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Calibration and User Guide from DuPont Land Management

- **Checklist for applying nonagricultural-use herbicides.**
- **How to calibrate liquid and granular spraying equipment.**
- **Common conversion factors and other useful information.**

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General Stewardship

Proper stewardship during brush and weed control applications is necessary for the long-term viability of herbicide programs in the vegetation management industry. DuPont is committed to providing the information and resources necessary to support the continued use of existing products as well as the development of new technology to meet future weed- and brush-control needs.

DuPont herbicides can be great tools to help you provide uninterrupted power supply to the public while keeping encroaching brush out of rights of way. These herbicides also help you to manage the safety issues associated with uncontrolled weed growth along roadsides or the elimination of environmentally degrading invasive weeds.

For more specific application guidance on how to incorporate DuPont herbicides in your brush or weed control programs, please refer to their federally approved labels or contact your local DuPont sales representative.

Checklist for Applying Nonagricultural-Use Herbicides

Understanding the risks associated with applying nonagricultural-use herbicides aids in minimizing potential off-target injury to desirable vegetation. Providing for proper herbicide performance through training and education results in economic, aesthetic and environmental benefits to the treatment site. The following checklist will aid applicators in developing a minimized-risk and high-benefit herbicide program.

Always read and follow label directions, use precautions and restrictions. This Calibration Guide is not intended as a substitute for the product labeling for the products referenced herein.

Application Accuracy

- Select the proper equipment for the spray job.
- Use the proper nozzle type and recommended spray pressure for accurate herbicide placement.
- Calibrate equipment periodically for spray output accuracy.
- Use a drift control agent if instructed by product labeling.
- License and certify application personnel as necessary.
- Maintain detailed spray records of all treatments.

Chemical Selection

- Understand chemical properties such as solubility, mobility, persistence and volatility.
- Match the vegetation to be controlled with the correct herbicide(s), use rate and application timing.
- Evaluate the performance at the end of the season to consider any program upgrades needed.

Target Area Stability

- Sites disturbed by mechanical means or vehicle traffic may lead to herbicide ineffectiveness, or possible movement to off-target areas.
- Know the soil texture or road ballast composition as it relates to wind or water erosion potential.
- Treat asphalt or concrete surfaces only if specifically directed by product labeling.

Environmental Conditions

- Applications during high wind, high temperatures and low humidity may increase the potential for off-target drift.
- Be cautious of passing vehicle wind shear, particularly from large trucks, when spraying.
- Understand local weather patterns to determine a proper timing for the herbicide treatment.
- Applications made to saturated or frozen soils, or just prior to heavy rainfall, may have greater potential for off-target movement.
- When making herbicide applications to slopes, heavy rainfall may increase the potential for movement to nontarget areas.

Site-Specific Considerations

A careful evaluation of the potential for off-site movement of treated soil by wind or water erosion must be made prior to using DuPont nonagricultural herbicide products. This evaluation is particularly critical when neighboring land contains desirable vegetation or crops for which the DuPont product is not labeled.

Adjacent Vegetation and Property

- Know the chemical sensitivity of adjacent vegetation, crops and ornamentals.
- Use caution when making treatments next to agricultural crops.
- Know the sensitivity of your site and do not use non-crop herbicides in any ornamental planting, home or park area unless so labeled.
- Be aware that tree or plant roots may extend or grow into a treatment area. Applying nonagricultural-use herbicides and draining or flushing equipment on or near these treatment areas may result in injury or loss of desirable vegetation.

Always obtain and read the appropriate labels before using DuPont Land Management products. Always follow the label directions, use precautions and restrictions.

Transportation Accidents, Fires and Spills:
CHEMTREC 800-424-9300

Medical Emergencies: 800-441-3637

Calibrating Herbicide Equipment

The first step in calibrating liquid or granular spraying equipment is to read the entire label of the herbicide you are about to use. Then select the application rate listed on the label that fits the needs for managing that particular pest.

Calibrating Boom and Boomless Sprayers

1. Fill the spray tank with water.
2. Choose spray nozzles with low drift properties. Measure the swath width (SW) in feet to be sprayed with the nozzle(s).
3. Collect the water sprayed from all nozzles for the SW measured during ONE minute. Record as GPM.
4. Determine the sprayer speed (mph). Time the sprayer in seconds (SEC) to travel 200 measured feet.

$$\text{mph} = \frac{200 \text{ feet} \times 0.682}{\text{SEC}}$$

Determine the gallons of output per acre (GPA).

$$\text{GPA} = \frac{\text{GPM} \times 495}{\text{mph} \times \text{SW (in feet)}}$$

5. Add your herbicide at the desired rate per acre based on the GPA output.

How To Determine Speed in Miles Per Hour If You Do Not Have a Ground Speed Indicator on Your Equipment

1. Set two markers in the field 200 feet apart.
2. Select gear and throttle setting on your vehicle.
3. Check time (in seconds) from running start to drive the 200 feet.

Time Required to Travel 200 Feet at Various Speeds

Time for 200 feet Seconds	Equivalent speed mph
45	3
34	4
27	5
23	6
19	7
17	8
15	9
14	10
11	12
9	15

This chart provides the area treated per mile lengths based on the width of the spray swath.

Width of Area Covered to Acres Per Mile Traveled	
Width of strip (feet)	Number of acres covered per miles traveled
2	0.24
4	0.48
6	0.72
8	0.96
10	1.21
12	1.45
16	1.93
18	2.18
20	2.42
25	3.02
30	3.63
50	6.04
75	9.06
100	12.1

Stationary Calibration Method

1. Fill the spray tank approximately half full with clean water.
2. Measure the swath width (SW) in inches or feet.
3. Collect the spray output from the nozzle(s) for 1 minute. Measure the volume collected in fluid ounces and divide by 128 to determine gallons per minute (GPM).
4. Select the speed, in miles per hour, that will be used for spraying.
5. Determine the gallons per acre (GPA) being applied, using a large output nozzle or a cluster of nozzles.

$$GPA = \frac{5940 \times GPM}{mph \times SW \text{ (in inches)}}$$

OR

$$GPA = \frac{GPM \times 495}{mph \times SW \text{ (in feet)}}$$

6. Chemical need $= \frac{\text{Chemical rate per acre} \times \text{tank volume (in gallons)}}{GPA}$

Volume Calibration Method

1. Place the sprayer on level ground and fill the tank to a known level with clean water.
2. Mark the start of your calibrating course with a stake, or other marking device, and measure off the distance required to cover 0.25 acre. (Consult the table below.)
3. When you get to the starting mark, open the valve and drive at the speed you will be going when spraying.
4. Shut off the valve when you get to the mark at the end of your calibrating course. Return the sprayer to level ground and measure carefully the amount of water needed to refill the tank to the known level in step 1 above.
5. Multiply this amount by 4. This gives you the quantity of water your sprayer delivers per acre.

Table for Step 2

Width of boom swath (in feet)	Linear feet traveled to cover 1/4 acre
2	5445
4	2723
6	1815
8	1362
10	1090
20	545
30	363

Handgun Calibration (by Area)

1. Put 50 to 100 gallons of clean water in the sprayer. Choose the pressure setting and the nozzle you will use during the application.
2. Set up a test spray area that is 10 feet wide and 43.5 feet long (equivalent to 1/100 of an acre). Uniformly spray this area just as you would spray an actual site (same walking speed and pattern), being sure to time exactly how long it takes to spray the test area.
3. Take the handgun and spray into a bucket and collect the water for exactly the same length of time it took to spray the test area.
4. Multiply the amount (in gallons) of water you collected in the bucket(s) by 100 to get your carrier volume per acre.

> Example: If you collected 3 quarts of water in the bucket after 45 seconds, multiply 100 by 0.75 gallon (3 quarts = 0.75 gallon) to get 75 gallons per acre.

5. Then, use the desired amount of herbicide to treat one acre at the carrier volume for which you just calibrated.

Backpack Sprayer Usage

Mixing DuPont™ Escort® XP or Telar® XP herbicide with the adjuvant ammonia in backpack sprayers

Control targeted invasive noxious weeds by using Escort® XP or Telar® XP herbicide in small, backpack sprayers.

Steps for mixing

1. Add 2.0 grams of Escort® XP or Telar® XP to 3 gallons of water in a small backpack sprayer.
   - Note that using gram measurement tubes gives approximate weight. For precise measurement, the herbicide should be weighed using a scale.
   - Application rate is approximately 1 ounce per acre when spraying 3 gallons on roughly 3,025 square feet, or an area 55 feet x 55 feet (0.069 acre).
   - This rate is based on the area being treated with approximately 42 GPA.
   - To ensure proper use of a given sprayer, the sprayer must be calibrated prior to use.
2. Stir the mixture. It will become slightly cloudy.
   - This takes about one minute.
3. Add 1 teaspoon (3 ml or 60 drops) of ammonia solution (3% active).
   - Stir and the solution will clarify significantly.
   - No further agitation is required.
4. Add other adjuvants and a colorant, if desired.
   - Stir and apply the solution on the targeted pest as directed by the label.

For larger loads

Mix one fluid ounce (2 tablespoons) of ammonia solution (3% active) with every ounce (by weight) of Escort® XP or Telar® XP used in the spray tank.

Using ammonia as an adjuvant solution will help solubilize the Escort® XP or Telar® XP. After the initial mixing and stirring (agitation), this reduces the need to agitate the tank mixture to prevent settling out. The product will usually remain stable in this solution for a maximum of 1 to 3 days under normal conditions. Mixing and spraying the product immediately will provide the best results.

The spray-mix solution is relatively stable in temperatures below 80 degrees. Solution temperatures reaching 110 degrees would degrade approximately 10 to 15 percent in 3 days. pH ranges of 7.0 to 8.0 are ideal for this spray-mix solution.

Injection System Instructions

Mixing DuPont™ Escort® XP, Krovar® I DF, Landmark® XP, Oust® Extra, Perspective®, Streamline®, Telar® XP and Viewpoint® herbicides.

Injection systems offer a quick and effective method to deliver measured quantities of weed-control products to a target area without tank mixing. Certain steps should be followed in order to optimize mixing and injection performance.

When mixing **dry formulations**, the following mixing and application steps must be taken to provide a uniform mixture that does not plug the equipment.

General use tips for injection systems:

1. Use larger, cone-shaped injection tanks to improve agitation.
2. Use larger ($^1/_2$"–$^5/_8$") injection tubes for increased injection volumes.
3. Determine the mixing instructions and rate for each product.
4. Agitate constantly to maintain suspension of products.
5. Use a suspension aid to improve the suspension of the chemical mixture in the tank during extended periods of use.
6. Using tank-cleaning aids, clean and flush the injection components following use to provide problem-free spraying.

Mixing instructions for injection systems:

1. Check the volume markings on the injection tank to confirm the proper volume. To verify correct volume(s) in the injection tank, measure water into the injection tank and re-mark the tank with a permanent marker.
2. Fill the injection tank with the predetermined amount of water.
3. Add the measured amount of herbicide with the agitator running.
4. Maintain agitation throughout the spray operation.
5. Add a suspension aid if required to reduce the risk of the mixture settling out.
6. Add a defoaming agent as needed.
7. Add a colorant if desired to help confirm injection and coverage.

Mixing and Injection Rates

DuPont™ Krovar® I DF		
Gallons water +	**Pounds product** =	**Gallons solution**
1	1.5	1.117 (143 oz)
5	7.5	5.585 (717 oz)
10	15	11.2 (1,433 oz)
20	30	22.4 (2,866 oz)
40	60	44.8 (5,734 oz)
60	90	67.2 (8,601 oz)

Desired rate/acre	Injection amount
Krovar® I DF (6 lb)	572 oz solution
Krovar® I DF (8 lb)	762 oz solution
Krovar® I DF (10 lb)	953 oz solution

Note: 95.3 oz of solution will contain 1 lb of Krovar® I DF herbicide.

Krovar® I DF note: Using dual injection tanks will reduce the demand on the injection pump and hose. You would split the rate in half for each injector.

Mixing and Injection Rates (cont'd)

DuPont™ Escort® XP, Landmark® XP, Oust® Extra, Perspective®, Streamline® and Telar® XP		
Gallons water +	**Ounces product** =	**Gallons solution**
1	4	1.025 (132 oz)
5	20	5.09 (660 oz)
10	40	10.187 (1,320 oz)
20	80	20.37 (2,640 oz)

Desired rate/acre	Injection amount
Escort® XP, Oust® Extra or Telar® XP (1/2 oz)	16.375 oz solution
Escort® XP, Oust® Extra or Telar® XP (1 oz)	32.75 oz solution*
Escort® XP, Oust® Extra or Telar® XP (2 oz)	65.50 oz solution
Escort® XP, Oust® Extra or Telar® XP (3 oz)	98.25 oz solution
Escort® XP or Oust® Extra (4 oz)	131.00 oz solution
Oust® Extra (4 oz) or Landmark® XP (4.5 oz)	150.40 oz solution

*** Note:** 32.75 oz of solution will contain 1 oz of Escort® XP, Landmark® XP, Oust® Extra or Telar® XP herbicide.

Desired rate/acre	Injection amount
Perspective®, Streamline® (2.75 oz)	90.75** oz solution
Perspective®, Streamline® (3.75 oz)	123.75 oz solution
Perspective®, Streamline® (4.75 oz)	156.75 oz solution
Perspective®, Streamline® (5.75 oz)	189.75 oz solution
Perspective®, Streamline® (6.75 oz)	222.75 oz solution
Perspective®, Streamline® (7.75 oz)	255.75 oz solution

**** Note:** 33 ounces of solution will contain 1 ounce of Perspective® or Streamline® herbicide.

Aircraft Calibration

Formula: Acres per minute = $\frac{\text{2 x swath width x miles per hour}}{1000}$

The chart below shows the rate, in acres per minute, at which spray or dry material can be applied when swath width and speed of aircraft are known. For swath widths or aircraft speeds other than those shown, interpolate or use combinations of the figures shown. To find the rate of flow in gallons per minute or pounds per minute, multiply the acres per minute figure by the number of gallons or pounds per acre to be applied.

Example: A 100 mph aircraft has a 40-foot effective swath. Follow the vertical 40-foot column down until the figure opposite 100 mph is intersected. The aircraft would cover 8.0 acres per minute. If 1 gallon of spray is to be applied per acre, the aircraft should be calibrated to disperse liquid at the rate of 1 x 8.0 or 8.0 gallons per minute. If 10 pounds of dry material is to be applied per acre, the aircraft should be calibrated to disperse material at the rate of 10 x 8.0 or 80 pounds per minute.

Acres-Per-Minute Chart

Speed mph	30' Swath	35' Swath	40' Swath	45' Swath	50' Swath	75' Swath	100' Swath	200' Swath	300' Swath	500' Swath
75	4.5	5.2	6.0	6.7	7.5	11.2	15.0	30.0	45.0	75.0
80	4.8	5.6	6.4	7.2	8.0	12.0	16.0	32.0	48.0	80.0
85	5.1	5.9	6.8	7.6	8.5	12.7	17.0	34.0	51.0	85.0
90	5.4	6.3	7.2	8.1	9.0	13.5	18.0	36.0	54.0	90.0
95	5.7	6.6	7.6	8.5	9.5	14.2	19.0	38.0	57.0	95.0
100	6.0	7.0	8.0	9.0	10.0	15.0	20.0	40.0	60.0	100.0
110	6.6	7.7	8.8	9.9	11.0	16.5	22.0	44.0	66.0	110.0
120	7.2	8.4	9.6	10.8	12.0	18.0	24.0	48.0	72.0	120.0
130	7.8	9.1	10.4	11.7	13.0	19.5	26.0	52.0	78.0	130.0
140	8.4	9.8	11.2	12.6	14.0	21.0	28.0	56.0	84.0	140.0
150	9.0	10.5	12.0	13.5	15.0	22.5	30.0	60.0	90.0	150.0

Dilution Rates for Spray Adjuvants

Approximate quantity of liquid material to be added to various quantities of water to get certain dilutions.

		Gallons of Water						
Dilution Desired	**%**	**100**	**50**	**25**	**10**	**5**	**2 1/2**	**1**
1 to 25	4	4 gal	2 gal	1 gal	51.2 fl oz	25.6 fl oz	12.8 fl oz	5.12 fl oz
1 to 33	3	3 gal	1.5 gal	3 qt	39 fl oz	20 fl oz	10 fl oz	4 fl oz
1 to 50	2	2 gal	1 gal	2 qt	26 fl oz	13 fl oz	6.5 fl oz	2.5 fl oz
1 to 100	1	1 gal	2 qt	1 qt	12.8 fl oz	6.4 fl oz	3.2 fl oz	8 tsp
1 to 200	1/2	2 qt	1 qt	1 pt	6.4 fl oz	3.2 fl oz	1.6 fl oz	4 tsp
1 to 400	1/4	1 qt	1 pt	1/2 pt	3.2 fl oz	1.6 fl oz	0.8 fl oz	2 tsp
1 to 600	1/6	1 1/3 pt	2/3 pt	1/3 pt	2.1 fl oz	1.1 fl oz	0.6 fl oz	1 1/3 tsp
1 to 800	1/8	1 pt	1/2 pt	1/2 cup	1.6 fl oz	0.8 fl oz	0.4 fl oz	1 tsp

Test Plot Conversion Table

1 kilogram (kg) = 1000 grams (g) = 2.2 lbs
1 gram (g) = 1000 milligrams (mg) = .0353 ounce
1 liter = 1000 milliliters (ml)
1 milliliter = .034 fluid ounces
1 milliliter of water weighs 1 gram
1 liter of water weighs 1 kilogram
1 lb = 453.6 grams
1 ounce = 28.35 grams
1 pt of water weighs approximately 1 lb
1 gallon of water weighs approximately 8.34 lbs
1 gallon = 4 qt = 3.785 liters
1 qt = 2 pt = .946 liters
1 pt = .473 liters
1 fluid ounce = 29.6 milliliters

1 part per million (ppm) = 1 milligram/liter
= 1 milligram/kilogram
= .0001 percent
= .013 ounces in 100 gallons of water

1 percent = 10,000 ppm
= 10 grams per kilogram
= 1.33 ounces by weight per gallon of water
= 8.34 ounces/100 gallons of water

.1 percent = 1000 ppm =1000 milligrams/liter
.01 percent = 100 ppm = 100 milligrams/liter
.001 percent = 10 ppm = 10 milligrams/liter
.0001 percent = 1 ppm = 1 milligram/liter

Capacity Measure — Liquid

Fluid ounce = 2 tablespoons
Fluid ounce = 6 teaspoons
Fluid ounce = 29.57 milliliters

Cup = 8 fluid ounces
Cup = 0.5 pint
Cup = 236.5 milliliters
Cup = 0.25 quart
Cup = 16 tablespoons
Cup = 48 teaspoons

Teaspoon = 5 milliliters
Teaspoon = 0.17 fluid ounce
Teaspoon = 60 drops

Tablespoon = 3 teaspoons
Tablespoon = 15 milliliters
Tablespoon = 0.5 fluid ounce

Pint = 2 cups
Pint = 16 fluid ounces
Pint = 473 milliliters
Pint = 0.125 gallon
Pint = 0.473 liter
Pint = 32 tablespoons

Quart = 32 fluid ounces
Quart = 2 pints
Quart = 946 milliliters
Quart = 0.25 gallon
Quart = 0.94 liter

Gallon = 128 fluid ounces
Gallon = 3,785 milliliters

Liter = 2.1 pints (liq.)
Liter = 1.06 quarts (liq.)

Common Conversion Factors

Multiply	By	To Get
Acres	43,560	Square feet
Acres	4,840	Square yards
Centimeters	0.3937	Inches
Centimeters	0.01	Meters
Centimeters	10	Millimeters
Feet	30.48	Centimeters
Feet	12	Inches
Feet	0.3048	Meters
Feet	1/3 or 0.33333	Yards
Feet per minute	0.01667	Feet per second
Feet per minute	0.01136	Miles per hour
Gallons	128	Ounces (liq.)
Gallons	8	Pints (liq.)
Gallons	4	Quarts (liq.)
Gallons of water	8.3453	Pounds of water
Grains	0.0648	Grams
Grams	15.43	Grains
Grams	0.001	Kilograms
Grams	1,000	Milligrams
Grams	0.0353	Ounces
Grams per liter	1,000	Parts per million

Common Conversion Factors (cont'd)

Multiply	By	To Get
Gallons of water	8.3453	Pounds of water
Grains	0.0648	Grams
Grams	15.43	Grains
Grams	0.001	Kilograms
Grams	1,000	Milligrams
Grams	0.0353	Ounces
Grams per liter	1,000	Parts per million
Inches	2.54	Centimeters
Inches	0.08333	Feet
Inches	0.02778	Yards
Kilograms	1,000	Grams
Kilograms	2.205	Pounds
Kilometers	3,281	Feet
Kilometers	1,000	Meters
Kilometers	0.6214	Miles
Kilometers	1,094	Yards
Liters	0.2642	Gallons
Liters	2.113	Pints (liq.)
Liters	1.057	Quarts (liq.)
Meters	100	Centimeters
Meters	3.281	Feet

Common Conversion Factors (cont'd)

Multiply	By	To Get
Meters	39.37	Inches
Meters	0.001	Kilometers
Meters	1,000	Millimeters
Meters	1.094	Yards
Miles	5,280	Feet
Miles	320	Rods
Miles	1,760	Yards
Miles per hour	88	Feet per minute
Miles per hour	1.467	Feet per second
Miles per minute	88	Feet per second
Miles per minute	60	Miles per hour
Ounces (dry)	437.5	Grains
Ounces (dry)	28.3495	Grams
Ounces (dry)	0.0625	Pounds
Ounces (liq.)	0.0078125	Gallons
Ounces (liq.)	29.573	Milliliters
Ounces (liq.)	0.0625	Pints (liq.)
Ounces (liq.)	0.03125	Quarts (liq.)
Parts per million	0.0584	Grains per U.S. gallon
Parts per million	0.001	Grams per liter
Parts per million	8.345	Pounds per million gallons

Common Conversion Factors (cont'd)

Multiply	By	To Get
Pints (dry)	0.5	Quarts (dry)
Pints (liq.)	0.125	Gallons
Pints (liq.)	0.4732	Liters
Pints (liq.)	16	Ounces (liq.)
Pints (liq.)	0.5	Quarts (liq.)
Pounds	7,000	Grains
Pounds	453.5924	Grams
Pounds	16	Ounces (liq.)
Pounds	0.0005	Tons
Quarts (dry)	2	Pints (dry)
Quarts (liq.)	0.25	Gallons
Quarts (liq.)	0.9463	Liters
Quarts (liq.)	32	Ounces (liq.)
Quarts (liq.)	2	Pints (liq.)
Rods	16.5	Feet
Square feet	144	Square inches
Square feet	0.11111	Square yards
Square inches	0.00694	Square feet
Square miles	640	Acres
Square miles	28,878,400	Square feet
Square miles	3,097,600	Square yards

Common Conversion Factors (cont'd)

Multiply	By	To Get
Square yards	0.0002066	Acres
Square yards	9	Square feet
Square yards	1,296	Square inches
Temperature (°C) + 17.98	1.8	Temperature (°F)
Temperature (°F) – 32	5/9 or 0.5555	Temperature (°C)
Ton	907.1849	Kilograms
Ton	32,000	Ounces
Ton	2,000	Pounds
Yards	3	Feet
Yards	36	Inches
Yards	0.9144	Meters
Yards	0.000568	Miles

Concentration of Chemicals in Soil — Parts Per Million (PPM)

Amount of Chemical Required to Give Indicated Concentration in Soil*

PPM Concentration in Soil	1 Square Foot to Soil Depth of			1000 Square Feet to Soil Depth of			1 Acre (43,560 Sq. Ft.) to Soil Depth of		
	1"	4"	12"	1"	4"	12"	1"	4"	12"
1	—	0.01 gm	0.04 gm	0.11 oz	0.43 oz	1.3 oz	0.3 lb	1.2 lb	3.5 lb
10	—	0.1 gm	0.4 gm	1.1 oz	4.3 oz	13 oz	3 lb	12 lb	35 lb
50	0.2 gm	0.7 gm	2 gm	5.4 oz	1.3 lb	4 lb	14 lb	58 lb	175 lb
100	0.38 gm	1.3 gm	4 gm	10.8 oz	2.7 lb	8 lb	29 lb	117 lb	350 lb
150	0.5 gm	2.0 gm	6 gm	1.0 lb	4.0 lb	12 lb	44 lb	175 lb	525 lb
200	0.8 gm	2.6 gm	8 gm	1.3 lb	5.3 lb	16 lb	58 lb	233 lb	700 lb
500	1.7 gm	6.7 gm	20 gm	3.3 lb	13.3 lb	40 lb	146 lb	583 lb	1,750 lb
1000	3.4 gm	13.4 gm	40 gm	6.7 lb	26.7 lb	80 lb	292 lb	1,167 lb	3,500 lb

* Assumes soil specific gravity of 1.3 equivalent to 81 pounds of dry soil per cubic foot. Modify amounts of chemical proportionately for higher or lower specific gravity soil.

Mixing Sequence by Formulation Type

Always follow the specified order on the product labels. Allow time for complete mixing and dispersion after addition of each product. If no sequence is recommended, then follow the order below:

DuPont Nonagricultural-Use Herbicide Products

1. Water-soluble bags.
2. DuPont™ Escort® XP, Krovar® I DF, Landmark® XP, Oust® Extra, Oust® XP, Oustar®, Perspective®, Streamline®, Telar® XP, Velpar® DF, Viewpoint®, Westar® and other water-dispersible granules.
3. DuPont™ Hyvar® X and other wettable powders.
4. Water-based suspension concentrates (aqueous flowables).
5. DuPont™ Hyvar® X-L,* Velpar® L and other water-soluble concentrates.
6. Other oil-based suspension concentrates.
7. Emulsifiable concentrates (EC).
8. Adjuvants such as surfactants, oils, suspension aids, colorants, etc.
9. Soluble fertilizers.
10. Drift retardants.

* NOTE: DO NOT tank mix Escort® XP, Krovar® I DF, Landmark® XP, Oust® Extra, Oust® XP, Oustar®, Perspective®, Streamline®, Telar® XP, Velpar® DF, Viewpoint® and Westar® herbicides with Hyvar® X-L herbicide. DO NOT add oils, surfactants or ECs prior to dry formulations since they will prevent adequate wetting and dispersion of the dry products.

Deactivating Herbicide Residues

It may be necessary, after an improper application of a soil residual herbicide, to deactivate that herbicide residue with activated charcoal. The use of activated charcoal (granular or powder) can reduce the herbicide residue by absorbing the herbicide onto the charcoal's surface.

Charcoal can reduce the available level of most, but not all, herbicides. This results in a more suitable growing environment in a shorter period of time. However, it is not possible to eliminate all chemical residue and the associated inherent risk.

Testing for Herbicide Residue

Herbicide analysis is expensive. If the undesired herbicide cannot be determined from a spray record, or from the injury symptoms found in the plant, certain labs can be utilized to determine the herbicide in question. As a general rule of thumb, an analysis showing a 1 part per million (ppm) soil residual in the top 3 inches of soil equals 1 pound active ingredient per acre.

A second method of testing would be to conduct a bioassay using plants sensitive to the herbicide. Growing sensitive plants in soil from the treated area can prove or disprove the presence of herbicidally active residues. This bioassay process takes about four weeks to complete.

Rate of Charcoal Application for DuPont™ Hyvar®, Krovar® I DF and Velpar® Herbicides

- Use 100 to 200 pounds of charcoal per pound of active ingredient. Use no less than 600 pounds charcoal per acre, or at the rate of 2 pounds per 100 square feet for smaller areas.

For DuPont™ Escort® XP, Landmark® XP, Oust® Extra, Oust® XP, Perspective®, Streamline®, Telar® XP, Viewpoint® herbicides and custom blends containing these products:

- Use 600 pounds of charcoal per acre for each ounce of herbicide. Use no less than 600 pounds charcoal per acre, or 2 pounds per 100 square feet.

Charcoal Application

Apply the charcoal, then mix it into the top 6 inches of the soil using a rototiller or similar incorporation implement. In cases where a high residue is expected, remove the top 6 inches of soil, then mix charcoal into the next 6 inches of soil. Back-fill the area with uncontaminated soil. Properly dispose of the contaminated soil that was removed.

A trenching method may be utilized to stop the lateral advancement of the unwanted herbicide by digging a 4- to 6-inch wide by 2-foot deep trench. Remove the contaminated soil and refill with new soil mixed with charcoal. This method is useful when attempting to protect trees.

After the charcoal application, fertilize lightly and water the plants to promote vigorous growth.

Notes

Notes

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DuPont Land Management Herbicides

Escort® XP herbicide
Hyvar® X herbicide
Hyvar® X-L herbicide
Krovar® I DF herbicide
Landmark® XP herbicide
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Matrix® SG herbicide
Oust® Extra herbicide
Oust® XP herbicide
Pastora® herbicide
Perspective® herbicide
Streamline® herbicide
Telar® XP herbicide
Throttle® XP herbicide
Velpar® DF herbicide
Velpar® L herbicide
Viewpoint® herbicide
Westar® herbicide

For more information

Contact your DuPont Representative or visit us on the Web at **landmanagement.dupont.com**.

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