# Dosing Volume Calculation

## 1. CHEMICAL VOLUME FOR PER MM OF RAINFALL

Table 1 - Chemical Volume Estimate (L) per mm of rainfall [1]

| PPM | 1 ha | 2 ha | 3 ha | 4 ha | 5 ha | 6 ha | 7 ha | 8 ha | 9 ha | 10 ha |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 20 | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 |
| 30 | 0.3 | 0.6 | 0.9 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 |
| 40 | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.6 | 4.0 |
| 50 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 |
| 60 | 0.6 | 1.2 | 1.8 | 2.4 | 3.0 | 3.6 | 4.2 | 4.8 | 5.4 | 6.0 |
| 70 | 0.7 | 1.4 | 2.1 | 2.8 | 3.5 | 4.2 | 4.9 | 5.6 | 6.3 | 7.0 |
| 80 | 0.8 | 1.6 | 2.4 | 3.2 | 4.0 | 4.8 | 5.6 | 6.4 | 7.2 | 8.0 |
| 90 | 0.9 | 1.8 | 2.7 | 3.6 | 4.5 | 5.4 | 6.3 | 7.2 | 8.1 | 9.0 |
| 100 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 |
| 112 | 1.1 | 2.2 | 3.4 | 4.5 | 5.6 | 6.7 | 7.8 | 9.0 | 10.1 | 11.2 |
| 120 | 1.2 | 2.4 | 3.6 | 4.8 | 6.0 | 7.2 | 8.4 | 9.6 | 10.8 | 12.0 |
| 130 | 1.3 | 2.6 | 3.9 | 5.2 | 6.5 | 7.8 | 9.1 | 10.4 | 11.7 | 13.0 |
| 140 | 1.4 | 2.8 | 4.2 | 5.6 | 7.0 | 8.4 | 9.8 | 11.2 | 12.6 | 14.0 |
| 150 | 1.5 | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 | 10.5 | 12.0 | 13.5 | 15.0 |

[1] Note that the tipping bucket registers 0.2mm increments of rainfall. So it will take 5 tips of the bucket to register 1mm of rainfall.

The volume that will be dosed with each mm of rainfall for a site can be interpolated using Table 1, or with below equation:

**V = (A x PPM) / 100** *(Equation 1)*

Where: V is the chemical volume dosed in litres (per mm of rainfall depth)
A is the site area in hectares
PPM is the dosing rate of chemical in parts per million (from jar test or supplier advice)

For example: Site 5 ha
PPM 100

V = (A x PPM) / 100 = (5 x 100)/100 = 5 L

For the example site parameters, a standard IBC of 1,000 L would be sufficient to dose about 200 mm in total of rainfall. (1,000 L / 5 L = 200).

## 2. CHEMICAL VOLUME PER RAINFALL EVENT

Expanding on Equation 1, we can estimate the volume of chemical dosed per rainfall event if this is known in mm.

**V = A x MM x PPM/100** *(Equation 2)*

Where: V is the chemical volume dosed in litres
A is the site area in hectares
MM is the rainfall received in mm
PPM is the dosing rate of chemical in parts per million (from jar test or supplier advice)

For example: Site 5 ha
PPM 100
Rainfall 15 mm

V = A x MM x PPM/100 = **5 x 15 x 100/100 = 75 L**

For the example site parameters, the volume of chemical dosed during a 15 mm rainfall event is 75 L when ignoring losses.

## 3. CONSTANT DOSE RATE OPTION

Beside the manual dose option, the Flocca also has the capability of dosing at a constant rate, in litres per hour (L/h). This can be very useful if you are pumping between basins at a known flow rate when you have purchased the Flocca Rain system with the tipping bucket (this function is likely not required with the Flocca Flow). The flow rate that will need to be dosed in L/h is dependent on the flow rate (either L/s or L/h) of the pump that is being used and the flow rate can be determined using the equation below:

**If pump rate is specified in L/s:**

**Dose Rate L/h = pump L/s x 0.0036 x PPM** *(Equation 3)*

Where: Dose Rate L/h is the input in the Flocca unit under constant dose rate
Pump L/S is the flow rate of the pump in litres per second
PPM is the dosing rate of chemical in parts per million

For example: Pump L/s 10 L/s
PPM 100

Dose Rate L/h = pump L/s x 0.0036 x PPM = 10 x 0.0036 x 100 = 3.6 L/h

In this example, the value entered for Rate (L/H) at Dose at Constant Rate in the Flocca Manual Dose screen is 3.6 L/h.

**If the pump rate is specified L/h:**

**Dose Rate L/h = pump L/h x (PPM / 1,000,000)** *(Equation 4)*

Where: Dose Rate L/h is the input in the Flocca unit under constant dose rate
Pump L/h is the flow rate of the pump in litres per hour
PPM is the dosing rate of chemical in parts per million

For example: Pump L/h 36,000
PPM 100

Dose Rate L/h = pump L/h x (PPM / 1,000,000) = 36,000 x 100/1,000,000 = 3.6 L/h

In this example, the value entered for Rate (L/H) at Dose at Constant Rate in the Flocca Manual Dose screen is 3.6 L/h.

The dosing operation will need to be manually started and stopped with the Flocca control unit, using the touch screen. You will need to find out the flow rate of your pump and dosing rate of the chemical in parts per million to determine the correct value to enter into the Flocca.

The Flocca unit will spread the determined dose rate in equal (pulsed) parts out over an hour based on the minimum dose volume. We recommend the minimum dose rate to be set at a minimum of 0.1 L (100 ml) to prevent the solenoid from opening and closing constantly and draining the battery.

If you have the 'Flocca Flow' with ultrasonic sensor, you will probably not need the constant does rate option since you can pump directly through the basin inlet pipe or channel and dose accordingly.