

# SPRAYING INFORMATION

## SELECTION OF SPRAY TIP OR NOZZLE

To provide the variety of spray patterns and capacities used in farm spray applications, Spraying Systems Co. offers a complete line of nozzles and spray tips. Generally, standard flat spray TeeJet tips, with tapered pattern edges, mounted on a boom with overlapping spray patterns are used for applying herbicides and some insecticides. For band spraying applications requiring even spray distribution, the flat Even spray TeeJet tips are considered ideal. For spraying insecticides and fungicides hollow cone type ConeJet spray tips or disc core tips are used. This cone spray pattern provides better foliage coverage and is usually applied at higher pressures. For the surface application of liquid fertilizers, FloodJet tips and FloodJet nozzles - as well as boomless type FliedJet nozzles are usually recommended especially for suspension and slurry type fertilizers. In all cases follow the recommendations of the chemical manufacturers, Agricultural Extension Service and the USDA keeping driftage to a minimum.

## USEFUL FORMULAS

$$\text{GPM (Per Nozzle)} = \frac{\text{GPA} \times \text{M.P.H.} \times \text{W}^*}{5940}$$

$$\text{GPA} = \frac{5940 \times \text{GPM (Per Nozzle)}}{\text{M.P.H.} \times \text{W}^*}$$

\*W - Nozzle spacing (in boom spraying) or spray swath (in boomless) in inches.

## SIZE SELECTION OF SPRAY TIP OR NOZZLE

Based on the chemical manufacturer's recommendations on GPA application rates and nozzle types, a suitable spray tip size is chosen from the catalog tabulations. Since all the tabulations are based on spraying water, which weighs 8.34 lbs. per USA gallon, conversion factors must be used when spraying solutions which are heavier or lighter than water. Using conversion factors from the tables below multiply by the catalog tabulated GPM and GPA rates - to arrive at the values for the solution to be sprayed.

Weight of solution	Specific Gravity	Conversion Factors
7.0 lbs. per gallon	.84	.92
8.0 lbs. per gallon	.96	.98
8.34 lbs. per gallon - WATER	1.00	1.00
9.0 lbs. per gallon	1.08	1.04
10.0 lbs. per gallon	1.20	1.10
10.65 lbs. per gallon - 28% nitrogen	1.28	1.13
11.0 lbs. per gallon	1.32	1.15
12.0 lbs. per gallon	1.44	1.20
14.0 lbs per gallon	1.68	1.30

## NOZZLE SPACING

If the nozzle spacing on your boom is different than those tabulated, also multiply the tabulated or calculated GPA coverages by one of the following factors.

Where Tables Are Based on 20" Nozzle Spacing									
Other Spacing	8"	10"	12"	14"	16"	18"	22"	24"	30"
Conversion Factor	2.5	2	1.67	1.43	1.25	1.11	.91	.83	.66

Where Tables Are Based on 30" Nozzle Spacing									
Other Spacing	26"	28"	32"	34"	36"	38"	40"	42"	44"
Conversion Factor	1.15	1.07	.94	.88	.83	.79	.75	.71	.68

Where Tables Are Based on 40" Nozzle Spacing									
Other Spacing	28"	30"	32"	34"	36"	38"	42"	44"	48"
Conversion Factor	1.43	1.33	1.25	1.18	1.11	1.05	.95	.91	.83

## BEFORE YOU GO INTO THE FIELD

Check all your equipment - make certain that all components are clean including the tank, pump, control valves, check valves, hoses, boom, strainers, nozzles, and spray tips. **WARNING:** never use a metal object in cleaning nozzle orifices. Use a plastic or wooden probe.

Check the flow rate from all nozzles using a master pressure gauge mounted in the boom close to the nozzles. (After the test remove the master pressure gauge and plug the connection). While this nozzle flow test is being conducted, check the pressure reading on the rig pressure gauge to compare its reading to the pressure at the nozzles. The flow rates can be determined from the flow charts contained in this catalog. Remember, the catalog tabulations are based on pressures at the nozzles.

**NOTE:** If the ball type check valves are used, the actual nozzle pressure will be approximately 5 P.S.I. lower than the gauge reading, depending on spring rating and flow rate.

## CHOICE AND CARE OF SPRAY EQUIPMENT

All the factors in today's spraying application, including chemical costs, pollution and driftage control, point to the importance of choosing the proper spray equipment and maintaining it in an efficient operating order. Therefore, the original purchased equipment should be made of materials which resist corrosion and wear such as stainless steel spray tips. Since usage of spray nozzles usually brings about orifice clogging problems, erosion, etc., it is very important that the tips be cleaned after each operation, and tested before using again. Finally even when using precision spray tips, it is necessary to control all the other factors in the spraying application - such as rig speed, spraying pressure, spray height, etc., in order to place the proper amount of chemicals in the proper areas. An established routine of proper maintenance will soon pay for itself.

# SPRAYING INFORMATION

THE PERFORMANCE OF ANY AGRICULTURAL CHEMICAL DEPENDS UPON THE PROPER APPLICATION OF THE CORRECT AMOUNT BASED ON THE CHEMICAL MANUFACTURERS RECOMMENDATION. BE SURE THAT YOUR EQUIPMENT HAS BEEN PROPERLY CALIBRATED BEFORE SPRAYING.

## IN THE FIELD

Having established the proper spray tip style and size, spraying pressure and nozzle spacing the tractor throttle setting to provide the required rig speed should be determined. Because of wheel slippage, the actual rig speed, as determined from the tables below, may differ from the speedometer readings. Mark off a distance of 100, 200, and 300 feet in a field where the spraying is to be done - and run the tractor over this distance, carefully marking the throttle setting or speedometer reading. To make measurement of the test run, begin from standing start far enough ahead of first marker so that your rig is at full speed before traveling the 100, 200, or 300 foot distances.

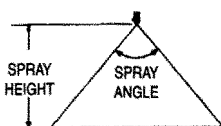
## TRACTOR SPEEDS

Speed in MPH (Miles Per Hour)	Time Required In SECONDS To Travel A Distance Of:		
	100 feet	200 feet	300 feet
3.0	23	45	68
3.5	20	39	58
4.0	17	34	51
4.5	15	30	45
5.0	14	27	41
6.0	-	23	34
7.0	-	19	29
7.5	-	18	27
8.0	-	17	26
9.0	-	15	23

Adjust The Spray Height To Give Proper Spray Overlap.

## SUGGESTED MINIMUM SPRAY HEIGHT

Spray Angle	Spray Height	
	20" Spacing	30" Spacing
65°	21" to 23"	32" to 34"
73°	20" to 22"	27" to 29"
80°	17" to 19"	24" to 26"
110°	10" to 12"	14" to 18"



## AFTER SPRAYING

Rinse And Clean All The Spraying equipment - including the spray tips, being careful not to use a metal probe in the orifice. This cleaning routine is especially important after spraying wettable powders. Wash spray tips thoroughly with water or cleaning solution (appropriate for chemical sprayed). Blow out orifice clean and dry. If orifice remains clogged, clean it with a fine bristle (not wire) brush or with a toothpick. Do not damage the orifice. Water - rinse and dry tips before storing.

! CAUTION !

AGRICULTURAL CHEMICALS CAN BE DANGEROUS. IMPROPER SELECTION OR USE CAN SERIOUSLY INJURE PERSONS, ANIMALS, PLANTS, SOIL, OR OTHER PROPERTY. BE SAFE: SELECT THE RIGHT CHEMICAL FOR THE JOB. HANDLE IT WITH CARE. FOLLOW THE INSTRUCTIONS ON THE CONTAINER LABEL AND INSTRUCTIONS FROM THE EQUIPMENT MANUFACTURER.

SPRAYING INFORMATION

## MISCELLANEOUS CONVERSION FACTORS

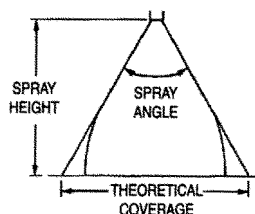
- One Acre = 43,560 square feet = 0.405 Hectares.
- One Hectare = 2.471 Acres.
- One Gallon Per Acre = 9.35 Liters Per Hectare.
- One Mile = 5280 feet = 1610 Meters = 1.61 KM.
- One Gallon = 128 fluid ounces = 8 Pints = 4 Quarts
- One Gallon = 3.79 Liters = 0.83 Imperial Gallons
- One Pound Per Square Inch = 0.069 bar. = 6.896 Kilopascal
- One Mile Per Hour = 1.609 Kilometers Per Hour

## ABBREVIATIONS

- GPA - Gallons Per Acre
- GPM - Gallons Per Minute
- GPH - Gallons per Hour
- NPT - Tapered Pipe Thread
- MPH - Miles Per Hour
- PSI - Pounds per Square Inch (gauge pressure)

## SPRAY COVERAGE INFORMATION

THEORETICAL SPRAY COVERAGE AT VARIOUS SPRAY HEIGHTS (AT 40 PSI)				
Spray Height	65° Spray Angle	73° Spray Angle	80° Spray Angle	150° Spray Angle
6"	7.6"	8.8"	10.1"	45"
9"	11.5"	13.3"	15.1"	67"
12"	15.3"	17.8"	20"	90"
15"	19.1"	22"	25"	112"
18"	23"	27"	30"	134"
21"	27"	31"	35"	157"
24"	31"	36"	40"	179"
27"	34"	40"	45"	202"
30"	38"	44"	50"	224"
33"	42"	49"	55"	246"
36"	46"	53"	60"	269"



This table lists the theoretical coverage of spray patterns as calculated from the included spray angle of the spray and the distance from the nozzle orifice. These values are based on the assumption that the spray angle remains the same throughout entire spray distance. In actual practice, the tabulated spray angle does not hold for long spray distances.