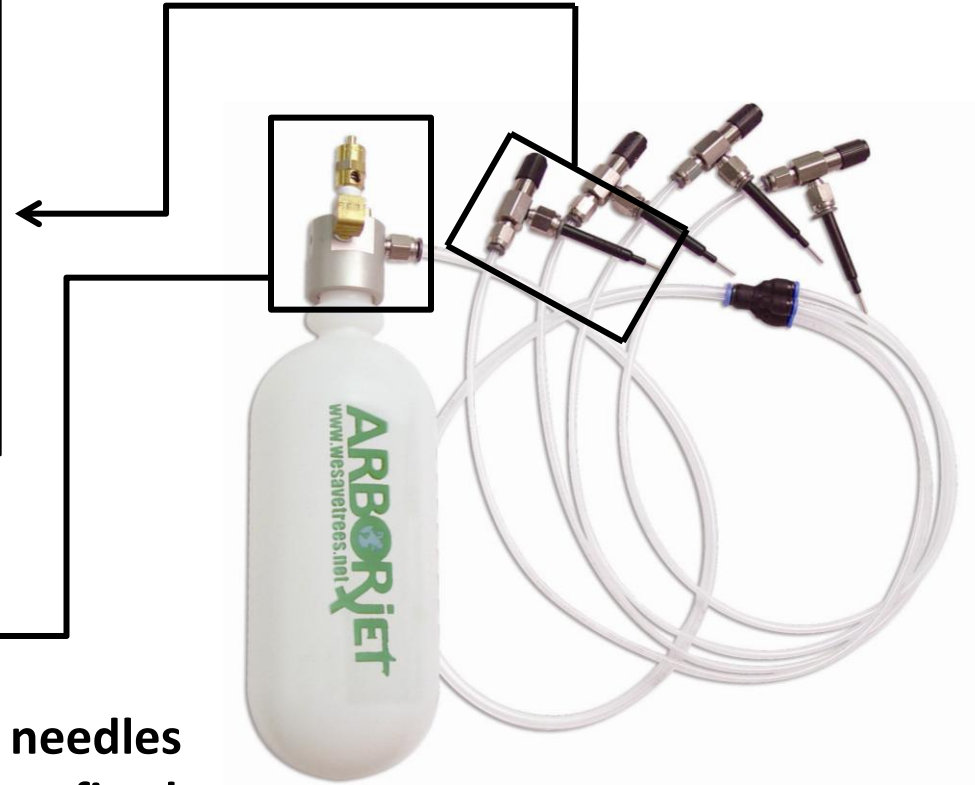
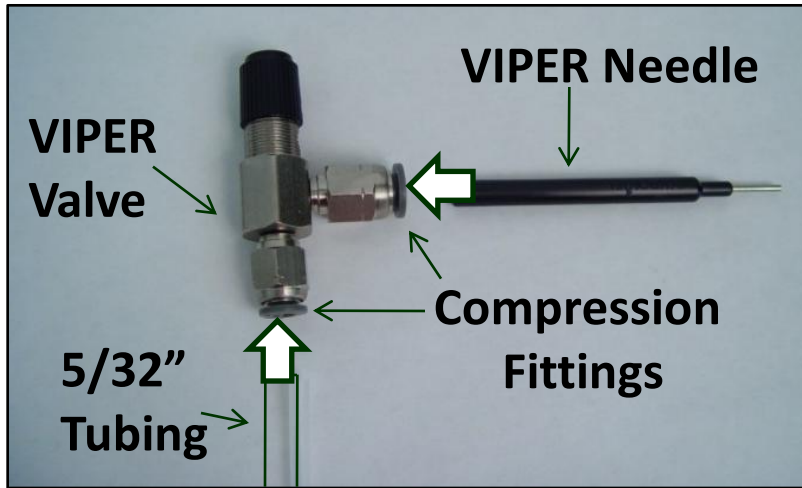


Always wear safety glasses and gloves when handling equipment and products.

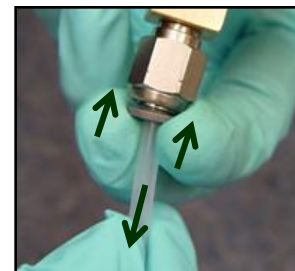


Tree I.V. in use

How to Assemble the Tree I.V.

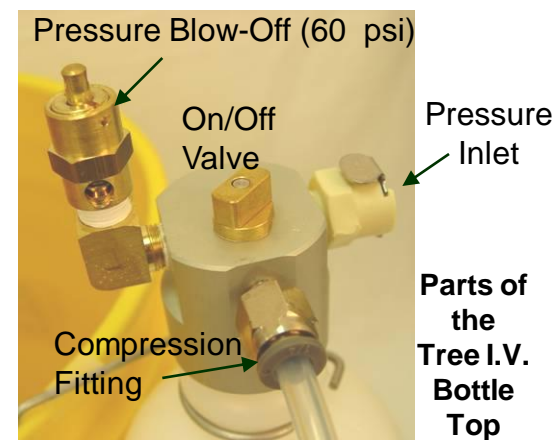


*** Insert needles and tubing firmly into quick disconnect fittings.**



**To Remove:
Compress the plastic ring and pull tubing or needle.**

Prepare the Tree I.V. for Micro-infusion™



1. **Measure tree** diameter in inches, at chest (breast) height by using a diameter tape, or measure circumference and divide by 3. **DBH” = Diameter at Breast Height in inches.**
2. Use the **Product Label**, and **DBH”** to determine 3 things:
 - a. **Total injection volume**
(ex. 16” tree @ 4mL/DBH” rate = 64mL total IMA-jet volume)
 - b. **# of Injection Sites Recommended**
 - c. **# of Tree I.V. Bottles to Use**
3. **Measure volume** in graduated cylinder.
4. **Pour** into Tree I.V. bottle(s) using funnel

!! IMPORTANT!! 600 ml capacity- There must be air space in the bottle for air pressure, otherwise you may need to re-pressurize during the micro-infusion.

Table 1. Recommended # Tree I.V. and Arborplugs

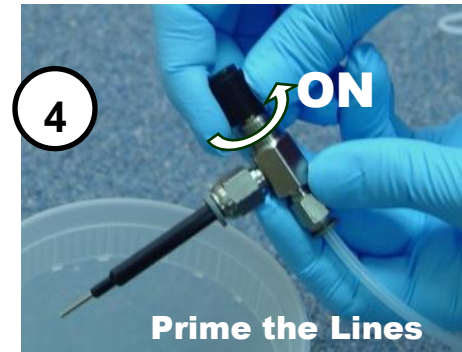
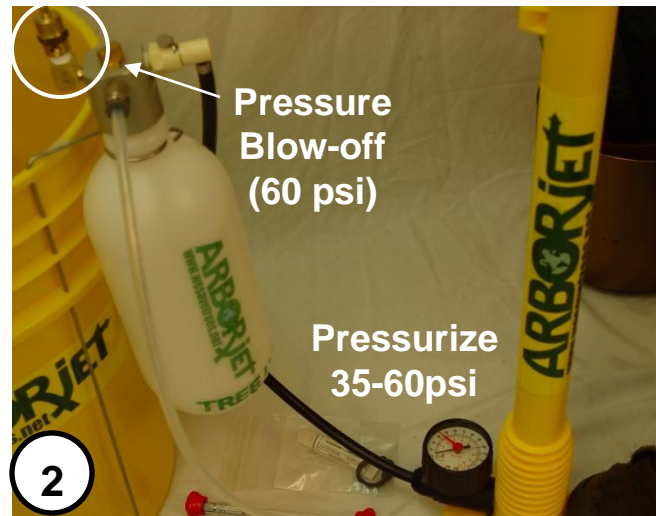
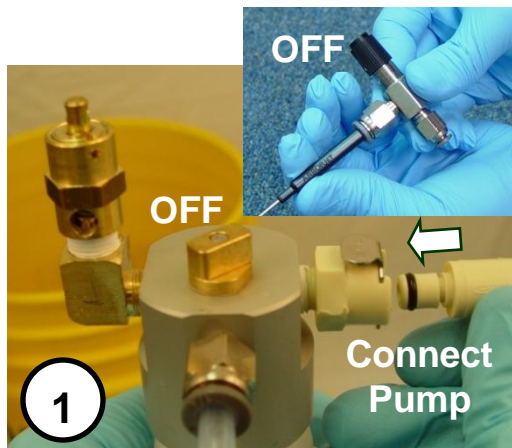
Inches DBH	# of Tree I.V. Bottles	# of Arborplugs
6-14”	1	4
15-26”	2 *	6-8
27-38”	3 *	10-12
39-50”	4 *	14-16
51-62”	5 **	18-20
63-74”	6 **	22-24

* Or use Expansion Kit – 010-7016

** Or use 2 Tree I.V. bottle plus Expansion Kit

WARRANTY VOID WITH USE OF NON-ARBORJET APPROVED FORMULATIONS

Pressurize and Prime Supply Lines



1. Make sure Tree I.V. Top and Needle Valves are **OFF** before Pressurizing, then connect the Tree Pump.
2. **Pressurize** between 35 – 60 psi. For safety: Blow-off valve will release at 60psi (maximum).
3. Turn **ON** the Tree I.V. Top valve, and product will flow into the supply lines.
4. To prime the supply lines, open each Needle Valve to release any air in the lines. Product will fill the supply lines. This is recommended for best uptake results.

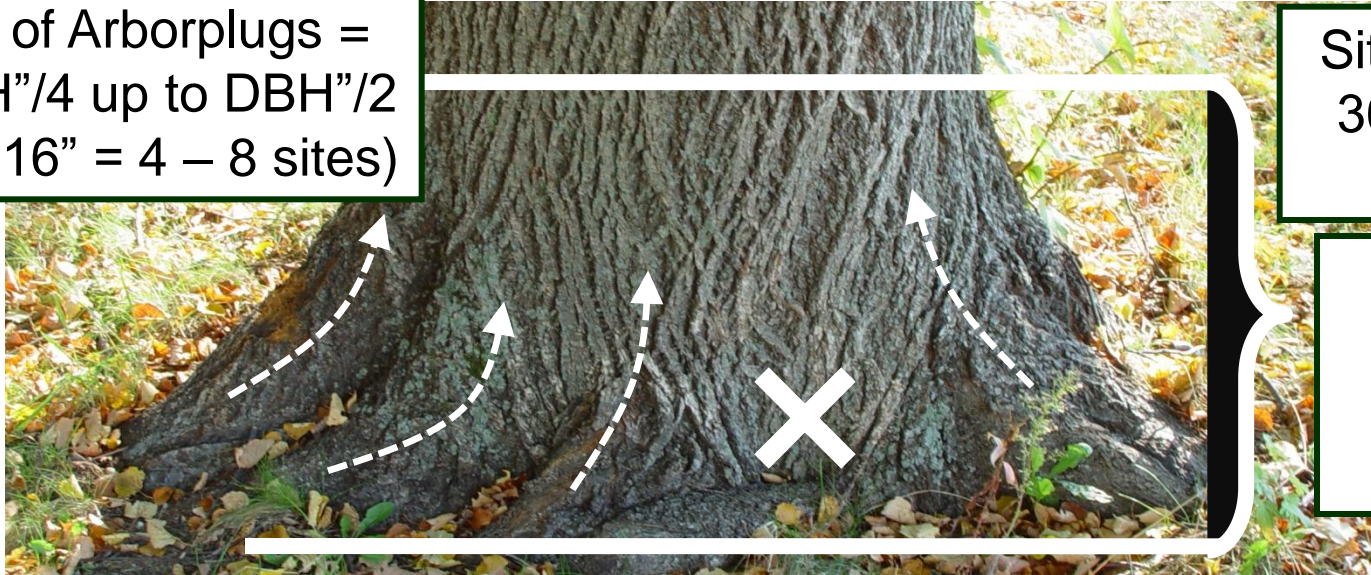
NOTE: Before you begin treating Conifers, please see pg 12 “Conifers vs Deciduous”

Select Arborplug™ Sites

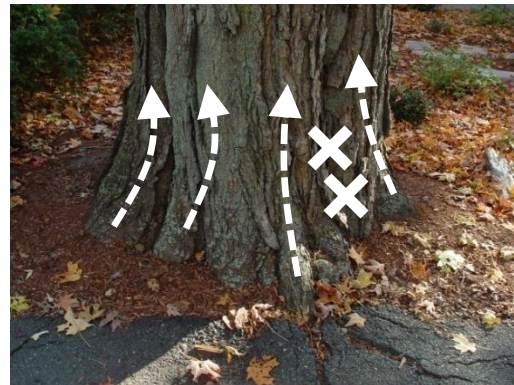
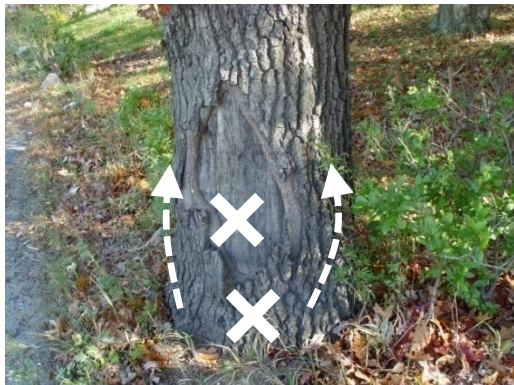
No. of Arborplugs =
DBH"/4 up to DBH"/2
(ex. 16" = 4 – 8 sites)

Sites are within
36" above the
soil line.

The Best
Arborplug
Injection
Zone



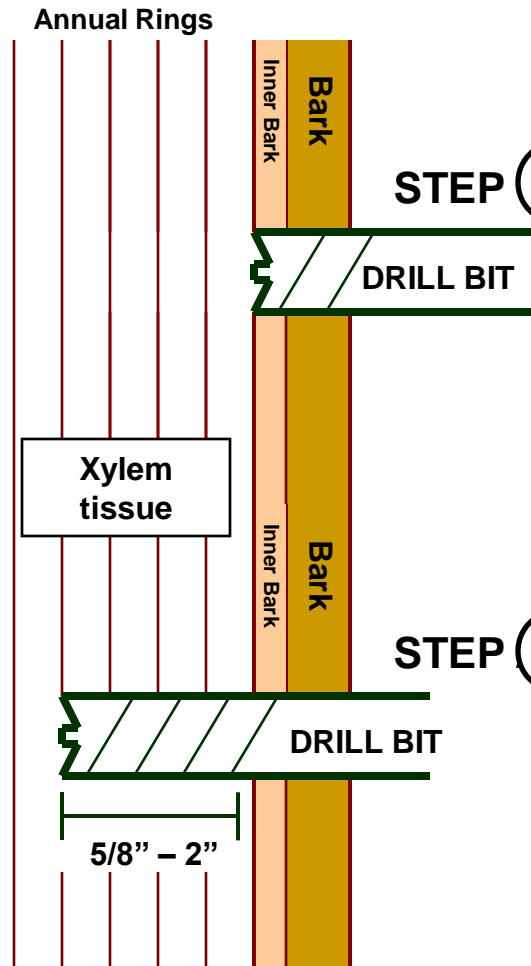
Root Flares show best uptake and formulation distribution to the canopy.
Choosing good Arborplug sites result in faster injections.



Drill Sites for Arborplugs

- Use sharp, high-helix brad-point drill bits (included in kit).
- **For Beginners:**
Drilling in 2 Steps:
 1. Use very light pressure to drill through outer bark and inner bark. The drill bit will stop at the Xylem. You can remove drill bit to note the bark thickness.
 2. Use quick heavy pressure to drill into the Xylem.

Estimated Drill Depth into Xylem:
Hardwoods – 5/8” – 1 5/8” deep
Conifers – 1 5/8” – 2” deep



Drill Bit Sizes:

9/32" for #3 Arborplugs
3/8" for #4 Arborplugs

Set the Arborplugs



1



1. Set Arborplugs into drilled holes using set tool (from kit) and hammer.

2. Make sure the barbs on the Arborplug make a seal between the xylem and the inner bark as illustrated.

Too Deep **Too Shallow**

INCORRECT

Xylem Tissue Bark Inner Bark

Xylem Tissue Bark Inner Bark

2

CORRECT

Xylem Tissue Bark Inner Bark

Barbs

Xylem Tissue Bark Inner Bark

Barbs

CORRECT

Procedure: Conifers vs. Deciduous

Important Note For Conifer Injections:

Sap flows out of conifers as a protective response to drilling. For best results, we recommend:

1. Pressurize Tree I.V. and prime each Needle Valve.
2. Drill and set 1 Arborplug
3. Insert 1 VIPER needle and turn on the Needle Valve.
4. Repeat steps 2 and 3 for each injection sites.

So insert VIPER needle and turn on valves right after each Arborplug is set. If too much time has passed between Arborplug setting and micro-infusion, sap may flow into your injection site, and make your uptake slower.

Important Note For Deciduous Injections:

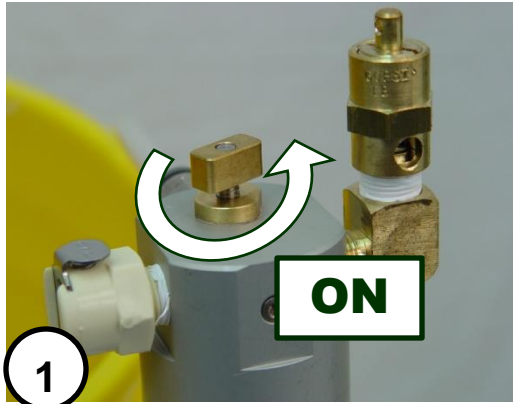
No sap flows from deciduous trees after drilling. For best results, we recommend:

1. Pressurize Tree I.V. and prime each Needle Valve.
2. Drill and Set All Arborplugs.
3. Insert All Primed VIPER needles and turn on each Needle Valves.
4. Turn All Primed VIPER needles ON (same time)

Deciduous tree micro-infusion occurs very rapidly. You can open all VIPER needle valves then open the bottle top valve. This will ensure that even distribution of product occurs at each injection site.



Micro-infusion™ with the Tree I.V.



1. Turn bottle top valve ON (counter-clockwise).
2. Set VIPER Needle into the Arborplug.
3. Turn VIPER Needle valve ON (counter-clockwise).
 - Repeat for each needle.
4. Turn OFF each VIPER Needle as it finishes, and remove.

Caution!!

Do not leave Arborjet Tree I.V. unattended. Pesticide applications should always be attended and monitored.

Using Multiple Tree I.V.'s

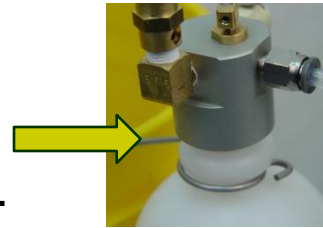


Recommended Number of I.V.'s per Applicator:

	Ring Porous Trees	Diffuse Porous Trees	Conifers
Avg. Sized Trees	2-3	3-4	4+
Larger Trees (>24")	3-4	4-5	6+



Use the Tree I.V. Stands to support the Tree I.V. Bottles.



When treating several trees in one area, multiple Tree I.V.'s work very well. Set up your first Tree I.V. then the second then the third. By then the first tree is complete. Remove the first Tree I.V. and set it up on the next tree and continue to "leap-frog" the Tree I.V.'s. This method is efficient. Fast uptake "ring-porous" trees may only need 2 Tree I.V.s to "leapfrog." Conifers and some diffuse porous trees take longer to treat and may require more Tree I.V.'s for maximum efficiency.

Large Tree Micro-infusion™

600mL is the maximum fill capacity.

If more than 600mL is used, the Tree I.V. requires RE-PRESSURIZING during Micro-infusion.

More than 1 Tree I.V. can be used on the same tree.

Examples:

If dose is 1000mL, put 500mL in 2 Tree I.V. bottles.
If dose is 1350mL, put 450mL in 3 Tree I.V. bottles.



Or Use the Expansion Kit: 010-7016

This includes the Expansion Manifold, plus 4 VIPER Needles, and a Tree I.V. 4 line Manifold.

This allows you to have 8, 12, or 16 injection sites per tree with only 1 Tree I.V. bottle.

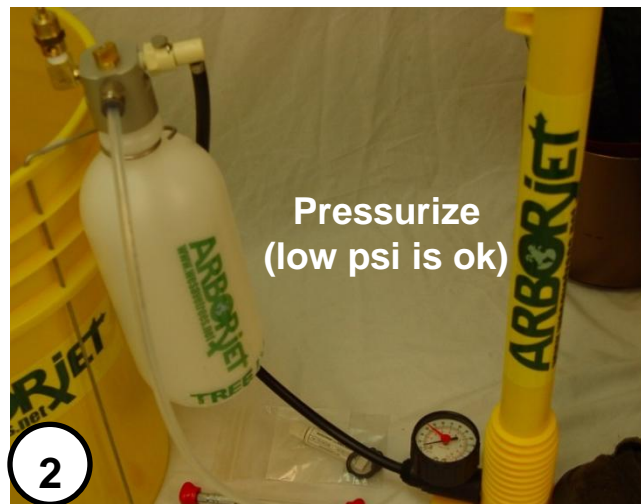


Expansion Manifold connects to bottle



Set's of 4 Needles and lines are connected

Clean Out the Tree I.V.



Before Clean-out: Make sure all product is out of Tree I.V. bottle and lines.

CLEAN-jet is for rinsing formulation residues to keep your Tree I.V. operating smoothly.

1. Remove bottle top to release pressure, then add 20-30mL CLEAN-jet (or rubbing alcohol)
2. Apply Tree I.V. Bottle Top and pressurize.
3. OPEN and close each Needle Valve to clean out all lines.

CLEAN-jet rinse can be squirted in the soil at the base of the tree, unless near ground water or waterways.* Rinse all CLEAN-jet out of the bottle, line, and device.

- Small amounts of leftover CLEAN-jet in lines is OK.
- CLEAN-jet should not be mixed with other formulations for long periods of time.

NOTE: If CLEAN-jet solution is stored inside the Tree I.V. device, make sure to push all CLEAN-jet solution out of the system before adding formulation to the bottle.

* Dispose of waste according to local and state regulations.

Maintenance



1



2



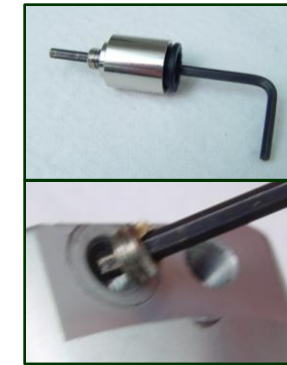
3

To Clean out any debris in VIPER Needles:

1. Remove VIPER Needle by pushing the compression fitting in and pulling on the Needle.
2. Push the **VIPER Needle Cleanout Tool** into the **VIPER Needle**.
3. Remove in-line debris without VIPER needle attached.



CAUTION:
External Hex PTC fittings may break if over tightened. It's recommended that you hand tighten, then only a 1/2 turn with a wrench.



Some PTC fittings have a 5/64" internal hex.
Use Allen key to tighten, loosen, or remove a broken part.

Make sure to keep device clean by using **CLEAN-jet** or rubbing alcohol



Keep o-rings lubricated as needed.



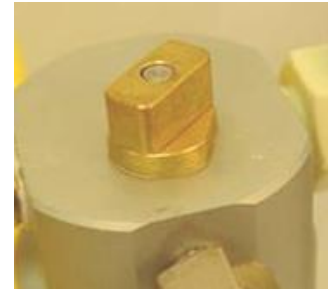
Maintenance: Deluxe Valve & Compression Fitting

Deluxe Valve Cartridges may need periodic cleaning or O-ring replacement.

Deluxe Valve Cartridge
(2 pack 070-0110)

#10 O-ring

#4 O-ring



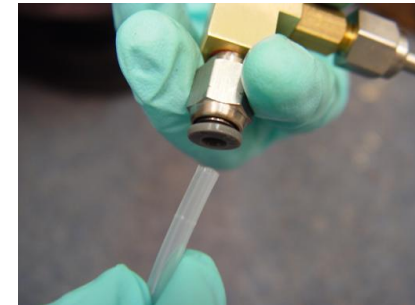
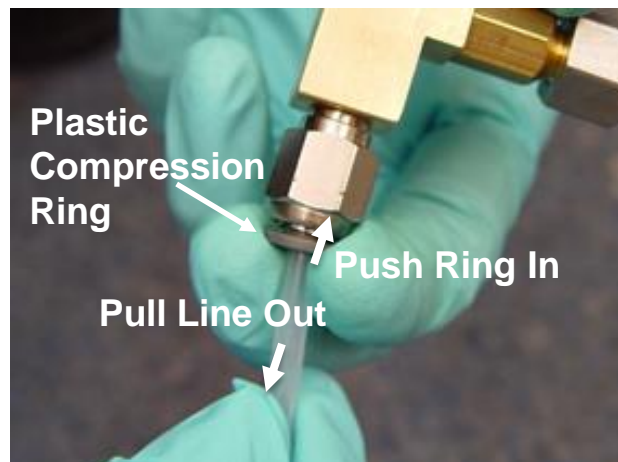
To restore on/off valve to like new operation, replace valve cartridge #4 O-ring, and #10 O-ring. It is recommended that spare valve cartridges be kept on hand for fast swap out in the field.

Compression fittings quickly connect/disconnect supply lines to other components



Compress the plastic rings to remove tubing.

To connect line, push the end of line all the way into fitting.



It could be necessary to re-cut ends of tubing for best fit..

STINGER Method for Tree I.V.

The STINGER Method is only recommended for use in Faster Uptake Trees.
The STINGER Method does not use Arborplugs, however the injection may take longer.



1. Drill 5/8" into sapwood (bark depth + 5/8").



2. Pressurize Tree I.V. Make sure valves are OFF.



3. Attach the Tip Guard. Turn each STINGER **ON, and OFF** to Prime Supply Lines.



4. Turn each STINGER OFF when Primed.



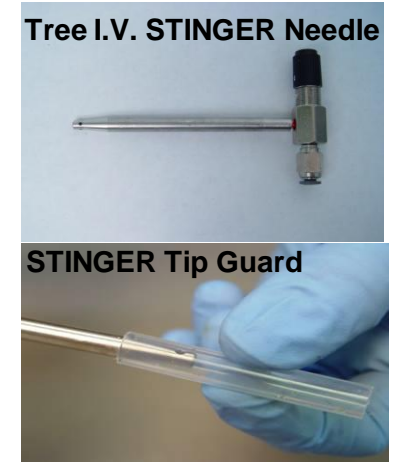
5. Push STINGER Tips into drilled holes.

Note: Always twist clockwise when inserting or removing.



6. Turn the STINGER ON

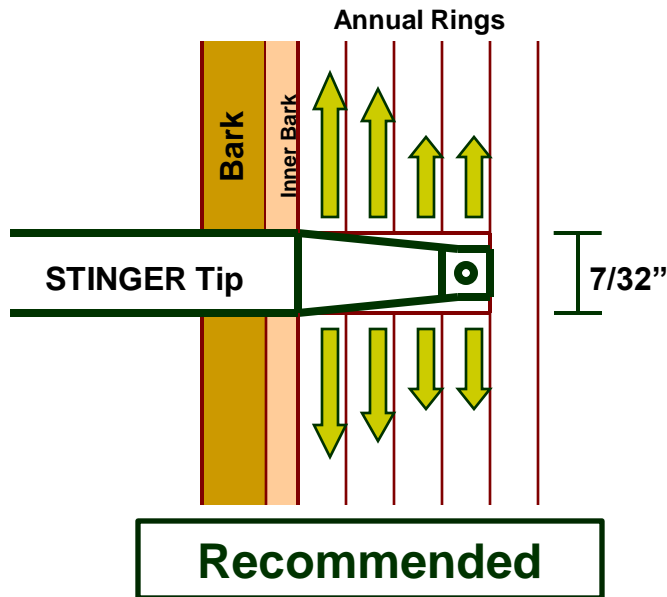
TO CLEAN:
Add **CLEAN-jet** or rubbing alcohol, then push through the system.



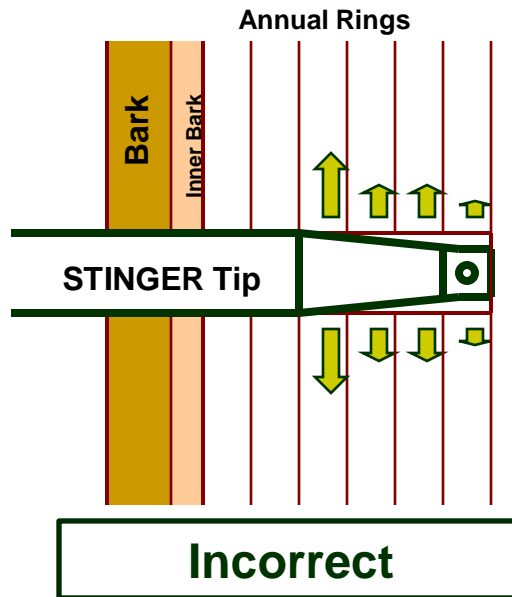
Place the STINGER Tip Guard on the STINGER Tip and point the STINGER Tip into a waste container to catch clean-out waste. Dispose of waste according to local regulations.

STINGER Method for Tree I.V.

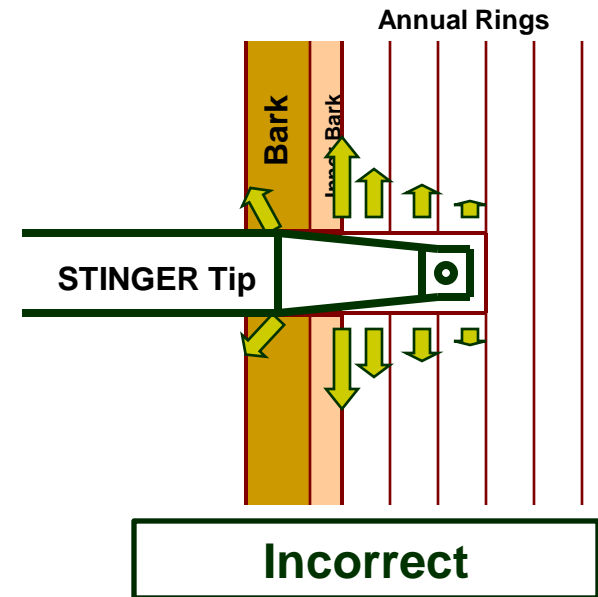
This is the recommended placement of the STINGER tips in the tree.



✓ Fast Product Uptake



• Slow Product Uptake



• Slow Product Uptake

• Possible Bark Separation or Leakage

Tree I.V. Replacement Parts

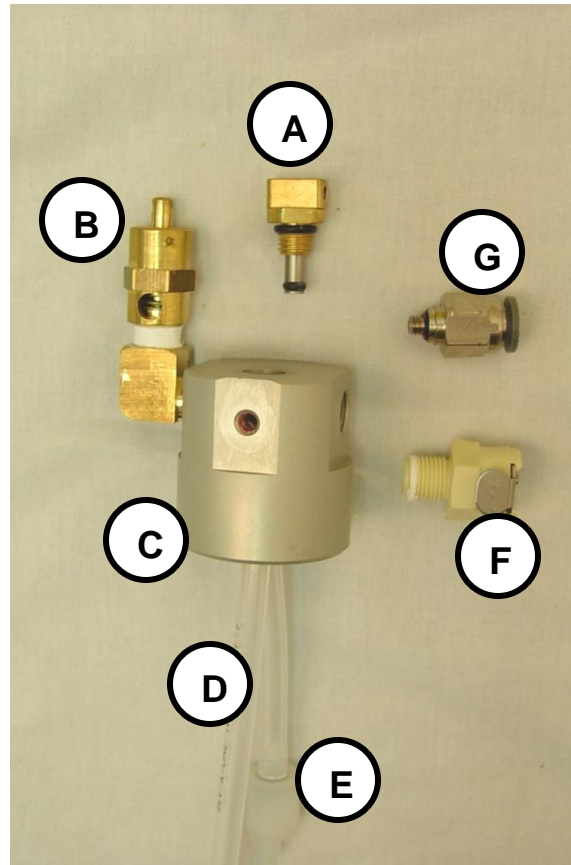
Arborjet offers all the replacement parts you may need for your Tree I.V.
 Please call 1-866-ARBORJT or visit www.arborjet.com to order parts or find current pricing.

Item #	MAJOR TREE I.V. KITS	Kit Components
010-9024	Tree IV Bottle and Cap Ass'y -1tr	Bottle and Cap
070-0501	VIPER Needle 4-Pack	4 Needles, No Valves
070-0500	VIPER Valve Assembly 2- Pack	2 Valves and Needles
070-0510	Deluxe VIPER Needle 4-Pack	4 Needles, No Valves
070-0520	Deluxe VIPER Valve Ass'y 2-Pack	2 Valves and Needles
070-0110	Deluxe Valve Cartridge 2-Pack	2 Pack
010-5005	STINGER Needle Ass'y 4-Pack	4 Needles w/ Valves
070-0106	Bottle Cap Quick Disconnect Parts	Discon., 90 degree Aapter/ Clamp
070-0100	PTC 10/32 * 1/4 Push 4-Pack	4 Pack
070-0101	PTC 10/32 to 5/32" Push 4-Pack	4 Pack
	MINOR TREE I.V. KITS	
070-0104	Mixing and Measuring Kit	Funnel, Graduated Cyl, Mixing Container
070-0105	Tree I.V. Stand 4-Pack	Wire Stands 4 per Package
070-0107	Spray Shield 4-Pack	4 per package
010-3055	Tree IV O-Ring Rebuild Kit	(5) # 4, #10, (2)#8, (4) Washers, Bottle Washer, Shocker Lube
010-4018	Tree IV Tool Kit	Adjustable/Allen Wrench, Clean out Tool, Drill Bit, plug Setter
070-0109	Tree IV Internal Bottle Parts	Ball check, Barbs , Base washer, Supply Tubes
070-0120	Arborplug Setter 2-Pack	2 Pack
070-2000	Drill Bit 2-Pack	2 Pack
070-0130	Needle Clean-out Tool 2-Pack	2 Pack

Tree I.V. Replacement Parts

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Item #	TREE I.V. COMPONENTS
975-9001	Tree IV Bottle -1 Liter
975-00113	5 Gallon Bucket - Yellow
975-00051	Arborjet Deluxe Carrying Case
070-00200	Carrying Case Strap Kit
070-00201	Arborplug Field Bag
070-0102	Tubing 1/4" EVA 5'
070-0103	Tubing 5/32" Poly 10'
010-7081	Pressure Pump w/Guage
070-0140	Compressor
010-1150	60 PSI Blowoff Assembly
951-00005	Universal Cap
070-0108	Tree IV Expansion Manifold
010-7006	Tree I.V. 5/32" Manifold 4 line



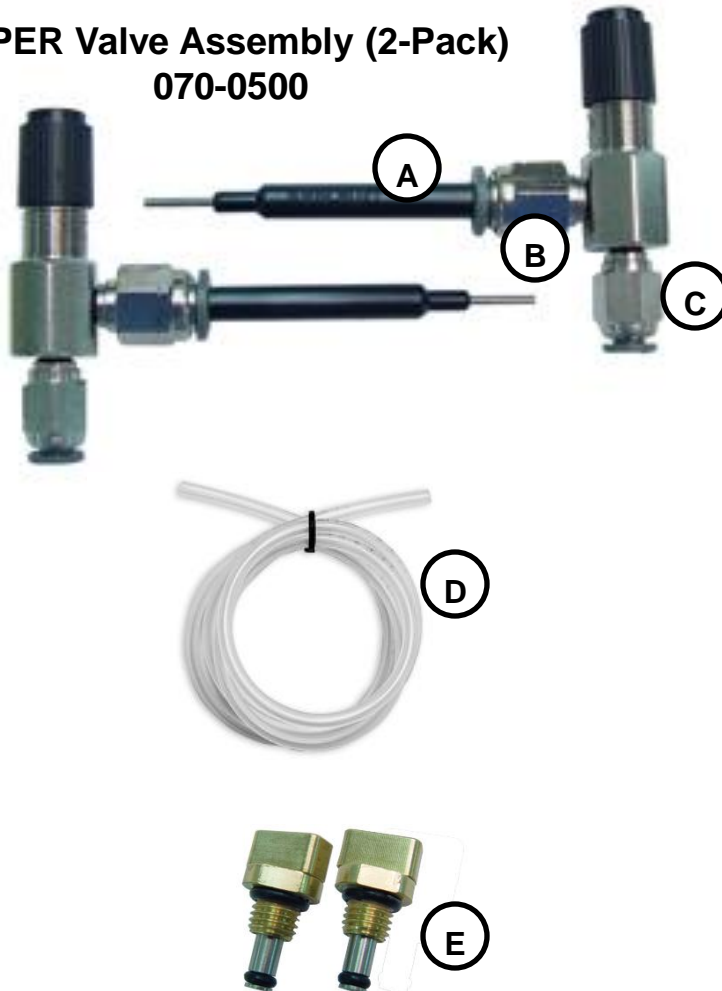
**Tree I.V. Bottle Top Assembly
010-1081**

- A. Deluxe Valve Cartridge
2-Pack
(070-0110)**
- B. 60psi Blowoff Assembly
(010-1150)**
- C. Cap Universal
(951-00005)**
- D. 1/4" Tubing
Sold in 5ft
(070-0102)**
- E. Ball Check Valve
Assembly
(070-0109)**
- F. Pressure Quick-
Disconnect
(070-0106)**
- G. 1/4" Push-to-Connect
4-Pack
(975-00035)**

Tree I.V. Replacements Parts

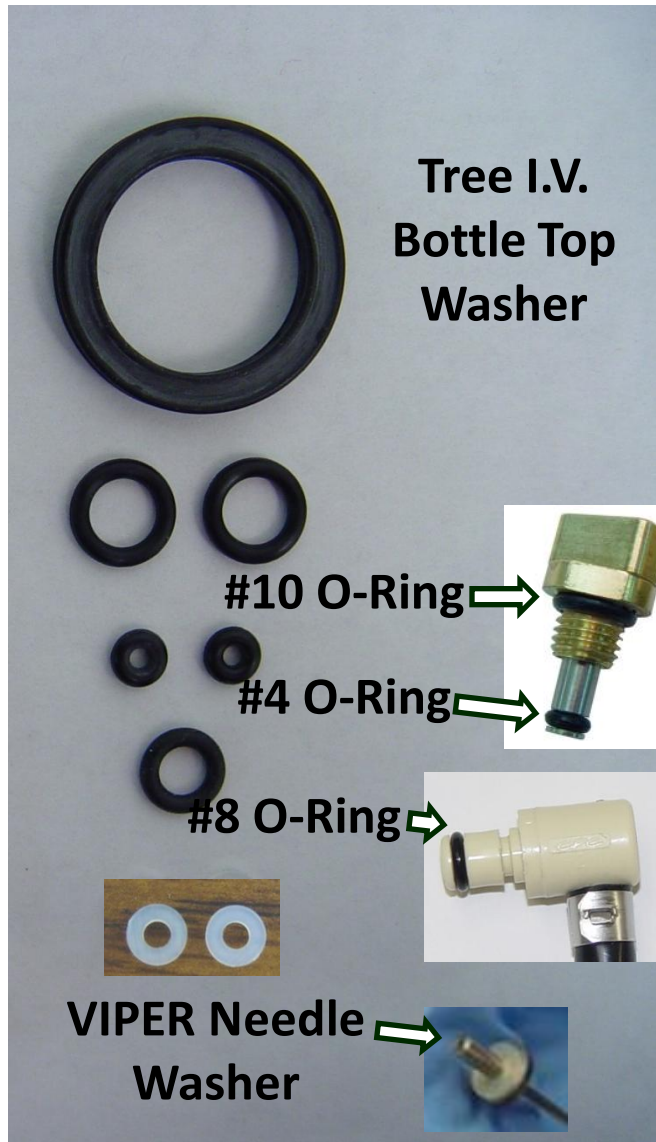
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Please call 1-866-ARBORJT or visit www.arborjet.com to order parts or find current pricing.

VIPER Valve Assembly (2-Pack)
070-0500



- A. VIPER Needle
4-Pack
(070-0501)
- B. PTC 10/32 to 1/4" Push
4-Pack
(070-0100)
- C. PTC 10/32 to 5/32" Push
4-Pack
(070-0101)
- D. 1/4" Tubing
Sold in 5ft
(070-0102)
OR
5/32" Tubing
Sold in 10ft
(070-0103)
- E. Deluxe Valve Cartridge
2-Pack
(070-0110)

TREE I.V. Replacement Parts



**For more of these
parts order:**

**Tree I.V. O-ring
Rebuild Kit
010-3055**

Includes:

- (5) #4 O-rings
- (5) #10 O-rings
- (2) #8 O-rings
- (4) VIPER Needle Washers
- (1) Med Bottle Washer