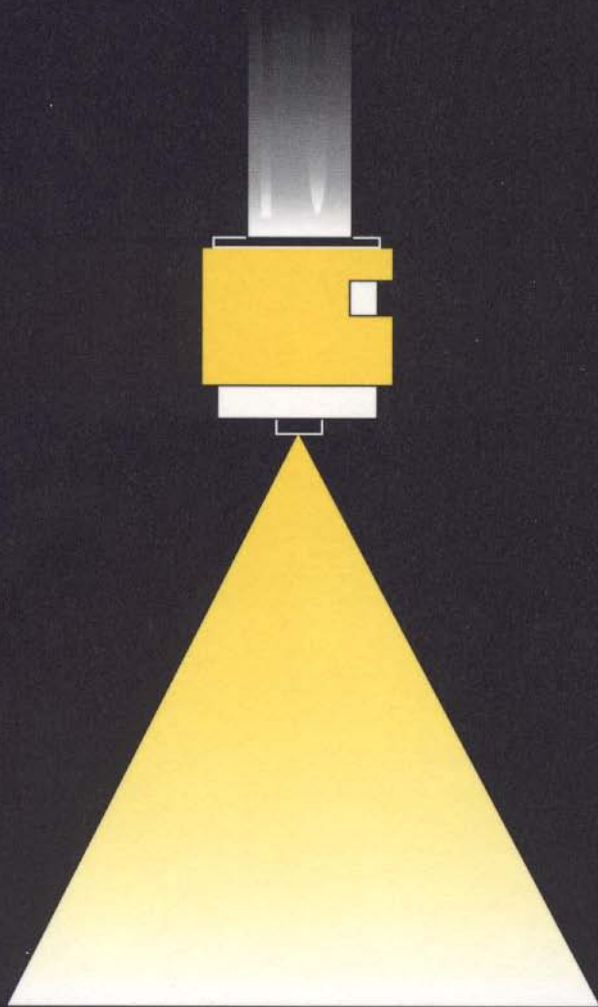


APPLICATION ACCURACY



ROW BANDERS

Guidelines for Post-Directed Row Banding with Accent[®], Assure II[®], Classic[®], and Pinnacle[®] Herbicides



Ounces Per Minute Collected From Each Nozzle

Do Not Use

Sprayer Ground Speed (mph)

Application Rate (gallons per treated acre)	Sprayer Ground Speed (mph)								
	2	3	4	5	6	7	8	9	10
10	6.5	9.7	12.9	16.2	19.4	22.6	25.9	29.1	32.3
11	7.1	10.7	14.2	17.8	21.3	24.9	28.4	32.0	35.6
12	7.8	11.6	15.5	19.4	23.3	27.2	31.0	34.9	38.8
13	8.4	12.6	16.8	21.0	25.2	29.4	33.6	37.8	42.0
14	9.1	13.6	18.1	22.6	27.2	31.7	36.2	40.7	45.3
15	9.7	14.5	19.4	24.2	29.1	33.9	38.8	43.6	48.5
16	10.3	15.5	20.7	25.9	31.0	36.2	41.4	46.5	51.7
17	11.0	16.5	22.0	27.5	33.0	38.5	44.0	49.5	54.9
18	11.6	17.5	23.3	29.1	34.9	40.7	46.5	52.4	58.2
19	12.3	18.4	24.6	30.7	36.8	43.0	49.1	55.3	61.4
20	12.9	19.4	25.9	32.3	38.8	45.3	51.7	58.2	64.6
21	13.6	20.4	27.2	33.9	40.7	47.5	54.3	61.1	67.9
22	14.2	21.3	28.4	35.6	42.7	49.8	56.9	64.0	71.1
23	14.9	22.3	29.7	37.2	44.6	52.0	59.5	66.9	74.3
24	15.5	23.3	31.0	38.8	46.5	54.3	62.1	69.8	77.6
25	16.2	24.2	32.3	40.4	48.5	56.6	64.6	72.7	80.8
26	16.8	25.2	33.6	42.0	50.4	58.8	67.2	75.6	84.0
27	17.5	26.2	34.9	43.6	52.4	61.1	69.8	78.5	87.3
28	18.1	27.2	36.2	45.3	54.3	63.4	72.4	81.5	90.5
29	18.7	28.1	37.5	46.9	56.2	65.6	75.0	84.4	93.7
30	19.4	29.1	38.8	48.5	58.2	67.9	77.6	87.3	97.0
	80015	8002	8003	8004	8005		8006		

Recommended Nozzle Sizes

Chart 1

Nozzles per band - 1
Band width - 15"

OPERATION

Periodic inspections of your sprayer will ensure that it is providing uniform coverage. Here are a few things you should check:

- *nozzle pressure* — Operate the system at 25-40 psi at the nozzle.*
- *boom height* — Set height to provide the desired nozzle clearance above the target canopy.
- *sprayer speed* — Operate the sprayer at a speed that minimizes vibration.
- *spray pattern* — Spray water on dry pavement or a hard-packed dirt roadway and check the spray pattern for equal distribution.

To keep your sprayer in top condition, regularly inspect the nozzles for damage or wear. Also, the use of nozzle screens will reduce the potential for clogged or partially clogged nozzles (recommended sizes: 100-mesh for nozzles smaller than 8002; 50-mesh for 8002s or larger). In addition, you should install a large-capacity line strainer (equipped with a 50- to 100-mesh screen) between the pump and the boom to help prevent the nozzles from clogging.

CALIBRATION

Calibration is the final step in ensuring uniform application at the desired rate. The process involves two phases—determining sprayer output and determining the amount of herbicide to put in the spray tank.

* Most sprayers monitor pressure at the pump, therefore, to obtain adequate nozzle pressure, you might need to adjust the pressure gauge to compensate for pressure loss in the spray boom. Once the output is adjusted, monitor the pressure while spraying. If the pressure changes during application, you might have a problem with your system, such as a clogged nozzle.

Ounces Per Minute Collected From Each Nozzle

		Sprayer Ground Speed (mph)									
		2	3	4	5	6	7	8	9	10	
Application Rate (gallons per treated acre)	10	3.2	4.8	6.5	8.1	9.7	11.3	12.9	14.5	16.2	
	11	3.6	5.3	7.1	8.9	10.7	12.4	14.2	16.0	17.8	
	12	3.9	5.8	7.8	9.7	11.6	13.6	15.5	17.5	19.4	
	13	4.2	6.3	8.4	10.5	12.6	14.7	16.8	18.9	21.0	
	14	4.5	6.8	9.1	11.3	13.6	15.8	18.1	20.4	22.6	
	15	4.8	7.3	9.7	12.1	14.5	17.0	19.4	21.8	24.2	
	16	5.2	7.8	10.3	12.9	15.5	18.1	20.7	23.3	25.9	
	17	5.5	8.2	11.0	13.7	16.5	19.2	22.0	24.7	27.5	
	18	5.8	8.7	11.6	14.5	17.5	20.4	23.3	26.2	29.1	
	19	6.1	9.2	12.3	15.4	18.4	21.5	24.6	27.6	30.7	
	20	6.5	9.7	12.9	16.2	19.4	22.6	25.9	29.1	32.3	
	21	6.8	10.2	13.6	17.0	20.4	23.8	27.2	30.5	33.9	
	22	7.1	10.7	14.2	17.8	21.3	24.9	28.4	32.0	35.6	
	23	7.4	11.2	14.9	18.6	22.3	26.0	29.7	33.5	37.2	
	24	7.8	11.6	15.5	19.4	23.3	27.2	31.0	34.9	38.8	
	25	8.1	12.1	16.2	20.2	24.2	28.3	32.3	36.4	40.4	
	26	8.4	12.6	16.8	21.0	25.2	29.4	33.6	37.8	42.0	
	27	8.7	13.1	17.5	21.8	26.2	30.5	34.9	39.3	43.6	
	28	9.1	13.6	18.1	22.6	27.2	31.7	36.2	40.7	45.3	
	29	9.4	14.1	18.7	23.4	28.1	32.8	37.5	42.2	46.9	
	30	9.7	14.5	19.4	24.2	29.1	33.9	38.8	43.6	48.5	
			Do Not Use	8001	80015	8002	8003	8004			

Recommended Nozzle Sizes

Chart 2

Nozzles per band - 2
Band width - 15"

Determining Sprayer Output

The nozzle output method is the easiest way to determine sprayer output because it can be done while the sprayer is stationary. To use this method, you must know the application rate of the herbicide plus carrier (in GPA) and the sprayer speed (in MPH).

Charts 1, 2, and 3 (for one, two, and three nozzles, respectively) provide the criteria necessary to determine the output volume you should collect from *each* nozzle based on a 15-inch band.** The ground speeds are listed across the top row of the table, and herbicide application rates (GPA of herbicide plus carrier) are listed in the left-hand column. **Select the appropriate value from each axis—the value at their point of intersection indicates the number of ounces per minute you should collect from each nozzle.** Recommended nozzle sizes are listed in the corresponding shaded area in boldface type.

Once you have determined the appropriate nozzle output, calibrate your sprayer as follows:

1. Fill the tank half full with water.
2. Turn the sprayer on, operating it at about 30 psi.
3. Collect and measure the output from several nozzles, comparing the volumes to the value you selected in Chart 1, 2, or 3.
4. Adjust the operating pressure until the amount you collect is within 10% of the value you selected.*

** For band widths other than 15", use the following equation to calculate nozzle output in oz/min:

$$\frac{\text{band width}}{15} \times \text{value from chart} = \text{_____ oz/min for each nozzle}$$

Ounces Per Minute Collected From Each Nozzle

		Sprayer Ground Speed (mph)								
		2	3	4	5	6	7	8	9	10
10	2.2	3.2	4.3	5.4	6.5	7.5	8.6	9.7	10.8	
11	2.4	3.6	4.7	5.9	7.1	8.3	9.5	10.7	11.9	
12	2.6	3.9	5.2	6.5	7.8	9.1	10.3	11.6	12.9	
13	2.8	4.2	5.6	7.0	8.4	9.8	11.2	12.6	14.0	
14	3.0	4.5	6.0	7.5	9.1	10.6	12.1	13.6	15.1	
15	3.2	4.8	6.5	8.1	9.7	11.3	12.9	14.5	16.2	
16	3.4	5.2	6.9	8.6	10.3	12.1	13.8	15.5	17.2	
17	3.7	5.5	7.3	9.2	11.0	12.8	14.7	16.5	18.3	
18	3.9	5.8	7.8	9.7	11.6	13.6	15.5	17.5	19.4	
19	4.1	6.1	8.2	10.2	12.3	14.3	16.4	18.4	20.5	
20	4.3	6.5	8.6	10.8	12.9	15.1	17.2	19.4	21.5	
21	4.5	6.8	9.1	11.3	13.6	15.8	18.1	20.4	22.6	
22	4.7	7.1	9.5	11.9	14.2	16.6	19.0	21.3	23.7	
23	5.0	7.4	9.9	12.4	14.9	17.3	19.8	22.3	24.8	
24	5.2	7.8	10.3	12.9	15.5	18.1	20.7	23.3	25.9	
25	5.4	8.1	10.8	13.5	16.2	18.9	21.5	24.2	26.9	
26	5.6	8.4	11.2	14.0	16.8	19.6	22.4	25.2	28.0	
27	5.8	8.7	11.6	14.5	17.5	20.4	23.3	26.2	29.1	
28	6.0	9.1	12.1	15.1	18.1	21.1	24.1	27.2	30.2	
29	6.2	9.4	12.5	15.6	18.7	21.9	25.0	28.1	31.2	
30	6.5	9.7	12.9	16.2	19.4	22.6	25.9	29.1	32.3	
	Do Not Use	8001	80015				8002			

Recommended Nozzle Sizes

Chart 3

Nozzles per band - 3
Band width - 15"

Factors Affecting Sprayer Output. The amount of chemical mixture applied per acre is based on the following variables:

- **Nozzle Flow Rate**—Nozzle flow rate is linked to the size of the tip's orifice and the operating pressure of the nozzle. The most effective way to make major adjustments to sprayer output is to install a nozzle that has a larger or smaller orifice. Minor adjustments that may be needed due to nozzle wear can be made by changing the nozzle pressure.
- **Sprayer Ground Speed**—Sprayer ground speed varies inversely with the application rate. For example, doubling the ground speed reduces the application rate by one-half.
- **Nozzle Spray Width**—Nozzle spray width also varies inversely with the application rate (i.e., doubling the effective spray width per nozzle decreases the application rate by one-half). The most common calibration errors are the result of using the incorrect spray width in the calculation.

Determining Herbicide Amounts - see back panel

This technical bulletin provides guidelines for setting-up, calibrating, and operating row crop sprayers used in post-directed spraying of Accent[®], Assure II[®], Classic[®], and Pinnacle[®] Herbicides. These sprayers, which are available through many suppliers, can be configured in a number of ways to apply herbicides in a uniform band over or adjacent to rows.

BANDER TYPES

The most commonly used set-ups are the standard three-nozzle, drop nozzle, and hooded-type. The *standard three-nozzle* set-up is used when the weed and crop canopy are approximately the same height. The *drop-nozzle* set-up is most effective when the weed canopy is shorter than the crop canopy and the crop is 8- to 12- inches tall or taller. The *hooded-type* set-up is used to reduce the effect of a cross wind on the spray pattern.

BANDER CONFIGURATION AND SETUP

The *standard three-nozzle* set-up, shown in Figure 1, is equipped with three, 80° even flat fan nozzles that intersect to produce a 15-inch band. To create a uniform distribution, set the center nozzle nine inches above the target canopy (normally the top of the weed canopy) and the side nozzles as shown.

The *drop-nozzle* set-up, shown in Figure 2, is equipped with two or three nozzles that are arranged to apply the herbicide below the crop canopy. An 80° standard flat fan is generally recommended for this sprayer. If you use a three-nozzle arrangement, position the center nozzle nine inches above the crop canopy, directing the other nozzles at the base of the crop plants. For a two-nozzle arrangement (Figure 3), direct the spray at the base of the crop plant. Use a support rod to minimize nozzle vibration, if necessary.

The *hooded-type* set-up is generally equipped with three nozzles fixed within a hood. Even flat fan tips are recommended; however, the fan angle depends on the nozzle location. Consult the hood manufacturer for nozzle arrangement. If the center nozzle is an 80° even flat fan, the hood should be operated so that it is approximately nine inches above the target canopy.

Figure 1

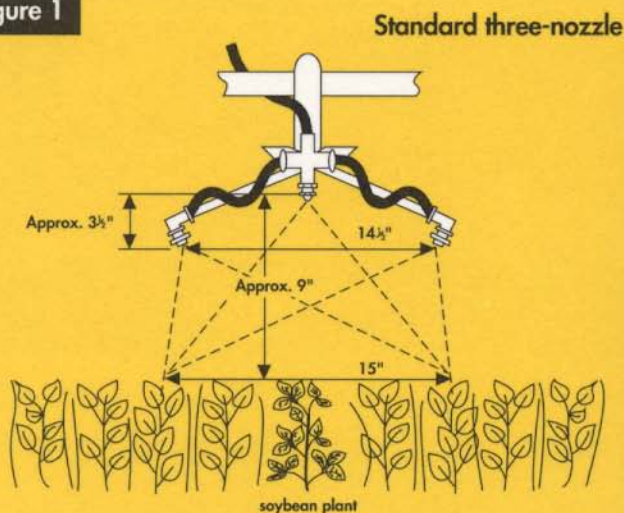


Figure 2

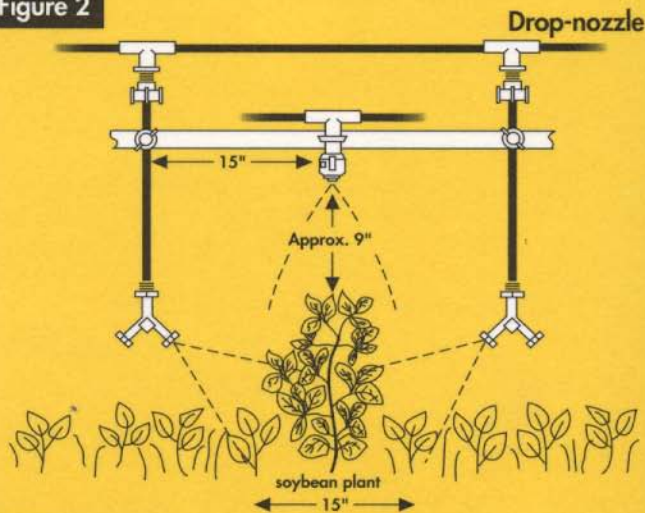


Figure 3

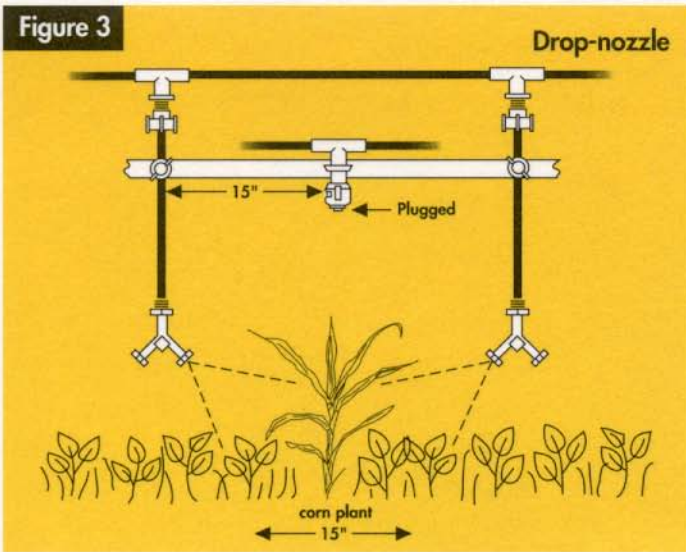
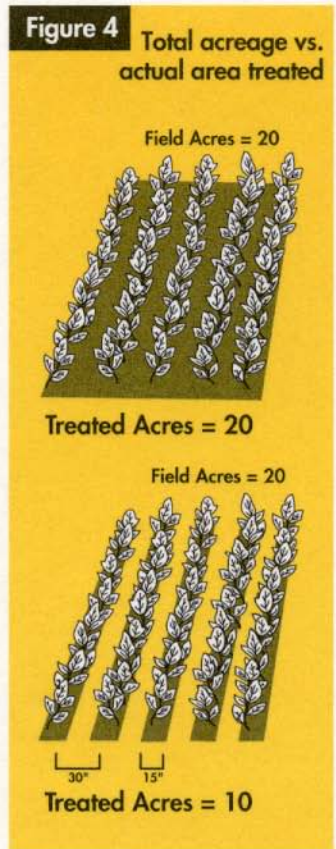


Figure 4



Determining Herbicide Amount

Applicators frequently miscalculate the amount of herbicide to put in the sprayer tank for spray banding applications because they assume the treatment area and crop acreage are the same. However, the treated area is actually less than the crop acreage because band sprayers only spray a strip over the row, not the ground between plant rows. For example, if a 15-inch band of herbicide is applied to a crop with 30-inch rows, only half of the total acreage is treated (Figure 4). You can determine the treated area using equation 1.

$$(1) \quad \frac{\text{band width}}{\text{row spacing}} \times \text{field size} = \text{actual area treated}$$

Once you have determined the area actually treated, calculate the number of acres that can be treated per tank using equation 2.

$$(2) \quad \frac{\text{total tank volume}}{\text{sprayer output (GPA)}} = \text{acres treated per tank}$$

Finally, determine herbicide amount using equation 3.

$$(3) \quad \frac{\text{water in spray tank (Gal)}}{\text{sprayer output (GPA)}} \times \text{herbicide rate/acre} = \text{herbicide amount}$$

For example, with sprayer output calibrated to 15 GPA, a sprayer tank capacity of 300 gallons (tank full), and a pesticide rate of 1 oz/A, the calculation would be as follows:

$$\frac{300 \text{ (Gal)}}{15 \text{ (GPA)}} \times 1 \text{ oz/A} = 20 \text{ oz}$$

With this setup, you could treat 20 acres per tank, covering the entire crop area (plant rows and spaces). However, using a 15-inch band on crop rows of 30 inches, the same volume of herbicide and carrier would cover 40 acres.

If you have additional questions about this method, consult your local Du Pont representative, agricultural advisor, or university extension specialist. Always check the product label for specific precautions and restrictions. The advice given in this bulletin is general. Refer to materials supplied by the equipment manufacturer for more details.