



## Plant Health Care Inc.

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# Technical Bulletin

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### Calculating Injection or Vertimulch Requirements from DBH *English Units*

As you know, many landscapers and arborists are always asking how much injectable or vertimulch will be needed to treat a number of trees, when the only parameter they offer is DBH (Diameter of trunk at Breast Height). We have been explaining that the area under the canopy is related to canopy diameter, and not to DBH.

ANSI A300 (Part 2) includes a section, which mathematically relates DBH to the radius of the canopy. This allows us to **estimate** the area under the canopy from the DBH (**for trees of 18-inches DBH or less**):

Let  $r$  = radius of canopy (distance from trunk to drip line)

In English Units (feet and inches):  $r$  (in feet) =  $1.5 \times \text{DBH}$  (in inches)

To estimate the number of injection or vertimulch holes on 2.5-foot centers, we came up with this equation based on the above ANSI equation and the equation for the area of a circle:

$$\# \text{ Holes} = 1.13 \times (\text{DBH})^2$$

NOTE: You must express DBH in **inches** for this to work. Also, the equation grossly overestimates the number of holes when the DBH gets very big (above 15-inches). Use this equation for only trees whose DBH is at or below 18-inches.

(The equations for metric units are different. For metric units, use the metric equations provided in the metric version of this bulletin, published separately.)

Following are a few examples where this equation is used to determine the amount of product needed to treat trees with PHC Injectable or Vertimulch.

Example 1:

**A linden tree has a 5-inch DBH. How much injectable will be needed to treat it?**

$$\# \text{ Holes} = 1.13 \times (\text{DBH})^2 = 1.13 \times (5)^2 = 1.13 \times (5 \times 5) = 28.25.$$

Round this up to 29 holes.

Injecting 1-qt per hole, we need 29 quarts or 7.25 gallons. In this example, we are using the 1-quart rate per hole, so dilute the injectable product using 1 packet for 50-gallons water. (If we wanted to inject 2-quarts per hole, we would need to dilute the product further, to 1 packet in 100-Gallons in order to deliver the same amount of spores per hole. To double the injection volume, you must double the water volume of the dilution.) Since it is a linden tree, Ecto Injectable would be preferred.

Example 2:

**You have 45 trees (some ecto and some VAM) with an average DBH of 6-inches. How much injectable product would be needed to treat these?**

For each tree, the number of holes =  $1.13 \times (\text{DBH})^2 = 1.13 \times (6)^2 = 1.13 \times (6 \times 6) = 41$  injection holes.

Using 1-quart per injection, you need 10.25 gallons per tree.

For 45 trees, you need 10.25 gallons x 45, or 462 gallons.

The dilution rate for a 1-qt injection volume is 1 packet per 50 gallons.

462 gallons divided by 50 gallons per packet is 9.24, or 10 packets.

Since the product is sold 4 packets to a box, you will need 3 boxes of PHC Injectable to get 10 packets.

**How much PHC Vertimulch would you need for the same trees?**

The vertimulch holes are spaced the same way as the injectable holes, so the same calculation works here too. So again, we need 41 holes, only we will apply vertimulch instead.

PHC Vertimulch uses 3 oz per hole. 3 oz x 41 holes = 123 oz per tree.

Remember, there are 16-oz in a Lb. So 123 oz is 7.7 Lbs. per tree.

For 45 trees, we need 7.7 Lbs. x 45, or 347 Lbs. PHC Vertimulch comes in 22-Lb boxes, so we need 15.8 boxes. Round this up to 16 boxes.

**Remember that these equations provide an estimate, so don't expect the numbers to be a bulls-eye quote of the exact amount needed. Also, use these equations only if the DBH is at or below 18-inches. For larger trees, determine the amount of product needed based on the area beneath the canopy.**