

CAUTION:

Chemicals are dangerous. Ensure before you start the volumetric injection test procedure that you have located and read the relevant Material Safety Data Sheets and that you are clear on what action to take in the case of accidental chemical splashes and spills.

Ensure that you wear the appropriate safety equipment including, but not limited to, eye protection, skin protection/safety apron and gloves of an appropriate material.

If in doubt, call your supervisor, engineering support or Dosatron at 1-800-523-8499.

Volumetric Injection Test Procedure

In order to monitor the calibration of the injector set at a specific injection rate and also to decide if it is time for routine maintenance, a simple “volume test” is appropriate. It requires verifying that the amount of solution injected is in the correct proportion to the volume of fluid going through the injector, according to its ratio. This test is usually run using water in place of the actual concentrate.

The example described below using the test of a DI16 set at 1:100 will show the different steps of the test. The process remains the same for all the Dosatron units.

Equipment needed to run the test:

- Graduated 5 gallon container
- 500ml graduated cylinder
- Black marker

Note: the volume of the sample taken needs to be in accordance with the size and dilution rate of the injector. (i.e. a 500ml graduated cylinder and a 5 gallon container will suffice to test a DI16, but a smaller and more accurate graduated cylinder and a larger container will be necessary to test DI-1500)

Some formulae:

- 1 ml = 0.00026417 gallon
- 1 gallon = 3785.4 ml
- To obtain a ratio from a percentage: $100/\text{percentage} = \text{bottom number of ratio}$
 - i.e. for 5% $100/5=20$ which is a ratio of 1:20
- To obtain a percentage from a ratio: $(1/\text{bottom number of ratio}) * 100 = \text{percentage}$
 - i.e. for 1:200 $1/200 * 100 = 0.5$ which is 0.5%
- Calculation of the injection rate:

$$\text{injection rate} = \frac{\text{actual volume uptake of concentrate}}{\text{volume of water flowing into the unit}}$$

Running the test:**Caution:**

To get an accurate reading from this test, attention must be paid to the water displacement that is going to occur when the suction hose is placed into the graduated cylinder (Water displacement from the hose can throw the reading off considerably).

This is easily accounted for by marking the hose with the black marker about two inches up from the end that will be placed into the cylinder. This gives a reference point to use when reading the final measurement.

Preliminary steps:

Before starting the test, the suction hose needs to be primed, so that it is completely full (this is done by simply placing the suction hose into the full cylinder and starting the unit up).

Once the suction hose is fully primed, the black mark on the injection hose needs to be lined up with the 500-ml mark of the cylinder. Then more water can be added to the graduated cylinder until it is level with the 500-ml mark. Having fully primed the suction hose and calibrated the water level with the black mark on the hose to the 500-ml point, the suction hose may be dropped to the bottom of the cylinder.

Start of the test:

The output hose needs to be put into the 5-gallon container and the water flow started. It is not necessary to run the injector at its full flow capacity, usually a low to mid range flow is plenty to obtain a good reading (4-5 GPM in the case of a DI16).

As the container fills up, the solution is being drawn from the graduated cylinder. Once the container has been filled all the way up to the 5-gal mark, the system has to be shut off precisely at this moment.

Readings:

In the graduated cylinder, raise the suction hose up so that the black mark is level with the water surface. The volume left in the cylinder can be read and the volume injected can be deducted.

In this example: If 312ml are left in the cylinder then 312 ml have been injected

$$(500 \text{ ml} - 312 \text{ ml} = 188 \text{ ml of injected material})$$

According to the injection formula, the actual injection rate is:

$$\frac{188 \text{ ml (concentrate injected)}}{18927 \text{ ml (5 gallons output)} - 188 \text{ ml (concentrate injected)}} = 0.01003$$

$$0.01003 \times 100 = 1.003\%$$

With the injector set at 1:100 or 1%, the volume injected to make 5gallons of output should be 187.4ml

Using the formula, the injection rate would have come up to exactly 1%.

Conclusion:

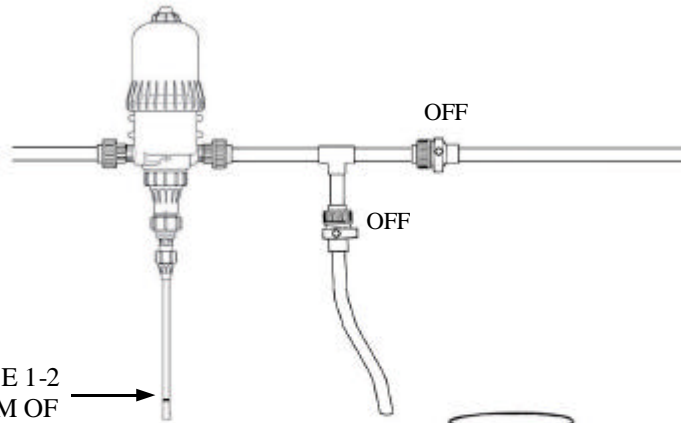
In this example, the calculated injection rate was 1.003%.

If actual test results show that the unit is not injecting at the required/expected rate then this may be due to:

- Testing or reading errors: for example, not having the unit fully primed, not having the hose placed properly at the beginning or the end of the test, not getting exactly the correct volume in the container, using an inaccurate cylinder or container.
- Leaks in the plumbing: all the water going the unit has to be collected. For example, there may be a tee with a leaking valve thought to be closed.
- The viscosity of the product: if the viscosity of the product exceeds the maximum recommended (then an adjustment needs to be made to the setting to compensate)
- The injector could be due for maintenance: it is recommended to periodically replace at least the seals, the frequency of which depends on the product injected, the filtration system, the frequency at which the unit is used, and the routine maintenance (i.e. rinsing) performed on it. See Dosatron Maintenance Guidelines.

If none of the above possibilities are a factor and the same results are achieved by repeating the test, then adjust the injection rate on the scale on the unit in the desired direction and repeat the test. Once the rate has been fine tuned it will be repeatable until someone or something changes the operating conditions.

1. Preliminary Steps

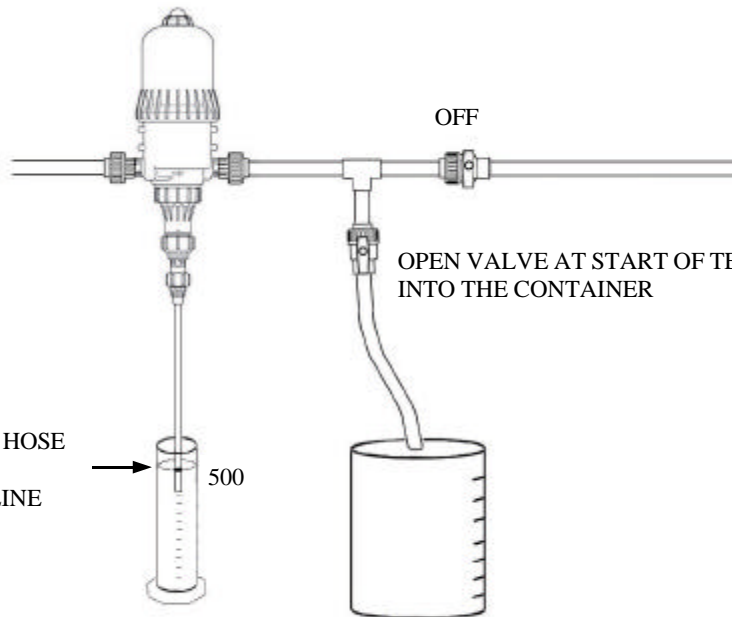


BLACK MARK ON HOSE 1-2 INCHES FROM BOTTOM OF SUCTION HOSE →



5 GALLON GRADUATED BUCKET

2. Beginning the Test



LEVEL BLACK MARK ON HOSE WITH WATER/SOLUTION SURFACE AT THE 500ml LINE →

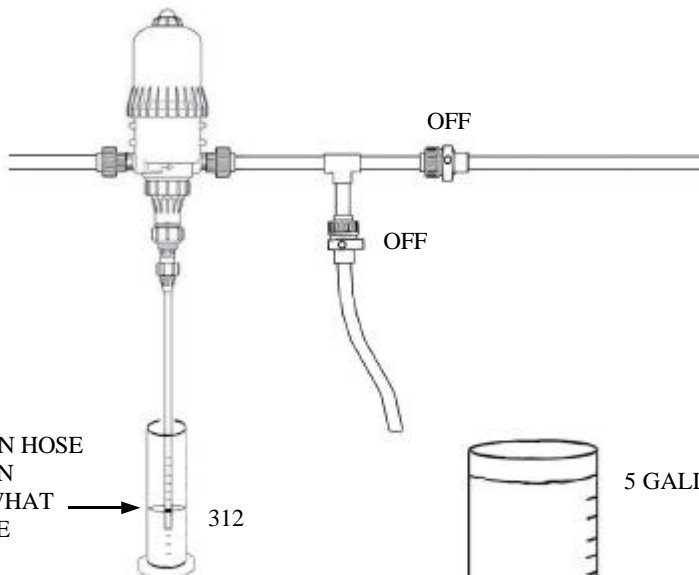
500

OPEN VALVE AT START OF TEST TO LET WATER INTO THE CONTAINER

3. Reading

Subtract Final Reading from 500ml and this is the amount of solution injected...

EX. 500ml
- 312 ml
188ml injected solution



LEVEL BLACK MARK ON HOSE WITH WATER/SOLUTION SURFACE AND READ WHAT VOLUME IS LEFT IN THE CYLINDER →

312



5 GALLONS