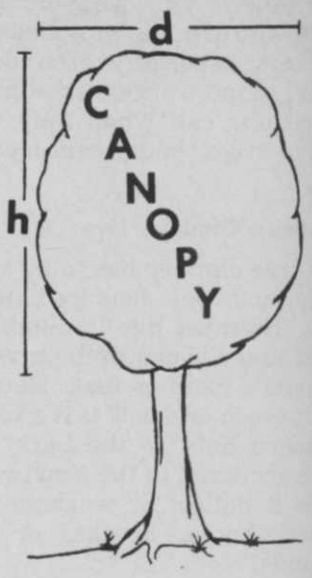
Calculate Tree Canopy To Regulate Treatment Time With Mistblowers



Volume of the tree canopy must be calculated to know how many minutes are needed to treat one tree with a mistblower where the output of the blower is known in cu. ft./min.

During mist blowing applications, it is important that static (dead) air held in the tree canopy is replaced by spray-laden air from the mistblower. Chemical-laden air blasted into the canopy will then yield small droplets of spray solution to leaves and twigs of the entire canopy.

To calculate the volume of a tree canopy, only two dimensions are needed (See Illustration):

d = diameter of tree canopy at the thickest portion, and

h = height of the tree *canopy* at the tallest point, not the entire tree.

These two values, diameter (d) and canopy height (h), are used in the following formula to calculate the volume of a tree canopy.

$$\text{Canopy volume (cu. ft.)} = \frac{(3.14 \times d)^2}{12.57} \times (1.16\ h - 0.36\ d)$$

For example, if canopy diameter (d) is 8 feet and canopy height (h) is 10 feet, letters in the formula are replaced by numbers to read:

$$\text{Canopy volume (cu. ft.)} = \frac{(3.14 \times 8)^2}{12.57} \times (1.16 \times 10 - 0.36 \times 8)$$

To find out how many cubic feet are in the canopy, first multiply 3.14 by 8; you get 25.12. The superscript (2) tells us to multiply 25.12 by 25.12; this gives 631.01. Divide 631.01 by 12.57; the answer is 50.19. The formula now reads:

$$\text{Canopy volume (cu. ft.)} = 50.19 \times (1.16 \times 10 - 0.36 \times 8).$$

Ten multiplied by 1.16 equals 11.6, and 8 multiplied by 0.36 equals 2.88. Subtract 2.88 from 11.6, and the answer is 8.72. Now the formula is stated: cu. ft. = 50.19 × 8.72, or canopy volume (cu. ft.) = 437.65. Thus, we have found there are 437.65 cu. ft. in a tree canopy 10 feet high and 8 feet in diameter.

To determine how much time it will take to treat 437.65 cu. ft. in the tree canopy, output of the mistblower must be known. Charts that accompany mistblowers tell the cu. ft. output for different nozzle settings and application speeds.

If, for example, blower output is 1,000 cu. ft. per minute, the time required to treat 437.65 cu. ft. is directly proportional to time required to mist blow 1,000 cu. ft. The proportion is stated:

$$\frac{1{,}000 \text{ cu. ft.}}{1 \text{ minute}} = \frac{437.65 \text{ cu. ft.}}{\text{X minutes}}$$

In other words, if the output of the mistblower is 1,000 cu. ft. per minute, how long (X minutes) will it take to produce 437.65 cu. ft.? To get the answer,

$$\text{cross multiply. } 1{,}000 \times \text{X minutes} = 437.65 \times 1 \text{ min.}$$

X min. times 1,000 equals 1,000 X, and 1 times 437.65 equals 437.65. The equation is now stated:

$$1{,}000\ X = 437.65.$$

To find the number of minutes (X) needed to produce 437.65 cu. ft. of air, divide 437.65 by 1,000, or:

$X = \frac{437.65}{1{,}000}$. The answer is 0.437, or 0.438 minutes if rounded to the nearest thousandth of a minute. For a mistblower that can produce 1,000 cu. ft. per minute, it takes 0.438 minutes (or about 27 seconds) to produce 437.65 cu. ft. of air.

To convert 0.438 minutes to more practical terms, multiply 0.438 by the number of seconds in one minute (60): 0.438 × 60 = 26.28 secs. It will take 26.28 seconds for a mistblower to replace 437.65 cu. ft. of air with insecticide in the tree canopy if the blower output is 1,000 cu. ft. per minute.