

## Measuring Substrate and pH and EC

### Testing Substrate Soluble Salts and pH

Pour Through or Virginia Tech Extraction Method (for substrates in planted containers):

1. Turn on meters, let warm up for 2 minutes, calibrate
2. Place a recently irrigated (~1 hour prior) to container capacity but no longer draining container plant over a drip pan. Test at least 5 plants.
3. Add enough water (see table) over the substrate surface so that 20% of applied water drains out (leachate) from the container (do not pour water so that it drains down sidewalls).
4. Test the leachate for pH and EC by using a pipette or eyedropper to transfer the required volume of sample from the drip pan to the meter.
5. A soluble salts (EC in mS/cm) reading of:
  - a. 0 – 0.7 is low for greenhouse plants
  - b. 0.8 – 1.5 is very low for greenhouse plants
  - c. 1.6 – 3.5 is suitable for most greenhouse plants
  - d. > 3.5 is high for greenhouse plants and may require leaching
  - e. 0.8 – 1.5 mS/cm (or dS/m) is the acceptable range for outdoor nursery plants fertilized with liquid or liquid and control release fertilizers
  - f. 0.5 – 1.0 mS/cm for outdoor nursery plants fertilized only with control release fertilizers.

**Table 1.** Approximate volume of water to apply to obtain 50 ml (2.0 oz) of PT extract.

Container size	Water to apply	
	millimeters	ounces
4-6 inch pot	75	2.5
6 1/2 azalea pot	100	3.5
1 quart	75	2.5
1 gallon	150	5
3 gallon	350	12
5 gallon	550	18.5
Cavities or cells in flats	50	2

Containers should be at container capacity for about 30 minutes (for cavities or cells in flats and small containers) to 2 hours (for larger containers) before applying water.

*The volumes of water are estimates so actual amount may vary depending on crop, substrate, or environmental conditions. Adapted from 1, 2, 3 of PourThru, Whipker et al. 2001).*

Plant Identifier	pH	EC (note the unit mS/cm or $\mu$ S/cm)

Approximate conversions for pot sizes in Table 1:

4-6 inch	0.5 – 1 liter
6.5 inch azalea	1.9 liter
1 quart	1 liter
1 gallon	4 liter
3 gallon	11 liter
5 gallon	19 liter

1:2 Extraction Method for Stockpiles or Samples from Pots:

1. Turn on meters, let warm up for 2 minutes, and calibrate EC and pH meters
2. Grab samples from several areas of the stockpile at various depths or from several containers. Blend together.
3. In a clean container mix 1 part substrate (~100 ml from blended sample, packed similar to packing in pots, remove any fertilizer prills if present) with 2 parts distilled water, let sit for 30 minutes.
4. Insert pH and EC sensors into mixture and measure.
5. An EC (mS/cm) reading of:
  - a. 0 – 0.25 is good for stockpiles without fertilizer or low if sample from pots
  - b. 0.25 – 0.75 is good to high for stockpiles or adequate from pots
  - c. 0.75 – 1.25 is optimum for mature & woody plants, high for stockpiles and young plants
  - d. 1.25 – 1.75 is high for woody plants, too high for stockpiles and some herbaceous plants & young plants- may need to leach
  - e. over 1.75 is very high for all situations, may need to leach even for woody plants

Substrate Identifier	pH	EC (note the unit mS/cm or $\mu$ S/cm)