



# Technical Data

YOUR SPRAYER COMPONENT SPECIALIST

The team at Mr Nozzle are trained to offer you assistance in calibration, nozzle selection or any other technical advice you require.

## CALIBRATION

**Calibration:** is simply the process of taking measurements and calculating the volume that a given machine is applying.

**Nozzles:** Firstly you need to determine what your nozzle outputs should be at a given pressure or if you are happy with what you are applying, what the rate is.

The most common and the easiest way to calibrate any type of sprayer is to use the following formulae:

$$\frac{\text{Row Width (M)} \times \text{Tractor Speed (KPH)} \times \text{Desired Application Rate (LPH)}}{600 \text{ (constant)}} = \frac{\text{Total Litres per Minute}}{\text{Number of Nozzles Used}} = \text{Litres per Minute per Nozzle}$$

Often the operator likes what amount is being applied but does not know what rate per hectare that is being applied. The formulae is:

$$\frac{\text{Total Output from Nozzles} \times 600}{\text{Row Width (M)} \times \text{Tractor Speed (KPH)}} = \text{Litres per Hectare}$$

**Speed:** to calculate speed of the vehicle, use the formulae below:

$$\frac{\text{Distance Travelled (M)} \times 3.6}{\text{Time Taken in Seconds}} = \text{KPH}$$

Once you have all the required information from above, look up a desired nozzle chart to select the required nozzles at a suitable pressure.

**Please Note:** To double the output nozzle flow, increase pressure by four times.

**NB:** – This calibration procedure is only THEORETICAL and should always be checked physically

**Checking the system:** Collect the spray in a calibrated jug from a few nozzles individually for 1 minute at random, and check the output against a nozzle chart. Adjust the pressure until the required output per minute is achieved. If the output is greater or less than 10% from a new nozzle, it should be cleaned or replaced. If 2 nozzles are defective, replace all the nozzles.

It may seem unrealistic but it is a sign that all nozzles are worn and serious application problems may occur if only the worn nozzles are changed.

## SPEED CONVERSION TABLE

### Time Taken to Cover 100 metres

Time in Seconds	90	72	60	51	45	40	36	33	30	28	26	24	23	21	20
Speed Kph	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18



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## SPRAY DENSITY

### *Spraying solutions other than water*

Since most tabulations are based on spraying water, which weighs 1 kilogram per litre, conversion factors must be used when spraying solutions heavier or lighter than water. To determine the proper size nozzles for the solution to be sprayed, first weigh 1 litre of mixed product and multiply the desired l/min or l/ha of solution by the water rate conversion factor. Then use the new converted l/min or l/ha rate to select the proper size nozzle.

**Example:** Desired application rate is 100 l/ha of solution which has a density of 1.28 kg/litre. Determine the correct nozzle size as follows:

1/ha (solution) x conversion factor (from table) = l/ha

100 l/ha (1.28 kg/l solution) x 1.13 = 113 l/ha (water)

The applicator should choose a nozzle size that supplies 113 l/ha of water at the desired pressure.

Density-kg/litre	Conversion Factors
0.84	0.92
0.96	0.98
1.00 water	1.00
1.08	1.04
1.20	1.10
1.28-28% nitrogen	1.13
1.32	1.15
1.44	1.20
1.68	1.30

## DRIFT CONTROL

Drift can be managed successfully with the right knowledge of the equipment and the factors influencing drift. Every application must be balanced between managing drift and maintaining effective crop protection. Below is a list that must be considered to insure a safe, accurate spray application.

- Spray pressure
- Nozzle Size and Type
- Droplet Size
- Application Rate
- Nozzle Height or Nozzle Placement
- Operating Speed
- Wind speed and Direction
- Air Temperature and Relative Humidity
- Stability of the local atmospheric conditions
- Buffer Zone (safe distances from sensitive areas)
- Recommendations from Chemical Manufacturers
- Correct Sprayer Set-up
- Calibration of the sprayer regularly

## DROPLET SIZE

Nozzle selection is often based on droplet size according to the BCPC specification and the chemical manufacturer's recommendations, eg extremely coarse, very coarse, medium, fine or very fine. It is important to know that a nozzle that produces a medium droplet at a given pressure may produce a fine drop at a higher pressure. This may mean that you could be spraying off label and against the manufacturer's recommendation. Generally a fine droplet is ideal for post-emergence applications in boom spraying or contact sprays in tree and vine crops which require excellent coverage of the leaf surface. The most common nozzle in boom spraying produces a medium droplet. Ideal for contact and systemic herbicides, pre emergence surface applied herbicides, insecticides and fungicides. Almost all nozzle manufacturers produce a nozzle chart or similar to show the droplet size classifications. Please ask the Mr Nozzle staff for this information when purchasing nozzles.