

Calibration for Farm Sprayers

Sprayer calibration is a two stage procedure which should be done before the spraying season begins. Before calibrating make sure that all nozzles, screens and filters are clean, and that the pressure gauge is giving an accurate reading of boom pressure.

Definitions

L/min - nozzle capacity in litres per minute

L/ha - application volume in litres per hectare

km/h - forward speed in kilometres per hour

cm - band width in centimetres

Procedure

1. Check the output of each nozzle.

With the sprayer operating at the desired pressure, collect the output from each nozzle for one minute, using an accurate measuring cup or graduated cylinder.

Record the output from each nozzle and replace any nozzles that are more than 5 per cent above or below the average, or have a visibly distorted pattern.

If the outputs are more than 15 percent above their original output, replace the whole set.

2. Check the entire sprayer for output to determine the correct forward speed.

The following method requires no calculations or distance measurement. It is also much more accurate than checking the output of only one or two nozzles.

- Fill the sprayer tank with water.
- Operate the sprayer at the desired pressure for 15 minutes.
- Measure the number of litres needed to refill the tank.
- Refer to the table (Number of Nozzles) for the correct speed in km/h.

Note: The table is correct only for a nozzle spacing of 500 mm. For 1000 mm spacing, multiply the number of nozzles on the sprayer by two before entering the table.

Example: Sprayer with 26 nozzles at 500 mm spacings. Desired application volume - 100 L/ha. After 15 minutes of spraying, 260 litres are required to refill the sprayer tank. follow the 100 L/ha column down to 260 and go across to the column for 26 nozzles. Read off the correct speed - 8.0 km/h.

Proper sprayer calibration minimizes input cost by ensuring that the product meets the target at the recommended dose.

Metric Calibration Chart

Litres per 15 minutes to apply		Number of Nozzles - 500 mm spacings													
50 L/ha	100 L/ha	26	27	30	32	33	34	35	36	37	38	41	42	48	49
100	200	6.2	5.9	5.3	5.0	4.8	-	-	-	-	-	-	-	-	-
110	220	6.8	6.5	5.9	5.5	5.3	5.2	5.0	4.9	-	-	-	-	-	-
120	240	7.4	7.1	6.4	6.0	5.8	5.6	5.5	5.3	5.2	5.1	-	-	-	-
130	260	8.0	7.7	6.9	6.5	6.3	6.1	5.9	5.8	5.6	5.5	5.1	5.0	-	-
140	280	8.6	8.3	7.5	7.0	6.8	6.6	9.5	6.2	6.1	5.9	5.5	5.3	-	-
150	300	9.2	8.9	8.0	7.5	7.3	7.1	9.9	6.7	6.5	6.3	5.9	5.7	5.0	4.9
160	320	9.8	9.5	8.5	8.0	7.8	7.5	10.4	7.1	6.9	6.7	6.2	6.1	5.3	5.2
170	340	10.5	10.1	9.1	8.5	8.2	8.0	10.8	7.6	7.4	7.2	6.6	6.5	5.7	5.5
180	360	11.1	10.7	9.6	9.0	8.7	8.5	11.2	8.0	7.8	7.6	7.0	6.9	6.0	5.9
190	380	11.7	11.3	10.7	9.5	9.2	8.9	8.7	8.4	8.2	8.0	7.4	7.2	6.3	6.2
200	400	-	11.9	11.2	10.0	9.7	9.4	9.2	8.9	8.6	8.4	7.8	7.6	6.7	6.5
210	420	-	-	11.7	10.5	10.2	9.9	9.6	9.3	9.1	8.8	8.2	8.0	7.0	6.9
220	440	-	-	-	11.0	10.7	10.4	10.1	9.8	9.5	9.3	8.6	8.4	7.3	7.2
230	460	-	-	-	11.5	11.1	10.8	10.5	10.2	9.9	9.7	9.0	8.8	7.7	7.5
240	480	-	-	-	12.0	11.6	11.3	11.0	10.7	10.4	10.1	9.4	9.1	8.0	7.9
250	500	-	-	-	-	-	11.8	11.4	11.1	10.8	10.5	9.8	9.5	8.3	8.2
260	520	-	-	-	-	-	-	11.9	11.6	11.2	10.9	10.1	9.9	8.7	8.5
270	540	-	-	-	-	-	-	-	12.0	11.7	11.4	10.5	10.3	9.0	8.8
280	560	-	-	-	-	-	-	-	-	-	11.8	10.9	10.7	9.3	9.1
290	580	-	-	-	-	-	-	-	-	-	-	11.3	11.0	9.7	9.5
300	600	-	-	-	-	-	-	-	-	-	-	11.7	11.4	10.0	9.8
310	620	-	-	-	-	-	-	-	-	-	-	-	11.8	10.3	10.1
320	640	-	-	-	-	-	-	-	-	-	-	-	-	10.7	10.5

For other application volumes or number s of nozzles use this formula:

$$\text{Forward Speed (km/h)} = \frac{(\text{litres per 15 min}) \times 80}{(\text{number of nozzles}) \times (\text{Desired application volume})}$$

Sprayer with 28 nozzles (500 mm spacing) uses 330 litres in 15 minutes.
Desired application volume is 150 L/ha

Example:

$$\text{Correct forward speed} = \frac{330 \times 80}{28 \times 50} = 6.3 \text{ km/h}$$

Speed Chart

Tractor speedometers are often inaccurate so the actual forward speed should be checked in the field using the following chart.

km/h	mph	Time to Travel 800m (1/2 mile) (min:s)	km/h	mph	Time to Travel 800m (1/2 mile) (min:s)
5.0	3.1	9:36	8.6	5.3	5:35
5.2	3.2	9:14	8.8	5.5	5:27
5.4	3.4	8:52	9.0	5.6	5:02
5.6	3.5	8:34	9.2	5.7	5:13
5.8	3.5	8:17	9.4	5.8	5:07
6.0	3.7	8:00	9.6	6.0	5:00
6.2	3.8	7:44	9.8	6.1	4:54
6.4	4.0	7:30	10.0	6.2	4:48
6.6	4.1	7:16	10.2	6.3	4:43
6.8	4.2	7:04	10.4	6.5	4:38
7.0	4.4	6:52	10.6	6.6	4:32
7.2	4.5	6:40	10.8	6.7	4:27
7.4	4.6	6:29	11.0	6.8	4:22
7.6	4.7	6:19	11.2	7.0	4:17
7.8	4.8	6:09	11.4	7.2	4:13
8.0	5.0	6:00	11.6	7.2	4:08
8.2	5.1	5:51	11.8	7.3	4:04
8.4	5.2	5:43	12.0	7.5	4:00