

Laboratory

Pesticide Formulations, Labels, and Safety

I. Pesticide Formulations

Pesticides are rarely used in their pure form (technical grade). They are processed into a usable form for direct application. Formulation is the final physical condition in which the pesticide is sold for use. Formulations improve a pesticide's storage, handling, application, effectiveness, or safety properties.

Manufacturers usually add one or more inert (inactive) ingredients, such as solvents, wetting agents, spreaders, or emulsifiers. The resulting formulation is used as is in the package or diluted with water or another carrier. Factors to consider in choosing a formulation are:

- Type of application equipment required
- Cost of the material
- Danger of drift or runoff
- The crop to be treated
- Ease of handling

The formulation is always listed on the label. The following information gives a brief description of commonly used formulations and their abbreviations.

A. LIQUID FORMULATIONS

- 1) **Emulsifiable Concentrates (EC or E)** - Liquid formulations containing the active ingredient, one or more solvents, and an emulsifier which allows mixing in water. Most commonly, a concentrated oil solution of the technical grade material with emulsifier added to make the concentrate readily mix with water. An EC is the most common and cheapest carrier, but the most dangerous to humans.
- 2) **Solutions (S)** - Some pesticide active ingredients dissolve readily in a liquid solvent such as water or a petroleum-based solvent. When mixed with the solvent, these ingredients form a solution that will not settle out or separate. Formulations of these pesticides usually contain the active ingredient, the solvent and one or more other ingredients.
- 3) **Ultra-Low-Volume Concentrates (ULV)** - Liquid formulations which may be applied with specialized equipment as is or diluted with a small quantity of specified carrier. Designed to apply only in ounces per acre.
- 4) **Low-Concentrates (LC)** - These formulations, usually solutions in petroleum solvents, contain small amounts (usually 1 percent or less) of active ingredients per gallon. They are designed to be used without further dilution for structural pests, space sprays in barns, mosquito control, etc.
- 5) **Flowables (F or FL)** - Liquid formulations consisting of a finely ground active ingredient *suspended* in a liquid. Flowables are mixed with water for application.

- 6) **Aerosols** - These formulations contain one or more active ingredient and a solvent. There are two types of aerosol formulations-the ready-to-use type and those made for use in smoke or fog generators.
- 7) **Invert Emulsions** - Water-soluble pesticides dispersed in an oil carrier. Large droplets are formed which do not drift easily.

B. DRY FORMULATIONS

- 1) **Wettable Powders (WP or W)** - Dry, finely ground formulations which look like dusts. The active ingredient is combined with a finely ground, dry carrier, usually mineral clay, along with other ingredients that enhance the ability of the powder to suspend in water. Mixed with water for application as a spray.
- 2) **Dry Flowables (DF or WDG)** - Dry flowables, also known as water-dispersible granules, are like wettable powders except the active ingredient is formulated as a granule instead of a powder. Easier to pour and mix than wettable powders because there is less dust. The pesticide industry is beginning to use this formulation more and more commonly. It is usually the formulation of experimental compounds prior to labeling and sale.
- 3) **Dusts (D)** - Low percentage of active ingredient on a very fine dry inert carrier like talc, chalk or clay. Most are ready to use, but drift and inhalation is a danger.
- 4) **Baits** - Active ingredient mixed with food or other attractive substance.
- 5) **Granules (G)** - Most often used for soil applications. The active ingredient is coated or absorbed onto *coarse* particles like clay, ground walnut shells or ground corncobs. Similar to dusts except that the particles are much larger.
- 6) **Pellets (P or PS)** - Very similar to granules although pellets are usually more uniform (of a specific weight and shape).

C. OTHER FORMULATIONS

- 1) **Fumigants** - Pesticides which form poisonous gases when applied. Sometimes the active ingredients are gases that may become liquids when packaged under high pressure. Other active ingredients are volatile liquids when enclosed in an ordinary container and so are not formulated under pressure. They also become gases during application. Others are solids that release gases when applied under conditions of high humidity or in the presence of water vapor.
- 2) **Micro-Encapsulations** - Particles of a pesticide, either liquid or dry, surrounded by a plastic coating. Mixed with water and applied as a spray. Encapsulation makes timed release possible.

- D. CARRIERS** - A carrier is a solid, liquid, or gas substance used to dilute or suspend a herbicide during application. Cost and efficiency are very important factors in choosing a carrier, which is probably why water is the most commonly used carrier.
- 1) **Liquid Carriers** – Includes water, liquid fertilizers, diesel, and similar viscosity oils. Water is the most abundant, cheapest, and acts as a relatively good carrier. Problems may occur with dirty or hard water. Oil carriers, including diesel, are used for special applications such as dormant applications of herbicides on woody species. Oils tend to be very phytotoxic and are most suited for non-selective applications. However, vegetable and mineral oils are used with selective weed control treatments that contribute minimal phytotoxicity to the plant when used alone. They allow for increased cuticle saturation and penetration over water based carriers. Use of oil carriers usually increases the price per acre considerably.
 - 2) **Dry Carriers** – Used to apply herbicides without further dilution and are the major components of granules and pellets. They include attapulgit, kaolinite, vermiculite, dry fertilizers, and polymers of starch. Very commonly used in turf management applications.
 - 3) **Gas Carriers** – Unlike gasses and solids, gasses are used as propellants rather than as a suspension. Compressed air, carbon dioxide, and nitrogen. Not commonly used for herbicides, but fungicides and insecticides are commonly used with gas carriers.

II. Pesticide Labels

Labels contain all the information that you receive from the manufacturer about the product. A label is a “license to sell”. The label, by law, must be attached to every pesticide container. It acts as a source of facts on how to use the product correctly and legally. It also is an important source of information on proper treatment should poisoning occur.

Parts of a label include the following:

- (a) Brand, trade, or product name
- (b) Ingredient statement
- (c) Chemical name
- (d) Common name
- (e) Type of pesticide
- (f) Net contents
- (g) Name and address of manufacturer
- (h) Registration and establishment numbers
- (i) Signal words and symbols (Danger, Warning, Caution)
- (j) Precautionary statement
- (k) Statement of practical treatment
- (l) Environmental hazards
- (m) Physical or chemical hazards
- (n) Classification statement
- (o) Reentry statement
- (p) Storage and disposal
- (q) Directions for use

Zeneca

TOUCHDOWN® 5**HERBICIDE**

Nonselective Foliar Systemic Herbicide for Weed Control

ACTIVE INGREDIENT	
Sulfosate	48.6%
INERT INGREDIENTS	51.4%
TOTAL	100.0%

Contains 5 pounds active ingredient per gallon.

EPA Reg. No. 10182-429

KEEP OUT OF REACH OF CHILDREN**CAUTION****STATEMENT OF PRACTICAL TREATMENT**

IF SWALLOWED: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. If person is unconscious, do not give anything by mouth and do not induce vomiting.

IF ON SKIN: Wash with plenty of soap and water. Get medical attention.

IF IN EYES: Flush eyes with plenty of water. Call a physician if irritation persists.

CALL ZENECA'S MEDICAL EMERGENCY INFORMATION NETWORK AT 1-800-327-8633 (1-800-F-A-S-T-M-E-D) FOR 24-HOUR EMERGENCY MEDICAL ASSISTANCE.
CALL CHEMTREC AT 1-800-424-9300 FOR A CHEMICAL EMERGENCY such as a spill, leak, fire, or accident.

PRECAUTIONARY STATEMENTS**HAZARDS TO HUMANS AND DOMESTIC ANIMALS****CAUTION**

Harmful if swallowed or absorbed through skin. Causes moderate eye irritation. Avoid contact with eyes, skin, or clothing.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Socks and shoes
- Waterproof gloves

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

When handlers use closed systems, or enclosed cabs in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water by cleaning of equipment or disposal of equipment wash waters.

In case of spill, ISOLATE the spill. Absorb spill with inert absorbent material such as clay or Fuller's earth. Sweep up used absorbent and place in an appropriate chemical waste container. Flush spill area with water. Observe all local, State, and Federal laws and regulations regarding disposal, spill, cleanup, removal, or discharge.

DRIFT: Caution must be taken when applying TOUCHDOWN® 5 herbicide to avoid drift or contact with nontarget plant species. Such contact may result in plant injury.

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product should be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of

such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of ZENECA or Seller. All such risks shall be assumed by Buyer and User, and Buyer and User agree to hold ZENECA and Seller harmless for any claims relating to such factors.

ZENECA warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. This warranty does not extend to the use of this product contrary to label instructions, or under abnormal conditions or under conditions not reasonably foreseeable to or beyond the control of Seller or ZENECA, and Buyer and User assume the risk of any such use. ZENECA MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

In no event shall ZENECA or Seller be liable for any incidental, consequential or special damages resulting from the use or handling of this product. **THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF ZENECA AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF ZENECA OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

ZENECA and Seller offer this product, and Buyer and User accept it, subject to the foregoing conditions of sale and limitations of warranty and of liability, which may not be modified except by written agreement signed by a duly authorized representative of ZENECA.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

- Apply this product only as specified on the label.
- Do not apply this product through any type of irrigation system.
- Do not exceed a total of 6.4 pints of TOUCHDOWN 5 herbicide per acre per year.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval (REI). The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 12 hours.

PPE required for early entry into treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Waterproof gloves
- Shoes plus socks

NONAGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Keep people and pets off treated areas until spray solution has dried.

GENERAL INFORMATION

TOUCHDOWN 5 herbicide is a nonselective foliar systemic herbicide used to control a broad spectrum of emerged grass and broadleaf weeds, both annual and perennial, in:

- berries, fruits, nuts, vegetables, and vines specified on this label;
- conservation compliance/conservation reserve program (CRP);
- corn;
- fallow land and post harvest;
- soybeans;
- certain noncrop areas around the farm specified on this label.

TOUCHDOWN 5 herbicide is formulated as a liquid concentrate which contains 5 pounds active ingredient per gallon.

GENERAL USE PRECAUTIONS

- TOUCHDOWN 5 herbicide requires actively growing green plant tissue to function. Application to drought-stressed weeds, or weeds with little green foliage (i.e., mowed or cut weeds), may result in reduced weed control.
- TOUCHDOWN 5 herbicide does not provide residual control of weeds. Weeds emerging after application will require retreatment.
- Heavy rainfall or irrigation shortly after application may require retreatment.
- Do not till or mow within 3 days following application.
- DO NOT spray if conditions of thermal inversion exist, or if wind direction and speed may cause spray to drift onto adjacent nontarget areas. Drift minimization is the responsibility of the applicator. Consult with local and State agricultural authorities for information regarding avoiding or minimizing spray drift.
- It is recommended that the spray system be thoroughly cleaned with water and a commercial tank cleaner after each use.
- Stainless steel, plastic-lined steel, plastic, or fiberglass containers are acceptable for mixing and storing TOUCHDOWN 5 herbicide. TOUCHDOWN 5 herbicide should not be mixed or stored in galvanized steel or unlined steel containers. TOUCHDOWN 5 herbicide is not compatible with carbon steel and neoprene or butyl rubber.
- Any crop not listed on this label may be planted back into TOUCHDOWN 5 herbicide treated areas 35 days after application.
- Do not exceed a total of 6.4 pints of TOUCHDOWN 5 herbicide per acre per year.
- Do not graze or harvest treated cover crops for feed.

APPLICATION DIRECTIONS**TIMING**

TOUCHDOWN 5 herbicide should be applied to actively growing emerged weeds. Annual weeds of 6 inches or less in height are typically the easiest to control. Generally, more effective control of perennial weeds is achieved at the flowering or seed head stage. Refer to the "WEEDS CONTROLLED" section for specific application timing.

When annual weeds have been mowed or grazed, wait for 3 to 4 inches of new growth to appear prior to application. When perennial weeds have been mowed or grazed, allow new growth to reach the recommended stage prior to application.

RATES

Follow recommended rates for TOUCHDOWN 5 herbicide listed in the "WEEDS CONTROLLED" section. Use the higher label rates when weeds are dense or large. Also, use higher application volumes and pressures when weed vegetation is dense. The following table will assist in rate conversions:

LBS A/A	FL OZS/A	PINTS/A	ACRES/GALLON
0.5	12.8	0.8	10
0.625	16.0	1.0	8
0.75	19.2	1.2	6.7
1.0	25.6	1.6	5
1.5	38.4	2.4	3.3
2.0	51.2	3.2	2.5
3.0	76.8	4.8	1.7
4.0	102.4	6.4	1.25

SPRAY ADDITIVES

Surfactants/Wetting Agents—A nonionic surfactant (NIS) or wetting agent (approved for use on growing crops) may be used at levels up to 0.25% v/v (1 quart TOUCHDOWN 5 herbicide per 100 gallons) of finished spray volumes. All nonionic surfactants or wetting agents should contain at least 75% active ingredient.

Ammonium Sulfate (AMS)—Control of annual and perennial weeds with TOUCHDOWN 5 herbicide may be improved by adding dry ammonium sulfate at 1% to 2% by weight or 8.5 to 17 pounds per 100 gallons of water. Liquid formulations of AMS may be used at an equivalent rate. Use AMS in conservation compliance programs; noncrop areas; berries, fruits, nuts, vegetables, and vines specified on this label; and for preplant/preemergence applications. Do not reduce use rates of TOUCHDOWN 5 herbicide when using AMS.

TANKMIXES WITH RESIDUAL HERBICIDES

Refer to crop sections for recommended tankmixes. Tankmixes of TOUCHDOWN 5 herbicide with other pesticides, fertilizers, or any other additives except as specified on this label or other approved ZENECA supplemental labeling may result in tankmix incompatibility or unsatisfactory performance. It is recommended that the compatibility of any tankmix combination be tested on a small scale such as a jar test before actual tank mixing.

Always refer to labels of other pesticide products for mixing directions and precautions which may differ from those outlined here. Use in accordance with the most restrictive of label limitations and precautions. No label dosage rates should be exceeded. This product cannot be mixed with any product containing a label prohibition against such mixing.

Tank Mixing Recommendations:

1. Fill spray tank $\frac{1}{2}$ full with clean water.
2. Begin tank agitation and continue throughout mixing and spraying.

3. Add ammonium sulfate (if used).
4. Add dry formulations (WP, DF, etc.) to tank.
5. Add liquid formulations (SC, EC, L, etc.) to tank.
6. Add TOUCHDOWN 5 herbicide.
7. Add nonionic surfactant/wetting agent (if used).
8. Fill remainder of spray tank.

APPLICATION EQUIPMENT & TECHNIQUES

- Avoid drift. Do not apply in low level inversion conditions, when winds are gusty or under any other conditions which favor drift. Inversions are characterized by stable air and increasing temperatures with height above the ground. The applicator may detect the presence of an inversion by producing smoke and observing a smoke layer. Drift may cause damage to any vegetation contacted to which treatment is not intended.
- Drift control additives may be used with TOUCHDOWN 5 herbicide. Read and follow the manufacturer's directions for use.
- All aerial equipment must be properly maintained and washed to remove product residues after use.

Broadcast Applications

Ground—Applications should be made in 3 to 30 gallons of water per acre.

When foliage is dense, spray volume should be increased to ensure coverage of the target weeds. Flat-fan nozzles will result in the most effective application of TOUCHDOWN 5 herbicide. Spray boom and nozzle heights must be adjusted to provide coverage of target weed. Flood nozzles may result in reduced weed control due to inadequate coverage.

Air—Applications should be made in 3 to 15 gallons of water per acre.

Spray should be released at the lowest height consistent with effective weed control and flight safety. Applications more than 10 feet above the canopy should be avoided.

Use the largest droplet size consistent with good weed control. Formation of very small droplets may be minimized by appropriate nozzle selection, by orienting nozzles away from the air stream as much as possible, and by avoiding inappropriate spray boom pressure. Solid-stream or low-shear nozzles may be utilized to reduce small droplet formation. These nozzles direct the fluid parallel to the existing airflow to reduce shear effects. Other techniques may include reducing the fan angle of flat-fan nozzles if used, or reducing the deflector plate angle if deflector-type nozzles are used. Ensure the spray is released at an appropriate distance below the airflow.

For best results, each specific aerial application vehicle used should be quantifiably pattern tested for aerial application of TOUCHDOWN 5 herbicide initially and every year thereafter. To minimize drift, it is suggested aerial application equipment produce the following minimum spray deposition characteristics:

Volume Median Diameter (VMD)	> 400 microns
Volume Diameter (VD) {0.9}	> 200 microns

Spot Treatments—For annual weeds less than 6 inches, use a 0.75% v/v solution (3 quarts TOUCHDOWN 5 herbicide per 100 gallons of finished spray solution). For annual weeds over 6 inches, use a 1.25% v/v solution. Use a 1% to 2% v/v solution for most perennials (see "TABLE 4" for specific rates and timing). When using motorized spot spray equipment (rider bar), use a 3% v/v solution. Spray the solution on actively growing weeds until uniformly wet but not to the point of runoff. Retreat 14 to 21 days later if regrowth occurs.

TOUCHDOWN 5 HERBICIDE HERBICIDE SPOT SPRAY DILUTION TABLE

Solution Strength	To Make This Volume			
	1 Gallon	10 Gallons	25 Gallons	100 Gallons
0.75%	1 fl. oz.	0.6 pint	1 1/2 pints	3 quarts
1%	1 1/2 fl. oz.	0.8 pint	2 pints	1 gallon
1.25%	1 3/4 fl. oz.	1 pint	2 1/2 pints	5 quarts
1.5%	2 fl. oz.	1 1/4 pints	3 pints	6 quarts
2%	2 1/2 fl. oz.	1 1/2 pints	4 pints	2 gallons
3%	4 fl. oz.	2 1/2 pints	6 pints	3 gallons

Wiper Application—TOUCHDOWN 5 herbicide may be applied using a wiper or "wick" applicator for selective control or suppression of annual and perennial weeds which become taller than the crop or desirable vegetation. Mix 1 quart of TOUCHDOWN 5 herbicide in 1 gallon of water. Precautions should be taken to avoid contact with crops or desirable vegetation. Equipment should be operated at speeds of 5 mph or less. Use slower speeds where weeds are dense. For improved control, make 2 applications in opposite directions. Do not use wiper applications in corn or in bearing grape vineyards.

CROPS

This section is organized alphabetically by crop categories. There may be several crops listed in a crop category.

Any crop not listed on this label may be planted back into TOUCHDOWN 5 herbicide treated areas 35 days after TOUCHDOWN 5 herbicide application.

BERRIES, FRUITS, NUTS, VEGETABLES, AND VINES

TOUCHDOWN 5 herbicide may be used on both bearing and nonbearing crops listed in the following table.

BEARING CROPS

Almonds	Citrus Citron	Peach
Apricot	Filberts (Hazelnuts)	Pecans
Beech Nuts	Grapefruit	Plums (All)
Brazil Nuts	Grapes (All)	Plumcot
Butternuts	Hickory Nuts	Prune
Calamondin	Kumquat	Pummelo
Cashews	Lemon	Satsuma Mandarin
Cherry (sweet, sour, tart)	Lime	Tangelo
Chestnuts	Macadamia Nuts	Tangerine
Chinquapins	Mandarin	Tangor
Chironja	Nectarine	Walnuts (Black, English)
Citron	Orange (All)	

NONBEARING CROPS

TOUCHDOWN 5 herbicide can be used 1 year or more prior to harvest in these crops.

Acerola (West Indian Cherry)	Currants	Olallieberry
Apple	Dates	Olives
Artichokes	Dewberry	Papayas
Asparagus	Elderberry	Passion Fruit
Atemoya	Figs	Pears
Avocados	Genip	Persimmons
Bananas	Ginseng	Pineapple
Blackberry	Gooseberry	Pistachios
Blueberry	Guava	Plantains
Boysenberry	Huckleberry	Pomegranates
Breadfruit	Jaboticaba	Quince
Canistel	Jackfruit	Raspberry (Black, Red)
Carambola	Jojoba	Sapodilla
Cherimoya	Kiwi	Sapote
Cocoa Bean	Loganberry	Soursop
Coconut	Longan	Sugar Apple
Coffee	Loquat	Tamarind
Crabapple	Lychee	Tea
Cranberry	Mango	Youngberry
	Mayhaw	

Method of Application: Preplant; preemergence; directed spray (except Cranberry); middles (between rows of trees); strips (in rows of trees); perennial grass suppression (chemical mowing); and wiper/wick applicator equipment.

GENERAL USE

Applications may be made with boom equipment; shielded sprayers; CDA; hand-held and high-volume wands; lances; orchard guns; or wiper/wick application equipment, except as directed in the "GENERAL USE PRECAUTIONS FOR BERRIES, FRUITS, NUTS, VEGETABLES, AND VINES" section. Follow directions listed in the "APPLICATION DIRECTIONS," "SPRAY ADDITIVES," and "APPLICATION EQUIPMENT AND TECHNIQUES" sections of this label. Refer to the "WEEDS CONTROLLED" section for application rates and timing. Multiple applications may be necessary to control certain perennial weeds, and weeds originating from underground parts (rhizomes, stolons, tubers) that are initially untreated. Do not apply more than 6.4 pints of TOUCHDOWN 5 herbicide per acre per year. For residual weed control, tank mix TOUCHDOWN 5 herbicide with residual herbicides as prescribed in the "TANK MIXTURES FOR BERRIES, FRUITS, NUTS, VEGETABLES, AND VINES" section, or make multiple applications.

GENERAL USE PRECAUTIONS FOR BERRIES, FRUITS, NUTS, VEGETABLES, AND VINES

- Do not allow the spray, spray drift, or mist to contact foliage, fruit, shoots, branches, canes, suckers, open wounds, or other green parts of crops. Contact with any crop part other than mature brown woody bark can result in severe crop injury.
- Avoid contact with stumps as injury to adjacent trees may occur from root grafting.
- For PEACHES grown in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee, apply TOUCHDOWN 5 herbicide with a shielded applicator which prevents contact with foliage, suckers, or bark of trees. Apply no later than 90 days after first bloom to avoid severe damage. Avoid application to peach trees with recent mechanical injury or pruning wounds. Apply only near trees which have been planted in the orchard for two or more years. SEVERE INJURY WILL OCCUR IF ANY PORTION OF THE PEACH TREE IS CONTACTED WITH SPRAY OR SPRAY DRIFT.
- For APRICOTS, NECTARINES, PEACHES, PLUMS, and PRUNES grown in Arizona, California, Colorado, Idaho, Kansas, Kentucky, New Jersey, North Dakota, Oklahoma, Oregon, Texas, Utah, and Washington, any application equipment listed for these crops may be used.
- For APRICOTS, NECTARINES, PEACHES, PLUMS, and PRUNES grown in all other states not previously listed, use only wiper/wick application equipment.
- For GRAPES grown in the Great Lakes and northeast regions, apply TOUCHDOWN 5 herbicide prior to the end of bloom stage to avoid injury, or apply with shielded equipment.
- For COFFEE and BANANA, delay application 3 months after transplanting to allow the new plants to become established.
- Allow at least 13 days from the last application to harvest of citrus or stone fruit.
- Allow at least 14 days from the last application to harvest of grapes.

- Allow at least 20 days from the last application to harvest of nuts.

TANK MIXTURES WITH RESIDUAL HERBICIDES FOR BERRIES, FRUITS, NUTS, VEGETABLES, AND VINES

TOUCHDOWN 5 herbicide can be tank mixed with the following herbicides for control or suppression of annual and perennial weeds provided that the tankmix product label allows use of the product. Apply TOUCHDOWN 5 herbicide at 1.2 to 6.4 pints per acre for control or suppression of annual and perennial weeds. For control or suppression of dense populations or weeds greater than 12 inches in height or weeds under stress, use rates at the higher end of the rate range.

DEVRINOL®	Krovar®	Sim-Tro®
Dirax®	Princep® 4L	Sinbar®
Goal®	Princep® Caliber 90®	Solicam®
Karmex®	Prowl®	Surflan®
Kerb®	Simazine	2,4-D

Refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved crops, and a list of weeds controlled.

HARD TO CONTROL WEED RECOMMENDATIONS IN CITRUS (FLORIDA AND TEXAS ONLY)

To control or suppress the perennial weeds listed in the following table, apply the recommended rate of TOUCHDOWN 5 herbicide in 3 to 30 gallons of water per acre. Use 10 to 30 gallons per acre if weed foliage is dense. Apply when weeds are actively growing. Refer to the "PERENNIAL WEED CONTROL" section, "TABLE 4," for application timing. If weeds have been mowed or grazed, allow new growth to reach recommended growth stage prior to application.

Weed Species	Rate of TOUCHDOWN 5 Herbicide (Pints per Acre)			
	1.6	3.2	4.8	6.4
Bermudagrass	B	B	PC	C
Guineagrass				
Texas and Florida Ridge	B	C	C	C
Florida Flatwoods	NR	B	C	C
Paragrass	B	C	C	C
Torpedograss	NR	S	PC	PC

B = Burndown

C = Control

NR = Not Recommended

PC = Partial Control

S = Suppression

PERENNIAL GRASS SUPPRESSION (CHEMICAL MOWING) OF ORCHARD FLOORS**BAHIA GRASS**

TOUCHDOWN 5 herbicide can be used to inhibit seed head emergence and suppress vegetative growth for approximately 40 to 50 days with a single application. By using a sequential application, suppression of vegetative growth and inhibition of seed head emergence can be extended to 120 days. Applications must be made prior to seed head emergence. Apply TOUCHDOWN 5 herbicide at 20 to 30 days after complete green-up or after mowing to 4 inches tall. When a single application is planned, use 5 fluid ounces of TOUCHDOWN 5 herbicide per acre in 10 to 20 gallons of water. When a sequential application is planned, use 3½ fluid ounces per acre for the first application, followed by another application of 3½ fluid ounces per acre 40 to 50 days later.

BERMUDAGRASS**For Suppression Only**

East of the Rocky Mountains—Apply 5 to 12 fluid ounces of TOUCHDOWN 5 herbicide in 3 to 20 gallons of water per acre. Make the application 2 weeks after complete green-up or after 3 to 4 inches of regrowth following mowing. Use 5 to 8 fluid ounces per acre if a lesser degree of suppression is desired. A sequential application can be used when regrowth occurs.

West of the Rocky Mountains—Apply 12 fluid ounces of TOUCHDOWN 5 herbicide in 3 to 10 gallons of water per acre. Make the application 2 weeks after complete green-up or after 3 to 4 inches of regrowth following mowing. A sequential application can be used when regrowth occurs.

For Partial Control and Burndown

TOUCHDOWN 5 herbicide can be used for burndown and partial control of bermudagrass at 1.6 to 3.2 pints in 3 to 20 gallons of water per acre. Use 1.6 pints east of the Rocky Mountains and 3.2 pints west of the Rocky Mountains.

Use this treatment only if reduction of the bermudagrass stand can be tolerated. Allow at least 21 days for complete burndown.

COOL SEASON GRASS COVERS (Fine Fescue, Kentucky Bluegrass, Orchardgrass, Quackgrass, Tall Fescue)

For suppression of orchardgrass, fine fescue, tall fescue, and quackgrass, apply 6 fluid ounces of TOUCHDOWN 5 herbicide in 10 to 20 gallons of water per acre. Add AMS. See "SPRAY ADDITIVES" section for rates.

For suppression of Kentucky bluegrass, use 5 fluid ounces of TOUCHDOWN 5 herbicide. Do not add AMS for suppression of Kentucky bluegrass.

CONSERVATION COMPLIANCE/CONSERVATION RESERVE PROGRAM (CRP)

Method of Application: Renovation (rotating out of CRP), site preparation (sequential herbicide applications), dormant beneficial plant management.

- Renovation/Site Preparation: Prior to application, removal of excessive vegetation by grazing, mowing, burning, etc. may improve control. When annual weeds have been mowed or grazed, wait for 3 to 4 inches of new growth before application. When perennial weeds have been mowed or grazed, allow regrowth to reach recommended stage (see "PERENNIAL WEED CONTROL" section, "TABLE 4" for rates and timing).

Sequential applications of TOUCHDOWN and GRAMOXONE® EXTRA herbicides are effective in controlling established CRP grasses. Refer to the GRAMOXONE EXTRA herbicide label for recommended rates and tankmixes.

TOUCHDOWN 5 herbicide/GRAMOXONE EXTRA HERBICIDE SEQUENTIAL PROGRAM: (Spring Application)

WEED SPECIES	PROGRAM A	PROGRAM B
Fescue Orchardgrass Ryegrass	GRAMOXONE EXTRA herbicide at 2 to 2.5 pints per acre followed 7 to 10 days later with GRAMOXONE EXTRA herbicide at 2 to 2.5 pints per acre	TOUCHDOWN 5 herbicide at 1.6 to 2.0 pints per acre followed 10 to 14 days later with GRAMOXONE EXTRA herbicide at 2 to 2.5 pints per acre

- Dormant Beneficial Plant Applications: Apply 0.6 to 0.8 pints per acre in early spring before desirable species, such as crested and tall wheatgrass, break dormancy. Late fall applications can be made after desirable grasses have reached dormancy. If perennial grasses are not dormant at time of application, stunting can occur.
- TOUCHDOWN 5 herbicide may be tank mixed with other herbicides registered for this use.
- Any crops not listed on this label may be planted back into TOUCHDOWN 5 herbicide treated areas 35 days after application provided plant back is not prohibited by labels of other products if used in a tank mix or sequential application.

CORN (Field Corn, Popcorn, and Seed Corn)

Method of Application: Before, during, or after planting but before crop emergence; spot spray; and post harvest.

Follow the directions listed in the "APPLICATION DIRECTIONS," "SPRAY ADDITIVES," and "APPLICATION EQUIPMENT AND TECHNIQUES" sections. Refer to the "WEEDS CONTROLLED" section for rates and timing.

GENERAL USE PRECAUTIONS FOR CORN

- Spot application must be made at least 90 days before harvest of corn grain or corn fodder.
- Avoid contact with corn foliage.
- Do not use on sweet corn.
- Do not apply more than 6.4 pints per acre per year.

TANK MIXTURES FOR CORN

For Control of Annual Weeds in a Residual Herbicide Tankmix: Refer to the "ANNUAL WEEDS CONTROLLED" section, "TABLE 1" and "TABLE 2," for application rates and timing. Apply TOUCHDOWN 5 herbicide at 1.2 to 4.8 pints per acre for the control of annual weeds that are less than 6 inches tall and actively growing. When annual weeds are taller than 6 inches or under stress, use 1.6 to 4.8 pints per acre of TOUCHDOWN 5 herbicide.

For Control or Suppression of Perennial Weeds in a Residual Herbicide Tankmix: Refer to the "PERENNIAL WEEDS CONTROLLED" section, "TABLE 4," for application rates and timing. Use rates at the higher end of the rate range when weed populations are dense or plants are under stress. Perennial weeds may require multiple applications for control. If multiple applications are required, then no more than 6.4 pints of TOUCHDOWN 5 herbicide should be applied per year.

UAN may be used as a carrier at 10 to 70 gallons per acre with 2,4-D, Banvel®, or any residual herbicides on the following list. For use with 2,4-D and Banvel on annual and perennial weeds, consult "TABLE 3" and "TABLE 4." Reduced weed control may occur on certain weeds as a result of UAN foliar burn which can reduce uptake of TOUCHDOWN 5 herbicide.

TOUCHDOWN 5 herbicide can be tank mixed with the following products:

AMBUSH®	Dual II®	Linex®
Atrazine	Dual II Magnum™	Lorox®
Banvel	Extrazine® II	Marksman®
Basis®	Frontier® II	Micro-Tech®
Bicep®	FULTIME™	Prowl
Bicep II®	Guardsman®	Simazine
Bicep II Magnum™	Harness®	SURPASS® EC
Bladex®	Harness Xtra	SURPASS 100
Broadstrike®	Hornet™	TOPNOTCH®
Bullet®	Lariat®	WARRIOR®
Clarity®	Lasso®	2,4-D
Dual®	Lighting™	

Refer to individual product labels for precautionary statements, restrictions, rates, and a list of weeds controlled.

FALLOWLAND AND POST HARVEST USE

Refer to "WEEDS CONTROLLED" section for use rates. Repeat applications may be necessary to control weeds emerging after application. Use the higher rate on heavy or sodded infestations. Allow sufficient time for regrowth to occur after harvest, prior to application. Avoid application after plants have been exposed

to severe frost. Any crops not listed on this label may be planted back into TOUCHDOWN 5 herbicide treated areas 35 days after application.

FARMSTEAD (NONCROP)

- Applications can be made in noncrop areas around the farm such as:

Farmyards	Rights-of-way
Soil Bank Land	Barrier Strips
Farm Buildings	Equipment Areas
Fuel Storage Areas	Fence Rows

- Refer to "WEEDS CONTROLLED" section for application rates and timing.
- Avoid contact with the foliage of ornamentals or other desirable plants.
- Repeat applications may be necessary.

SOYBEANS

Method of Application: Before, during, or after planting, but before crop emergence; spot spray; wiper/wick; post harvest.

Follow the directions listed in the "APPLICATION DIRECTIONS," "SPRAY ADDITIVES," and "APPLICATION EQUIPMENT AND TECHNIQUES" sections. Refer to "WEEDS CONTROLLED" section for rates and timing.

GENERAL USE PRECAUTIONS FOR SOYBEANS

- Spot application must be made at least 8 weeks before harvest.
- Wiper/wick application must be made at least 7 days before harvest.
- Avoid contact with soybean foliage.
- Do not apply more than 6.4 pints per acre per year as a combination of broadcast sprays prior to crop emergence and as spot spray and wiper applications.

TANK MIXTURES FOR SOYBEANS

For Control of Annual Weeds in a Residual Herbicide Tankmix: Refer to the "ANNUAL WEEDS CONTROLLED" section, "TABLE 1" and "TABLE 2," for application rates and timing. Apply TOUCHDOWN 5 herbicide at 1.2 to 4.8 pints per acre for the control of annual weeds that are less than 6 inches tall and actively growing. When annual weeds are taller than 6 inches or under stress, use 1.6 to 4.8 pints per acre of TOUCHDOWN 5 herbicide.

For Control or Suppression of Perennial Weeds in a Residual Herbicide Tankmix: Refer to the "PERENNIAL WEEDS CONTROLLED" section, "TABLE 4," for application rates and timing. Use rates at the higher end of the rate range when weed populations are dense or plants are under stress. Perennial weeds may require multiple applications for control. If multiple applications are required, then no more than 6.4 pints of TOUCHDOWN 5 herbicide should be applied per year.

For use with 2,4-D on perennial weeds, consult "TABLE 4."

TOUCHDOWN 5 herbicide can be tank mixed with the following products:

Authority™	Frontier	Prowl
Authority Broadleaf	FUSION®	Pursuit®
Broadstrike	Gemini®	Pursuit Plus
Canopy®	KARATE®	REFLEX®
Canopy XL	Lasso	Scepter®
Command®	Lexone®	Sencor®
Cover®	Linex	Squadron®
Dual	Lorox	Steel®
Dual II	Lorox Plus	Turbo®
Dual II Magnum	Partner®	WARRIOR
FirstRate™	Preview®	2,4-D

Refer to individual product labels for precautionary statements, restrictions, rates, and a list of weeds controlled.

WEEDS CONTROLLED

Water volumes of 3 to 30 gallons per acre by ground equipment and 3 to 15 gallons by air are recommended.

When tank mixing with residual herbicides, refer to the individual crop section for recommendations.

Apply to actively growing weeds.



Table 1
NORTH/SOUTH REGION
ANNUAL WEED CONTROL—TOUCHDOWN 5 HERBICIDE RATES

Use the higher end of the rate range when stressful growing conditions or dense plant populations exist.

Weed Species	Scientific Names	Pints per Acre				
		Maximum Weed Height/Length (Inches)				
		3	6	12	18	18+
Barley	<i>Hordeum vulgare</i>				0.8 to 1.2	1.2 to 1.6
Barnyardgrass	<i>Echinochloa crus-galli</i>	0.8	1.2 to 1.6	1.6 to 3.2		
Black Nightshade	<i>Solanum nigrum</i>		0.8 to 1.2	1.2 to 2.4		
Bluegrass, Annual	<i>Poa annua</i>		0.6 to 0.8	0.8		
Bluegrass, Bulbous	<i>Poa bulbosa</i>			0.8		
Brome, Downy ¹	<i>Bromus tectorum</i>		0.6 to 0.8	1.0		
Brome, Japanese	<i>Bromus japonicus</i>	0.6	0.8	1.0		
Buckwheat, Wild ²	<i>Polygonum convolvulus</i>		1.6			
Camphorweed	<i>Heterotheca subaxillaris</i>		2.4			
Carolina Geranium ³	<i>Geranium carolinianum</i>	1.6 to 2.4	2.4 to 3.2			
Cheat	<i>Bromus secalinus</i>	0.6	0.8	1.0	1.2	
Chickweed, Common	<i>Stellaria media</i>		0.6 to 0.8	0.8	1.2	
Chickweed, Mouseear	<i>Cerastium vulgatum</i>		0.6 to 0.8	0.8	1.2	
Cocklebur, Common	<i>Xanthium strumarium</i>			0.8	1.2 to 1.6	1.6 to 2.4
Corn ⁴	<i>Zea mays</i>			0.8	1.0 to 1.6	
Crabgrass ⁵	<i>Digitaria</i> spp.			0.8 to 1.2	1.2 to 1.6	
Crowfootgrass	<i>Dactyloctenium aegyptium</i>	0.8	1.2 to 1.6	1.6 to 3.2		
Cutleaf Evening-primrose ³	<i>Oenothera laciniosa</i>	1.6 to 2.4	2.4 to 3.2			
Fall Panicum	<i>Panicum dichotomiflorum</i>	0.8 to 1.2	1.2 to 1.6	1.6 to 2.4		
Filaree	<i>Erodium</i> spp.			2.4		
Fleabane, Annual	<i>Erigeron annuus</i>		0.8 to 1.2		1.2 to 2.4	
Fleabane, Hairy	<i>Conyza bonariensis</i>		0.8 to 1.2	1.2 to 2.4		
Fleabane, Rough	<i>Erigeron strigosus</i>		0.8 to 1.2	1.6 to 2.4		
Foxtail (North)	<i>Setaria</i> spp.				0.8	1.0 to 1.6
Foxtail (South)	<i>Setaria</i> spp.		0.8	0.8 to 1.2	1.2 to 1.6	
Goatgrass, Jointed	<i>Aegilops cylindrica</i>		0.8	1.0		
Goosegrass	<i>Eleusine indica</i>	0.8	1.2	1.6 to 2.4		2.4
Groundsel, Common	<i>Senecio vulgaris</i>		0.8			
Hemp Sesbania ³	<i>Sesbania exaltata</i>	1.2	1.6 to 2.4			
Henbit ³	<i>Lamium amplexicaule</i>		1.6	2.4		
Hop-bornbeam Copper-leaf	<i>Acalypha ostryifolia</i>	1.6	2.4			
Horseweed/Marestail (North)	<i>Conyza canadensis</i>		0.8 to 1.2	1.2 to 1.6	1.6	
Horseweed/Marestail (South)	<i>Conyza canadensis</i>			1.2 to 1.6	1.6	1.6 to 2.4
Johnsongrass, Seeding	<i>Sorghum halepense</i>			1.0	1.2	2.4
Kochia	<i>Kochia scoparia</i>	0.8	1.2 to 1.6	1.6 to 2.4		
Lambquarters, Common	<i>Chenopodium album</i>		0.8 to 1.6	1.6	2.4	
Lettuce, Prickly	<i>Lactuca serriola</i>		0.8 to 1.2	1.2 to 1.6		1.6 to 2.4
Morningglory ^{3,6}	<i>Ipomoea</i> spp.	1.2 to 1.6	1.6 to 3.2			
Mustard, Blue	<i>Chorispora tenella</i>		0.6 to 0.8	1.0		1.2
Mustard, Tansy	<i>Descurainia pinnata</i>		0.6 to 1.0	1.2		1.2
Mustard, Tumble	<i>Stybridium altissimum</i>		0.6 to 0.8	1.0		1.2
Mustard, Wild	<i>Sinapis arvensis</i>		0.6 to 0.8	0.8		1.2

Weed Species	Scientific Names	Pints per Acre				
		Maximum Weed Height/Length (Inches)				
		3	6	12	18	18+
Oats	<i>Avena sativa</i>		0.8			1.2 to 1.6
Oats, Wild	<i>Avena fatua</i>			0.8 to 1.2		
Panicum, Texas	<i>Panicum texanum</i>		0.8 to 1.0	1.6 to 2.4		
Pennycress, Field	<i>Thlaspi arvense</i>		0.6 to 1.0	1.0 to 1.6		
Pigweed	<i>Amaranthus</i> spp.		0.8	0.8 to 1.0		1.6
Prickly Sida (Teaweed) ^{3,6}	<i>Sida spinosa</i>	1.6 to 2.0	2.4 to 3.2			
Pusley, Florida	<i>Richardia scabra</i>			1.6 to 3.2		
Ragweed, Common	<i>Ambrosia artemisiifolia</i>		0.8 to 1.2	1.2 to 2.4		
Ragweed, Giant	<i>Ambrosia trifida</i>	1.2	1.6	2.4		2.4 to 3.2
Red Rice	<i>Oryza sativa</i>	1.6	2.4 to 3.2			
Rocket, London	<i>Sisymbrium irio</i>		0.8	1.0		
Rye (North)	<i>Secale cereale</i>			0.8 to 1.2	1.2 to 1.6	1.6 to 2.4
Rye (South)	<i>Secale cereale</i>		0.8	1.2	1.2 to 1.6	1.6 to 2.4
Ryegrass, Italian	<i>Lolium multiflorum</i>		1.6	2.4 to 3.2		
Sandbur, Field	<i>Cenchrus incertus</i>			0.6		
Shattercane	<i>Sorghum bicolor</i>			0.8 to 1.0	1.2	
Shepherdspurse	<i>Capsella bursa-pastoris</i>		0.8 to 1.0	1.2 to 1.6		
Sicklepod	<i>Senna obtusifolia</i>	1.6	2.4 to 3.2			
Signalgrass, Broadleaf	<i>Brachiaria platyphylla</i>	0.8	1.2 to 1.6	2.4 to 3.2		
Smartweed, (Ladysthumb)	<i>Polygonum persicaria</i>	0.8 to 1.0	1.2 to 1.6	1.6 to 2.4		
Smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>	0.8 to 1.0	1.2 to 1.6	1.6 to 2.4		
Sowthistle, Annual	<i>Sonchus oleraceus</i>		1.6	2.4		
Spanishneedles	<i>Bidens bipinnata</i>		1.6	1.6 to 2.4	2.4	
Sprangletop	<i>Leptochloa</i> spp.		0.8	1.2		1.6
Spurge	<i>Euphorbia</i> spp.		0.8	1.2		1.6
Stinkgrass	<i>Eragrostis ciliataensis</i>	0.6	0.8			
Sunflower, Common	<i>Helianthus annuus</i>		0.8 to 1.0	1.0 to 1.2	1.2 to 1.6	
Thistle, Russian	<i>Salsola ibericus</i>		1.6	1.6 to 2.4		
Velvetleaf ⁶ (North)	<i>Abutilon theophrasti</i>	0.8 to 1.2	1.2 to 1.6	1.6 to 2.4	3.2	
Velvetleaf ⁶ (South)	<i>Abutilon theophrasti</i>	1.2	1.6	2.4		
Virginia Copper-leaf	<i>Acalypha virginica</i>	1.6	2.4			
Waterhemp	<i>Amaranthus</i> spp.		0.8	1.0		
Wheat (North)	<i>Triticum aestivum</i>				0.8 to 1.2	1.2 to 2.4
Wheat (South)	<i>Triticum aestivum</i>		0.8 to 1.2			1.2 to 2.4
Witchgrass	<i>Panicum capillare</i>			0.8		
Woolly Cup Grass	<i>Eriochloa villosa</i>		0.8 to 1.2	1.2 to 1.6		

¹In no-till systems, use 1 pint per acre.

²Maximum runner length.

³When the predominant weed species include Carolina geranium, cutleaf evening-primrose, fescue, hemp sesbania, henbit, morningglory, prickly sida, and vetch that are less than 6 inches tall, GRAMOXONE EXTRA herbicide should be considered as an alternative.

⁴Will not control glyphosate-tolerant volunteer corn.

⁵Plant diameter.

⁶Multiple applications may be required.

Table 2
WESTERN REGION
ANNUAL WEED CONTROL—TOUCHDOWN 5 HERBICIDE RATES
Use the higher end of the rate range when stressful growing conditions or dense plant populations exist.

Weed Species	Scientific Names	Pints per Acre			
		Maximum Weed Height/Length (Inches)			
		4	6	12	18
Barley	<i>Hordeum vulgare</i>		0.8	0.8 to 1.2	1.2 to 2.4
Barnyardgrass	<i>Echinochloa crus-galli</i>		0.8 to 1.6		
Bluegrass, Annual	<i>Poa annua</i>		0.8 to 1.6		
Bluegrass, Bulbous	<i>Poa bulbosa</i>		0.8 to 1.6		
Brome, Downy ¹	<i>Bromus tectorum</i>		0.8 to 1.6		
Buttercup	<i>Ranunculus</i> spp.			0.8 to 1.6	
Canarygrass	<i>Phalaris canariensis</i>		0.8 to 1.6		
Cheat	<i>Bromus secalinus</i>		0.8 to 1.6		
Chickweed, Common	<i>Stellaria media</i>		0.8 to 1.6		
Chickweed, Mouseear	<i>Cerastium vulgatum</i>		0.8 to 1.6		
Cocklebur, Common	<i>Xanthium strumarium</i>			0.8 to 1.6	
Corn ²	<i>Zea mays</i>		0.8 to 1.6		
Crabgrass	<i>Digitaria</i> spp.			0.8 to 2.0	
Dwarf-dandelion, Virginia	<i>Krigia virginica</i>		0.8 to 1.6		
Fall Panicum	<i>Panicum dichotomiflorum</i>			0.8 to 2.0	
False Flax, Small-seeded	<i>Camelina microcarpa</i>			0.8 to 2.0	
Fiddleneck	<i>Amsinckia</i> spp.		0.8 to 1.6		
Filaree	<i>Erodium</i> spp.			2.4 to 4.0	
Foxtail	<i>Setaria</i> spp.			0.8 to 1.6	
Goatgrass, Jointed	<i>Aegilops cylindrica</i>		0.8 to 2.0		
Goosefoot, Nettleleaf	<i>Chenopodium murale</i>		0.8 to 1.6		
Groundcherry	<i>Physalis</i> spp.		1.6 to 2.4		
Groundsel, Common	<i>Senecio vulgaris</i>		0.8 to 2.0		
Henbit	<i>Lamium amplexicaule</i>		0.8 to 2.0		
Horseweed/Marestail	<i>Conyza canadensis</i>		0.8 to 2.0		
Johnsongrass, Seedling	<i>Sorghum halepense</i>			0.8 to 1.6	
Kochia	<i>Kochia scoparia</i>	0.8 to 1.2	1.2 to 1.6		
Lambsquarters, Common	<i>Chenopodium album</i>		0.8 to 2.0		
Morningglory ³	<i>Ipomoea</i> spp.	0.8 to 2.0			
Mustard, Blue	<i>Chorispora tenella</i>		0.8 to 1.6		
Mustard, Tansy	<i>Descurainia pinnata</i>		0.8 to 1.6		
Mustard, Tumble	<i>Sisymbrium altissimum</i>		0.8 to 1.6		
Mustard, Wild	<i>Sinapis arvensis</i>		0.8 to 1.6		
Nightshade	<i>Solanum</i> spp.		1.6 to 2.4		
Oats	<i>Avena sativa</i>		0.8 to 1.0	0.8 to 1.6	1.2 to 2.4
Oats, Wild	<i>Avena fatua</i>			0.8 to 1.6	
Panicum, Texas	<i>Panicum texanum</i>			0.8 to 1.6	
Pennycress, Field	<i>Thlaspi arvense</i>		0.8 to 1.6		
Pigweed	<i>Amaranthus</i> spp.			0.8 to 1.6	
Puncturevine	<i>Tribulus terrestris</i>	0.8 to 1.6	1.6 to 2.4		
Pustley, Florida	<i>Richardia scabra</i>			1.6 to 3.2	

Weed Species	Scientific Names	Pints per Acre			
		Maximum Weed Height/Length (Inches)			
		4	6	12	18
Rabbit's-foot Grass	<i>Polypogon monspeliensis</i>		0.8 to 1.6		
Rocket, London	<i>Sisymbrium irio</i>		0.8 to 1.6		
Rockspurslane, Rednaide	<i>Calandrinia caulescens</i>		0.8 to 1.6		
Rye	<i>Secale cereale</i>		0.8 to 1.2	0.8 to 1.6	1.6 to 2.0
Ryegrass, Italian/Annual	<i>Lolium multiflorum</i>		0.8 to 1.6		
Sandbur, Field	<i>Cenchrus incertus</i>			0.8 to 1.6	
Shattercane	<i>Sorghum bicolor</i>			0.8 to 1.6	
Shepherdspurse	<i>Capsella bursa-pastoris</i>		0.8 to 1.6		
Sowthistle, Annual	<i>Sanctus oleraceus</i>		0.8 to 2.0		
Sprangletop	<i>Leptochloa</i> spp.		1.6 to 2.4		
Spurge	<i>Euphorbia</i> spp.		0.8 to 2.0		
Spurge, Prostrate	<i>Euphorbia supina</i>		1.6 to 2.4		
Stinkgrass	<i>Eragrostis ciliaris</i>			0.8 to 1.6	
Sunflower, Common	<i>Helianthus annuus</i>		0.8 to 1.2	1.2 to 1.6	
Wheat	<i>Triticum aestivum</i>				0.8 to 1.6
Witchgrass	<i>Panicum capillare</i>			0.8 to 1.6	

¹In no-till systems, use 0.8 to 1.6 pints per acre.

²Will not control glyphosate-tolerant volunteer corn.

³Multiple applications may be required.

Table 3
ANNUAL WEED CONTROL—TOUCHDOWN 5 HERBICIDE RATES IN A TANKMIX WITH 0.25 LB. AI/ACRE OF BANVEL OR 0.5 LB. AI/ACRE OF 2,4-D

Weed Species	Scientific Names	Maximum Height/Length (Inches)	TOUCHDOWN 5 Herbicide Pints per Acre
Lettuce, Prickly Morningglory Ragweed, Common Ragweed, Giant Smartweed, Pennsylvania Velvetleaf	<i>Lactuca scariola</i> <i>Ipomoea</i> spp. <i>Ambrosia artemisiifolia</i> <i>Ambrosia trifida</i> <i>Polygonum pennsylvanicum</i> <i>Abitalon theophrasti</i>	6	0.8
Cocklebur, Common Fleabane, Rough Horseweed/Marestail Kochia Lambsquarters, Common Sunflower, Common Thistle, Russian	<i>Xanthium strumarium</i> <i>Erigeron strigosus</i> <i>Conyza canadensis</i> <i>Kochia scoparia</i> <i>Chenopodium album</i> <i>Helianthus annuus</i> <i>Salsola ibericus</i>	12	

Read and follow Banvel and 2,4-D labels.

Table 4
PERENNIAL WEED CONTROL AND WEED MANAGEMENT—TOUCHDOWN 5 HERBICIDE RATES USED ALONE OR IN TANKMIX WITH 0.25 LB. AI/A OF BANVEL OR 0.5 LB. AI/A OF 2,4-D

Weed Species	Scientific Names	Spot Spray % v/v	Pints per Acre	Tankmix with 2,4-D or Banvel	Application Timing and Remarks
Alfalfa	<i>Medicago sativa</i>	1.5	1.6 to 4.0		At 6- to 8-inch stage or more after final cutting in fall. Deep till 7 days after treatment.
			0.8 to 1.6	Yes	At 6- to 8-inch stage or more for suppression.
Artichoke, Jerusalem ¹	<i>Helianthus tuberosus</i>	1.5	4.8 to 6.4		At or after flowering.
Balsam-apple	<i>Momordica charantia</i>	1.5			For partial control only, apply at or beyond bloom.
Bahiagrass	<i>Paspalum notatum</i>	1.5	4.8 to 6.4		Early seed head stage.
Barley, Foxtail	<i>Hordeum jubatum</i>		0.8 to 1.6		For control up to 6 inches in height.
Bermudagrass	<i>Cynodon dactylon</i>	1.5	4.8 to 6.4		Seed heads present, may require retreatment.

Weed Species	Scientific Names	Spot Spray % v/v	Pints per Acre	Tankmix with 2,4-D or Beavel	Application Timing and Remarks
Bindweed, Field	<i>Convolvulus arvensis</i>	1.5	3.2 to 4.8		At or after flowering, requires 2 applications.
			0.8 to 1.6	Yes	At 8- to 12-inch stage or more for suppression.
			1.6	Yes	At or after flowering for control, multiple applications may be required.
			1.6 to 6.4		In California: 12 inches or greater runner length. Use high end of rate range where dense populations exist. For suppression on land which is irrigated and tilled, use 1.6 pints per acre.
Bluegrass, Kentucky	<i>Poa pratensis</i>	1.5	3.2 to 4.8		Boot to early seed head stage.
			1.6 to 2.4		For suppression.
Brackenfern	<i>Pteridium aquilinum</i>	1.25	4.8 to 6.4		Fronde fully expanded and at least 18 inches long.
Bromegrass, Smooth	<i>Bromus inermis</i>	1.5	1.6 to 3.2		Boot to early seed head.
			0.8		For suppression.
Canarygrass, Reed	<i>Phalaris arundinacea</i>	1.5	3.2 to 4.8		Boot to head.
Cat tail	<i>Typha</i> spp.	1.5	4.8 to 6.4		Early head to early bud.
Clover, Red	<i>Trifolium pratense</i>	1.5	4.8 to 6.4		Early head to early bud.
Clover, White	<i>Trifolium repens</i>	1.5	0.8 to 1.6	Yes	At 4- to 10-inch stage for suppression.
			4.8 to 6.4		
Cogongrass ¹	<i>Imperata cylindrica</i>	1.5	4.8 to 6.4		Late summer/fall greater than 18 inches in height. May require retreatment.
Dandelion	<i>Taraxacum officinale</i>	1.5	3.2 to 4.8		Early bud.
			0.8	Yes	Early bud.
Dayflower ¹	<i>Commelina</i> spp.	1.5	4.8 to 6.4		Less than 4 inches in height.
Dock, Curly	<i>Rumex crispus</i>	1.5	3.2 to 4.8		Early bud.
			0.8 to 1.6	Yes	Early bud.
Dogbane, Hemp	<i>Apocynum cannabinum</i>	1.5	6.4		Late bud to flower.
			0.8 to 3.2	Yes	Actively growing at 6- to 12-inch stage for suppression.
			1.6	Yes	Actively growing, late bud to flower.
Dogfennel	<i>Eupatorium capillifolium</i>	1.5	3.2 to 4.8		Actively growing, less than 12 inches in height.
Fescue ²	<i>Festuca</i> spp.	1.5	4.8 to 6.4		Boot to early seed head.
Fescue, Tall	<i>Festuca arundinacea</i>	1.5	1.6 to 4.8		For fall application on 8- to 12-inch plants, use 1.6 to 2.4 pints per acre. Use 4.8 pints per acre on CRP sodded stands at boot or later.
Goatweed	<i>Hypericum perforatum</i>	2.0	4.8 to 6.4		Less than 7-inch stage.
Guineagrass	<i>Panicum maximum</i>	1.0	4.8		7- to 10-leaf stage.
Horsenettle	<i>Solanum carolinense</i>	1.5	4.8 to 6.4		Late bud to flower.
			1.6 to 3.2	Yes	Late bud to flower.
Johnsongrass	<i>Sorghum halepense</i>	1.0	1.6 to 4.8		Apply at boot to head stage and in the fall prior to frost. Use 1.6 to 3.2 pints per acre for annual tillage systems. Use 3.2 to 4.8 pints per acre on no-till areas. Allow 3 to 7 days before tillage.
			0.8 to 1.6		For burn-down, apply when plants are at 10- to 12-inch stage and allow 3 days before tillage.
Lantana, Large-leaf	<i>Lantana camara</i>	1.0			For partial control, apply at or beyond bloom stage.
Milkweed, Common	<i>Asclepias syriaca</i>	1.5	4.8		Late bud to early flower.
			1.6	Yes	Late bud to early flower.
			0.8 to 1.6	Yes	Suppression.
Milkweed, Honeyvine	<i>Ampelamus albidus</i>	1.5	3.2	Yes	Late bud to early flower.
Muhly, Wirestem	<i>Muhlenbergia frondosa</i>	1.5	1.6 to 3.2		6- to 8-inch actively growing. Use high end of rate range in no-tillage areas.
Mullein, Common	<i>Verbascum thapsus</i>	1.5	4.8 to 6.4		Early bud to head.
Nightshade, Silverleaf	<i>Solanum elaeagnifolium</i>	1.5	1.6 to 3.2		Apply when 60% of plants have berries. Apply fall treatments before a killing frost.
Nutsedge, Purple	<i>Cyperus rotundus</i>	1.5	0.8 to 4.8		Treat when most plants are in flower stage. Repeat applications may be required for dense populations of nutsedge and subsequent germination of dormant nuts. Allow 5 inches of regrowth before retreatment. Use 0.8 to 1.6 pints per acre for suppression. A second application will be required on recovered plants with 5 inches of new growth.
			Nutsedge, Yellow	<i>Cyperus esculentus</i>	
Orchardgrass	<i>Dactylis glomerata</i>	1.5	2.4 to 3.2		Apply 3.2 pints per acre on plants at early boot to seed head stage. For spring applications, use 3.2 pints per acre and allow a minimum height of 10 to 12 inches. Fall applications may be made on actively growing plants at the boot to early seed head stage at 2.4 to 3.2 pints per acre.
Pampasgrass	<i>Cortaderia selloana</i>	1.5			For partial control only; apply at or beyond boot stage.
Paragrass	<i>Brachiaria mutica</i>	1.5	3.2		Early seed head stage.
Phaseybean ¹	<i>Macropitium lathyroides</i>	1.5	4.8 to 6.4		Less than 8 inches tall.
Quackgrass	<i>Agropyron repens</i>	1.5	1.6 to 3.2		Apply at 6- to 10-inch stage in annual cropping systems followed by tillage. Use the higher rate on dense established stands. Allow 3 days before tillage.
			3.2 to 4.8		Apply at 6- to 10-inch stage if tillage is not performed following application.
Redvine ¹	<i>Branthia ovata</i>	1.5	1.2 to 2.4		Greater than 18 inches tall in September/October; retreatment will be required at rates less than 1.6 pints per acre. Allow 12 inches of regrowth before retreatment.
Ryegrass, Perennial	<i>Lolium perenne</i>	1.0	1.6 to 4.8		Boot to head or prior to frost; use higher end of rate range if no tillage will be performed following application.
Small-flowered Alexandrigrass	<i>Brachiaria subquadriflora</i>	1.5	3.2 to 4.8		Less than 4 inches in height, actively growing.
			Smartweed, Swamp	<i>Polygonum coccineum</i>	1.5
			0.8	Yes	Early bud, 12-inch stage.
Spurge, Leafy	<i>Euphorbia esula</i>	1.5	3.2		Greater than 12 inches tall in late summer or fall.

Weed Species	Scientific Names	Spot Spray % v/v	Pints per Acre	Tankmix with 2,4-D or Baavel	Application Timing and Remarks
			0.8	Yes	Greater than 12 inches tall in late summer.
Sweet-potato-vine, Wild	<i>Ipomoea pandurata</i>	1.5			For partial control only, apply at or beyond flowering stage.
Switchgrass	<i>Panicum virgatum</i>	1.5	2.4 to 3.2		Boot to head stage.
Thistle, Canada	<i>Cirsium arvense</i>	1.5	3.2 to 4.8		Apply at bud to early flower stage. For fall applications or following mowing, allow a minimum of 6- to 8-inch rosette development.
Timothy	<i>Phleum pratense</i>	1.5	3.2 to 4.8		Boot to head; wait 3 days before tillage.
Torpedograss ¹	<i>Panicum repens</i>	1.5	6.4		At or beyond seed head for suppression.
Trumpetcreeper ¹	<i>Campsis radicans</i>	1.5	3.2 to 4.8		Late September/October applications on actively growing plants, retreatment may be required.
Vasey's Grass	<i>Paspalum urvillei</i>	1.5	4.8 to 6.4		Apply at early head stage.
Vetch ²	<i>Vicia</i> spp.	1.5	3.2 to 4.8		Boot to head.
Virginia Creeper	<i>Parthenocissus quinquefolia</i>	1.5	6.4		Full leaf expansion.
Wheatgrass, Western	<i>Agropyron smithii</i>	1.5	3.2 to 4.8		Boot to head.

¹Partial control.

²When the predominant weed species include Carolina geranium, cutleaf evening-primrose, fescue, hemp sesbania, henbit, morningglory, prickly sida, and vetch that are less than 6 inches tall, GRAMOXONE EXTRA herbicide should be considered as an alternative.

STORAGE AND DISPOSAL

PESTICIDE STORAGE: Do not contaminate water, food, or feed by storage and disposal. Keep container tightly closed when not in use. For help with any spill, leak, fire, or accident involving this material, call CHEMTREC 1-800-424-9300.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Triple rinse (or equivalent); then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

FOR RECYCLABLE/REFILLABLE CONTAINERS

Before refilling, inspect thoroughly for damage such as cracks, punctures, bulges, dents, abrasions, and damaged or worn threads on closure devices. After filling and before transporting, check for leaks. Do not refill or transport damaged or leaking container.

CONTAINER DISPOSAL: Reseal container and offer for reconditioning, or triple rinse (or equivalent) and offer for recycling or reconditioning, or clean in accordance with manufacturer's instructions.

CONTAINER IS NOT SAFE FOR FOOD, FEED, OR DRINKING WATER!

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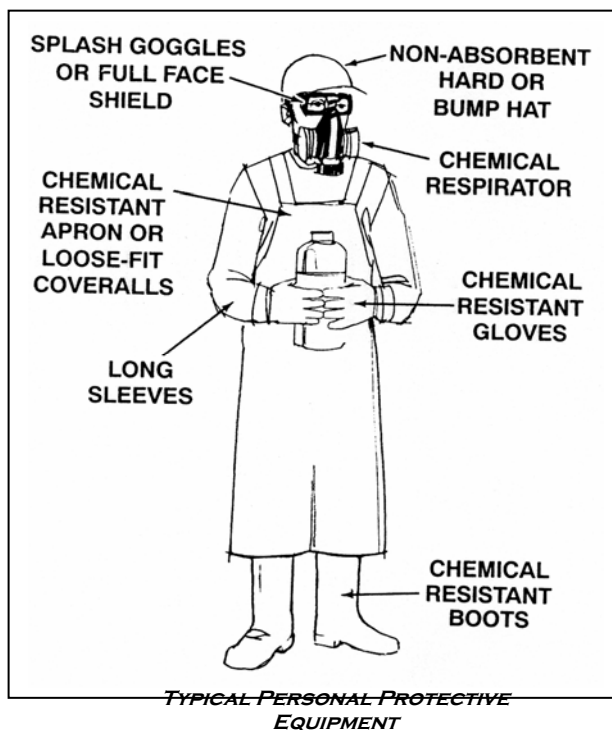
III. Pesticide Safety

A. Personal Protective Equipment (PPE)

PPE's consist of clothing and devices that are worn to protect the human body from contact with pesticides and their residues. Pesticide labels list the minimum PPE that is required to handle that particular pesticide. Labels may also list different personal protective equipment for different activities, e.g. one set for mixing and loading and another set for applying the pesticide.

Personal Protective Equipment Includes:

- (1) Gloves
- (2) Boots
- (3) Goggles or Face Shield
- (4) Head and Neck Coverings
- (5) Respirators
- (6) Tyvek Suit or Apron



B. Signal Words

Labels generally do not report the toxicity of a pesticide as an LD₅₀ value. This information can be found on the Material Safety Data Sheet (MSDS) available from the pesticide supplier. However, the label does include one of three signal words that express how toxic a chemical is to humans:

Caution

Category III Toxicity: slightly hazardous

Warning

Category II Toxicity: moderately hazardous

Danger

Category I toxicity: highly hazardous

