Calibration for Band Sprayers

When band spraying with row crop sprayers, only a portion of a field is actually treated with chemical. As a result, confusion can often occur in the calculation of application rates. The following outlines a simplified calibration procedure.

Step 1: Selecting a Nozzle Size

a) Choose the desired application rate, forward speed and band width, then use the following equation to calculate the required nozzle capacity.

$$L/\min = \frac{L/ha \times km/h \times cm}{60{,}000}$$

b) Choose a nozzle from the Nozzle Capacity Chart (next page).

c) Set the boom height to obtain the desired band width (see Nozzle Height Chart).

Example: It is desired to apply 100 L/ha using a 35 cm band and a forward speed of 8 km/h.

$$km/ha = \frac{60{,}000 \times 1.93}{600 \times 30} = 6.4 km/h$$

From the Nozzle Capacity Chart a Delavan LE-1.5 or a Tee Jet 80015E or 9501E at a pressure of200 kPa would be satisfactory. The Nozzle Height Chart indicated the nozzle height for 95˚ nozzles is 16cm, 80˚ nozzles 21 cm and 40˚ nozzles 48 cm.

Step 2: Choosing a Forward Speed

a) To obtain a desired application rate with a particular nozzle and band width, choose the forward speed using the following equation:.

$$km/h = \frac{60{,}000 \times L/min}{L/ha \times cm}$$

b) Set the boom height to obtain the desired band width (see the Nozzle Height Chart).

Example: It is desired to apply 600 L/ha using 8006E nozzles and a 30 cm band width.

From the Nozzle Capacity Chart, 8006E nozzles supply 1.93 L/min at a pressure of200 kPa.

$$L/\min = \frac{100 \times 8 \times 35}{60{,}000} = 0.47\ L/min$$

8006E nozzles have an 80˚ spray angle. From the Nozzle Height Chart, the proper boom height is 18 km/h=(60,000×L/min)/(L/ha×cm)cm for a 30 cm band width.

Actual Area Treated

The actual area of the field treated with chemicals is only a fraction of the total field area. The fraction is equal to the band width divided by the row spacing or:

$$\%\ of\ field\ treated = \frac{Band\ Width(cm) \times 100}{Row\ Spacing(cm)}$$

The actual area treated is equal to the total field area times the fraction of the field treated

Example: total field area is 45 ha
90 cm row spacing
30 cm band width

$$\%\ of\ field\ treated = \frac{30\ cm \times 100}{90\ cm} = 33\%$$

$$Actual\ area\ treated = 45\ ha \times 0.33 = 15\ ha$$

Chemical Required per Tankful

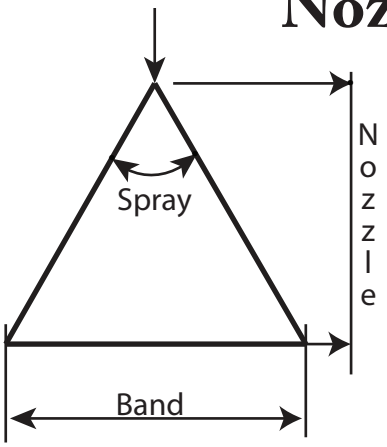
The amount of chemical to add to a sprayer thankful of water is determined by multiplying the actual area treated per thankful times the chemical application rate.

Example: Sprayer tank capacity is 800 L
Water application volume is 100 L/ha
Chemical application rate is 1.5 L/ha

1) $Actual\ area\ treated\ per\ tankful = \frac{800\ L}{100\ L/ha} = 8\ ha$

2) $Chemical\ per\ tankful = 8\ ha \times 1.5 L/ha = 12\ L$

Nozzle Height Chart



Band Width (cm)	Spray Angle		
	40°	80°	95°
	Nozzle Height (cm)		
20	27	12	9
25	34	15	12
30	41	18	14
35	48	21	16

Nozzle Capacity Chart

80° Delavan	40° Tee Jet	80° Tee Jet	95° Tee Jet	Pressure (kPa)	Nozzle Capacity (L/min)
LE-1	4001E	8001E	9501E	150	0.28
				200	0.32
				250	0.36
				275	0.38
LE-1.5		80015E	95015E	150	0.42
				200	0.48
				250	0.54
				275	0.57
LE-2	4002E	8002E	9502E	150	0.56
				200	0.65
				250	0.72
				275	0.76
LE-3	4003E	8003E	9503E	150	0.84
				200	0.97
				250	1.08
				275	1.13
LE-4		8004E	9504E	150	1.12
				200	1.29
				250	1.44
				275	1.51
LE-5		8005E	9505E	150	1.40
				200	1.61
				250	1.80
				275	1.89
LE-6		8006E	9506E	150	1.68
				200	1.93
				250	2.16
				275	2.27