CORNBELT®
Family of Quality Products

# VAN DIEST SUPPLY COMPANY

WEBSTER CITY, IOWA FACILITIES

Van Diest Supply Company is committed to the crop protection industry. Van Diest Supply Company is unique in the wide array of services offered to the agricultural industry:

**Product Development**
**Process Development**
**Formulation**
**Liquid Bulk Storage**
**Distribution**

## CORNBELT®
## Family of Quality Products

A product cannot carry the Cornbelt® label unless that product is as good as or better than competitive products in the market today. This is the way we do business. This is our promise to our customers.

**THE SIGN OF QUALITY**

***"CORNBELT® PRODUCTS ARE THE RIGHT CHOICE"***

# CORNBELT®
# Family of Quality Products


CORNBELT PRODUCTS - QUALITY


Extruded water dispersible granular herbicide for season-long weed control in corn, sorghum and certain other crops.

| | |
|---|---|
| ACTIVE INGREDIENTS | 90% |
| Atrazine: 2-chloro-4-ethylamino-6-isopropylamino-s-triazine | 88.5% |
| Related compounds | 1.5% |
| INERT INGREDIENTS | 10% |
| TOTAL | 100% |

Cornbelt® ATRAZINE 90DF Extruded is formulated utilizing **a state-of-the-art extrusion process**. This process yields a high quality **low dust** product in a **uniform granule size with excellent dispersion.**

Cornbelt® ATRAZINE 90DF Extruded **disperses fast, mixes well and stays in suspension longer** than other dry flowables. Cornbelt® ATRAZINE 90DF Extruded is formulated using only the **highest quality technical atrazine** available.


4 pound active ingredient per gallon herbicide for season-long weed control in corn, sorghum and certain other crops.

| | |
|---|---|
| ACTIVE INGREDIENTS | 43.6% |
| Atrazine: 2-chloro-4-ethylamino-6-isopropylamino-s-triazine | 42.9% |
| Related compounds | 0.7% |
| INERT INGREDIENTS | 56.4% |
| TOTAL | 100.0% |

Cornbelt® ATRAZINE 4L is **formulated utilizing a state-of-the-art microhomogenized process** which yields a top quality product with small particle size which is easy to pour and light in color. It is **totally clay free** enabling it to mix well and spray better with less plugged nozzles. Cornbelt® ATRAZINE 4L is formulated using only the **highest quality technical atrazine** available.

# CORNBELT® TRIFLURALIN

4 pound active ingredient per gallon selective herbicide for preemergent control of annual grasses and broadleaf weeds in soybeans and certain other crops.

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|---|---|
| ACTIVE INGREDIENT: | |
| Trifluralin (a,a,a-trifluoro-2,6-dinitro-N, N-dipropyl-p-toluidine) | 43.8% |
| INERT INGREDIENTS | 56.2% |
| TOTAL | 100.0% |

Cornbelt® TRIFLURALIN is a preemergent herbicide which must be incorporated into the soil to provide long lasting control of many annual grasses and broadleaf weeds.

Cornbelt® TRIFLURALIN controls weeds as they germinate before valuable nutrients are stolen from your crop.

Cornbelt® TRIFLURALIN provides excellent control on more than 30 weeds and grasses, including pigweed, lamb's quarter, foxtail, seedling johnsongrass, crabgrass and many more.

Cornbelt® TRIFLURALIN gives you application options to fit your farming practices. Apply in early Spring, Fall or at planting time.

Cornbelt® TRIFLURALIN is your first step in weed control in soybeans for dependable, season-long crop protection. When used in a planned program with one of the many post herbicides even the toughest broadleaf weeds may be effectively controlled.


## Concentrated – Solventless – Low Odor
## Low Volatile – Superior Mixing

| | |
|---|---|
| ACTIVE INGREDIENT: | |
| 2,4-Dichlorophenoxyacetic Acid 2-Ethylhexyl Ester | 87.2% |
| INERT INGREDIENTS | 12.8% |
| TOTAL | 100.0% |

Cornbelt® METRO™ is a new solventless 2,4-D formulation which incorporates the latest formulation technology. Cornbelt® METRO's™ solventless formulation has significantly less odor than traditional petroleum based formulations.

Cornbelt® METRO™ contains a proprietary surfactant blend. The high quality emulsifiers and surfactants contained in Cornbelt® METRO™ provide more consistent and dependable weed control and reduce the chance of injury to host crops.

Cornbelt® METRO™ has superior mixing characteristics to other formulations, especially with liquid fertilizers. Cornbelt® METRO™ should be used at the same use rates as traditional 6# LV Ester formulations.

Cornbelt® METRO™ contains all the benefits of traditional low volatile ester formulations without the odor of traditional solvents.

# CORNBELT® SALVAN®

| | |
|---|---|
| ACTIVE INGREDIENT: | |
| 2,4-Dichlorophenoxyacetic Acid 2-Ethylhexyl Ester | 81.8% |
| INERT INGREDIENTS | 18.2% |
| TOTAL | 100.0% |

Cornbelt® SALVAN® controls over 50 tough to control weeds including artichoke, bindweed, burdock, Canada thistle, pigweed, sunflower, lamb's quarter, and many more including noxious plants susceptible to 2,4-D.

Cornbelt® SALVAN® may be used alone or as a tank mix with other herbicides listed on the label.

Cornbelt® SALVAN® provides excellent application flexibility as it may be used preemerge or postemerge for corn. Refer to the product label for application information regarding other crops.

Cornbelt® SALVAN® is an effective broad-spectrum, low volatile weed killer that controls tough weeds in an ester formulation which may be tank mixed with many other herbicides. Refer to the tank mix partner's label for specific rate information.

Cornbelt® SALVAN® is formulated using a premium emulsifying agent which forms a high quality stable emulsion.

Caution should be exercised when applying above 95 degrees Fahrenheit, even though SALVAN® is a low volatile formulation, as vapors may damage susceptible crops growing nearby.


4 pounds of active ingredient per gallon herbicide for the control of many broadleaf weeds, herbaceous perennials and woody plants susceptible to 2,4-D.

| | |
|---|---|
| ACTIVE INGREDIENT: | |
| 2,4-Dichlorophenoxyacetic Acid 2-Ethylhexyl Ester | 66.0% |
| INERT INGREDIENTS | 34.0% |
| TOTAL | 100.0% |

Cornbelt® 4LB. LOVOL ESTER is a low volatile 2,4-D that contains a premium emulsifying agent which forms a stable emulsion. It is the ideal tank mix partner for burndown prior to planting in no-till and minimum tillage farming practices. The ester formulation of 2,4-D is generally more effective than amines on mature or large weeds or during dry conditions and gives a broader spectrum of control on the tougher broadleaf weeds.


6 pounds of active ingredient per gallon herbicide for the control of many broadleaf weeds, herbaceous perennials and woody plants susceptible to 2,4-D in grass pastures, certain crops and non-crop areas.

| | |
|---|---|
| ACTIVE INGREDIENT: | |
| 2,4-Dichlorophenoxyacetic Acid 2-Ethylhexyl Ester | 87.7% |
| INERT INGREDIENTS | 12.3% |
| TOTAL | 100.0% |

Cornbelt® 6LB. LOVOL ESTER is a low volatile 2,4-D that is a highly concentrated ester which gives excellent weed control that is very cost effective.

# CORNBELT® 4LB. AMINE

4 pounds of active ingredient per gallon herbicide for selective control of many broadleaf weeds in non-crop areas, grass pastures, rangelands, and certain crops. Also for control of trees by injection.

| | |
|---|---|
| ACTIVE INGREDIENT: | |
| Dimethylamine Salt of 2,4-Dichlorophenoxyacetic Acid | 46.3% |
| INERT INGREDIENTS | 53.7% |
| TOTAL | 100.0% |

Cornbelt® 4LB. AMINE controls more than 50 broadleaf weeds including cocklebur, lamb's quarter, annual morning glory, jimsonweed, bull thistle and many more.

Cornbelt® 4LB. AMINE contains an anti-foam agent to prevent annoying foam in the mix tank.

Cornbelt® 4LB. AMINE contains a **premium sequestering agent** that prevents a reaction in hard water which can result in a precipitate that can clog nozzles or create differences in effectiveness between the top and bottom of the tank.

Cornbelt® 4LB. AMINE mixes with water and is a clear color in solution when mixed.

Cornbelt® 4LB. AMINE has no significant volatility and is effective on weeds during moist conditions.

Cornbelt® 4LB. AMINE generally does not damage crops as it has a more gentle effect on crops than ester formulations.

Cornbelt® 4LB. AMINE can be stored at subfreezing temperatures. If freezing does occur the product should be warmed to at least 40 degrees Fahrenheit and mixed thoroughly before using. Following this procedure assures that weed control performance is not decreased by sub-freezing temperature exposures.

Cornbelt® 4LB. AMINE is a high quality formulation known for dependable performance.


**PRINCIPAL FUNCTIONING AGENTS:**

| | |
|---|---|
| Alkyl Aryl Polyethoxy Ethanol Phosphate And other Ethoxylated derivatives | 78% |
| Inert Ingredients | 22% |
| Total | 100% |

**Cornbelt® COMPATIBILITY AGENT** is a conditioning adjuvant designed to improve the compatibility of liquid fertilizers with pesticides, as well as combinations of different herbicides when applied in a single spray solution.

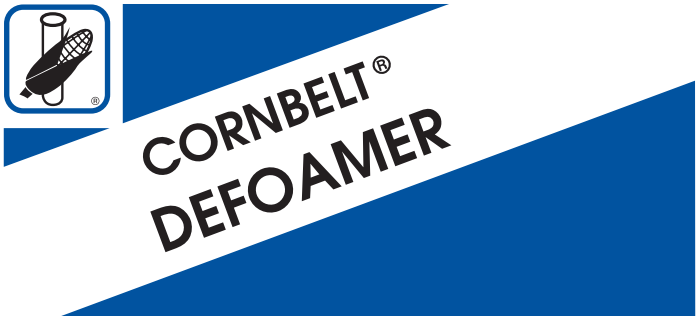
**Cornbelt® COMPATIBILITY AGENT** will provide a more uniform and stable liquid fertilizer/pesticide solution in the spray tank which will aid in more accurate and uniform applications with minimal agitation.

**Liquid Nitrogen Fertilizers: Use 1 to 3 pints of Cornbelt® COMPATIBILITY AGENT per 100 gallons of total liquid Nitrogen fertilizer/pesticide spray solution.**

**Liquid Mixed Fertilizers: Use 2 to 3 pints of Cornbelt® COMPATIBILITY AGENT per 100 gallons of total liquid mixed fertilizer/pesticide spray solution.**

**Herbicide Combinations: For spray solutions of combinations of two or more herbicides, use 1 to 3 pints of Cornbelt® COMPATIBILITY AGENT per 100 gallons of spray mix.**

Since formulations vary, all fertilizer/pesticide mixtures should be tested for compatibility prior to field mixing. The correct amount of Cornbelt® COMPATIBILITY AGENT will depend on the type of fertilizer and pesticide being mixed in the spray tank. Do not use Cornbelt® COMPATIBILITY AGENT with sulfonylurea herbicides.




Active Ingredient:

| | |
|---|---|
| Silicone Emulsion | 10% |
| Inert Ingredients | 90% |
| Total | 100% |

**Cornbelt® DEFOAMER is an effective way to prevent or eliminate foam from becoming a problem while mixing pesticides.** Foam is usually a result of pesticides and concentrated surfactants being mixed together under agitation. Defoamers work by reducing the surface tension of bubbles, preventing them from forming or lasting. Some of the disadvantages of foam buildup are uneven tank mixtures (pesticide becomes tied up in the foam), spray tank overflow and slow tank filling. Cornbelt® DEFOAMER should be added to the tank before pesticides or other adjuvants. In cases where foam has already developed, simply add Cornbelt® DEFOAMER in a zigzag pattern over the foam. Cornbelt® DEFOAMER will not react with any pesticide it is used with.


Cornbelt® HAND CLEANER is specifically formulated to **remove pesticide stains, oil, grease, paint, seed dyes** and other hard to remove contaminants from skin. Its potent cleaning action even removes such herbicide stains as Cornbelt® Trifluralin, Treflan and Prowl (DNA yellow herbicide stains). While removing tough stains, Cornbelt® HAND CLEANER **moisturizes and conditions skin** because emollients have been added making it pleasant smelling and gentle to use. Cornbelt® HAND CLEANER may be used with or without water, then wiped off with a towel or rinsed off by water. **Convenient 22-ounce tubes** are easy to hang on a sprayer or anywhere a hand cleaner is needed. Spring loaded caps make it easy to open the tube with one hand.

# TIPS FOR PRODUCING A GOOD FOAM

**TANK:**

- An upright cylindrical tank is the best choice when using a pressurized system.
- Tank should be cleaned at least three times per year with a high quality tank cleaner.
- Tank should be cleaned thoroughly whenever changing foam marker concentrates.

**AIR SUPPLY:**

- Maintain tank air pressure between 15 and 25 psi.
- Air should enter the foam generating tank as near the bottom as possible.
- A steady source of air is required for producing consistent foam. An air supply with varying pressure will produce a lower quality of foam.

**DILUTION:**

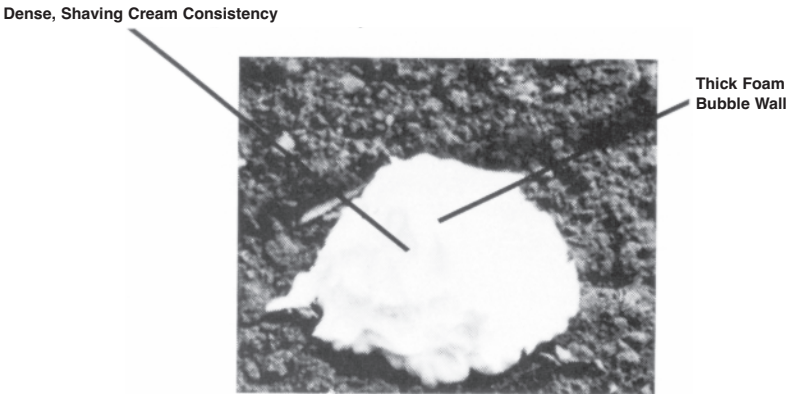
- Do not mix types or brands of foam concentrates.
- Do not fill tank beyond 80% of capacity
- When adding a foam dye additive, the use of higher concentrations of foam marker may be necessary.

**HOSES:**

- Use a one-inch hose running from the foam generator to the end of the boom. The foam gains strength while passing through the hose.
- Drop hose should be a 2 1/2-inch hose. The end of the hose or collector boot needs to be 12 inches from ground level.
- To produce a line of foam, use a one-inch drop hose cut diagonally just long enough to drag on the ground.

**STRINGY WET FOAM MAY BE CAUSED BY:**

- Too much water being forced into the foam. Reduce the air pressure.
- Two different brands of foam concentrate being mixed together. Clean tank and use only one brand.
- Not using enough foam concentrate. Increase the use rate of foam concentrate.
- Storage of foam concentrate at temperatures below 40° F for more than 24 hours.




Principal Functioning Agents:

Proprietary blend of Active Foam Agents
& Formulation Aids .....100%

Cornbelt® *ULTRA-MARK™* Foam Marker is specially formulated with a unique blend of high foaming surfactants and stabilizers that delivers longer foam life:

- Under hot conditions
- Under windy conditions
- Whatever the water hardness

Cornbelt® *ULTRA-MARK™* Foam Marker provides the applicator with one of the most long lasting and versatile foams on the market today.

## USE RATE

Standard .....1 gal per 100 gal of water

Soft Water (<300 ppm) .....1 gal per 120 gal to 160 gal water

Hard Water (>1,000 ppm).....1 gal per 80 gal water

Whenever a foam colorant additive is used, use one gallon of Cornbelt® *ULTRA-MARK™* Foam Marker for every 80 gallon of water.

For best results start by putting half of the water needed in the tank followed by the amount of Cornbelt® *ULTRA-MARK™* needed, followed by the remaining half of the water.

To insure a good quality foam, be certain to flush and clean the foam generating equipment before use.


Principal Functioning Agents:

| | |
|---|---|
| Proprietary blend of active foam agents | 45.9% |
| Inert Ingredients | 54.1% |
| Total | 100.0% |

Cornbelt® FOAM MARKER produces rich foam in a wide range of hard water conditions because it contains water softeners and conditioners. Foam quality is a result of the density and wall thickness of the foam bubbles. A foam marker is measured by how much money it can save in increased efficiency. The cost of pesticides, labor, fuel, insurance and misapplication are why it is important that the foam marker selected remains highly visible under a wide range of environmental conditions. It provides highly visible foam that lasts from 30 minutes up to several hours depending on environmental conditions.

**USE RATE:** 1 gallon per 80 gallons of water


Cornbelt® FOAM MARKER DYE (available in Blue or Red) is a highly concentrated colorant to add to the foam solution tank to produce a colored and more highly visible foam. Applicators of fertilizers and pesticides will discover the ease of application when guided by a trail of brilliantly colored foam marks. Adverse field conditions such as sun-bleached stubble, heavy crop residue, snow, sand, or alkaline areas will restrict the visibility of normal foam marks. However, by adding Cornbelt® FOAM MARKER DYE to the foam solution tank, the applicator will eliminate this costly and frustrating situation.

Add one ounce of Cornbelt® FOAM MARKER DYE per 10 gallons of foam concentrate solution.


Cornbelt® TANK AND EQUIPMENT CLEANER is an effective tank and equipment cleaner designed to remove contaminates from tanks, lines and nozzles. A clean tank has become a necessity because of today's many new pesticides, application techniques and complex adjuvant additive requirements.

Cornbelt® TANK AND EQUIPMENT CLEANER helps neutralize residues from acid based pesticides and fertilizers. Cornbelt® TANK AND EQUIPMENT CLEANER removes light rust and at the same time leaves a protective film that helps prevent corrosion.

Cornbelt® TANK AND EQUIPMENT CLEANER works well on metal, fiberglass and plastic spray systems as well as being safe to most painted surfaces.

**IMPORTANT:** Always rinse out the TANK AND EQUIPMENT CLEANER solution BEFORE re-loading the spray tank. TANK AND EQUIPMENT CLEANER solution must be removed before use.


Cornbelt® LIQUID TANK AND EQUIPMENT CLEANER will clean, rinse and emulsify pesticide and adjuvant residues and bond them to the rinse solution to allow for complete rinsing and system purging with ordinary water.

Cornbelt® LIQUID TANK AND EQUIPMENT CLEANER contains corrosion inhibitors and is tolerant to hard water; this characteristic prevents spray tanks from accumulating high residue levels.

Cornbelt® LIQUID TANK AND EQUIPMENT CLEANER neutralizes acid residues of pesticides, prepaints the spray tank for the use of other products. Neutralization of residue spray materials will prevent damage from occurring to non-target plants.

# SPRAY DRIFT MANAGEMENT

## What is Spray Drift?

The EPA defines pesticide spray drift as the physical movement of a pesticide through air at time of application to any site other than that intended for application. Spray drift is a concern for many reasons. It removes a portion of the chemical from the intended target making it less effective and can result in poor pest control in the target crop in addition to possible health, environmental, economic and legal consequences.

## EPA Policy

EPA Policy states, "pesticide drift from the target site is to be prevented." EPA uses its discretion to pursue violations based on the unique facts and circumstances of each situation. Applicators must refrain from application under conditions that are inconsistent with the goal of drift prevention, or are prohibited by the pesticide label. Applicators must use all available drift prevention practices in order to prevent drift.

## How Does Spray Drift Occur?

Wind and spray droplet size are the major factors influencing spray drift. Small droplets take more time to fall to the ground allowing them to drift further. High spray pressures increase the potential for spray drift to occur as high pressures increase the number of small droplets.

## Spray Drift Management

It is impossible to eliminate off-target movement from a pesticide application. However, good management practices can help manage and reduce the amount of drift to off-target areas.

# TIPS FOR MANAGING SPRAY DRIFT

1. **Reduce Spray Pressure:** Refrain from using pressures which exceed 40 to 45 psi. Higher pressures increase the number of small droplets. A spray pressure of 30 psi is all that is necessary for most spray tips.

2. **Increase Spray Volume:** As spray volumes are reduced from the customary 15 to 20 GPA down to 5 to 10 GPA the spray droplet size decreases. The problem is accentuated further if the applicator increases the spray pressure to compensate for the smaller spray volume thinking they can "drive" the spray into the crop canopy. The result is an increase in the number of small droplets, which will either quickly evaporate before reaching the plant or will be carried off by wind as they lack the momentum needed to reach the plant (small droplets take longer to fall than large droplets). Increasing spray pressure should not be used as a substitute for spray volume.

3. **Know the Wind Speed and Direction:** The greater the wind speed the farther small spray droplets will be carried. Wind speed can vary greatly from one location to another. Take time to check the wind speed and direction relative to sensitive crops at each field.

4. **Lower Spray Boom Height:** Wind speed increases with height. The amount of drift due to wind will decrease as the spray boom is lowered.

5. **Use Drift & Deposition Additives such as Cornbelt® Gardian®, Cornbelt® Gardian Plus®, Cornbelt® Dri-Gard® and Cornbelt® Pro-One XL™:** Research has shown the use of spray drift management additives can reduce spray drift deposits from 50% to 80%. The "user friendliness" of the various drift and deposition aids available in the market vary. They also vary in terms of additional features and benefits they provide.

6. **Use Nozzles that Produce Large Spray Droplets:** Switching from standard flat-fan nozzles to turbulence-chamber or venturi nozzles increase droplet size thereby reducing the amount of drift. Pre-orifice turbulence chamber nozzles absorb energy in the turbulence chamber reducing exit pressure from the nozzle. The turbo flat-fan nozzle design improves spray pattern uniformity and reduces the percentage of drift droplets under a wide range of pressures. Nozzles should be large enough to accommodate spray volumes of 15 to 20 GPA.

7. **Slower Speed:** Driving the sprayer at a slower speed decreases the potential for drift to occur.


# DRIFT & DEPOSITION MANAGEMENT AND WATER CONDITIONING AGENT

Ingredients:

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|---|---|
| Ammonium Sulfate | 20% |
| Acrylamide Sodium Acrylate Linear copolymer | 1% |
| Glycerol/Acid (citrophosphate) & siloxane | 14% |
| Inert Ingredients | 65% |
| Total | 100% |

Cornbelt® GARDIAN® is a multifunctional drift and deposition management concentrate and water conditioning agent containing the TransGard® System technology. Cornbelt® GARDIAN® is designed for use on both transgenic and conventional crop varieties. Cornbelt® GARDIAN® is formulated with a unique combination of patented, high molecular weight viscosity modifiers and anti-evaporants.

## DRIFT & DEPOSITION MANAGEMENT

Cornbelt® GARDIAN® aids in drift & deposition management in three ways:

- Minimizes Fines/Atomization
- Anti-Evaporant/Humectant
- Contact/Deposition

## WATER CONDITIONING AGENT

Cornbelt® GARDIAN® conditions the water in the spray mix in three ways:

- pH Controlled Buffering
- Sequestering Agent
- Electrolyte Management

## ADDITIONAL FEATURES & BENEFITS

Cornbelt® GARDIAN® contains a silicone additive to minimize the formation of foam in the spray tank.

Cornbelt® GARDIAN® is a pre-swelled high molecular weight polymer. Pre-swelling prevents the caking or gelling effect often found in traditional drift management products.

## USE RATE

1-3 quart per 100 gallon of spray solution.

# CORNBELT® GARDIAN PLUS®

## DRIFT & DEPOSITION MANAGEMENT AND WATER CONDITIONING AGENT PLUS AMMONIUM SULFATE

Ingredients:

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|---|---|
| Ammonium Sulfate | 34% |
| Glycerol/Acid (citrophosphate)- Acrylamide Sodium Acrylate Linear Copolymer complex & siloxane | 3% |
| Inert Ingredients | 63% |
| Total | 100% |

Cornbelt® GARDIAN PLUS® contains the same features and benefits of Cornbelt® GARDIAN®, plus the addition of liquid ammonium sulfate:

- Drift and Deposition Management
- Water Conditioning
- Defoaming
- Pre-swelled Polymer

## USE RATE

If 8.5 lbs of AMS is desired: Use 2.5 gal per 100 gal of spray solution.

If 17 lbs of AMS is desired: Use 5 gal per 100 gal of spray solution.

## CORNBELT® GARDIAN PLUS® & GLYPHOSATE

Cornbelt® GARDIAN PLUS® is the perfect fit with glyphosate products.

In addition to ammonium sulfate, a drift, deposition and water conditioning agent is suggested when using the various glyphosate products.

Cornbelt® GARDIAN PLUS® provides the convenience of a liquid with everything you need in one container when using glyphosate products.

CORNBELT®
DRI-GARD®

# AMMONIUM SULFATE BASED WATER CONDITIONING AGENT WITH DRIFT & DEPOSITION MANAGEMENT AGENTS AND DEFOAMER

Ingredients:
A Proprietary Blend of Ammonium Sulfate, Polyacrylamide and Polysaccharide Polymers and Antifoam Agent.....100%

Cornbelt® DRI-GARD® is a multifunctional drift & deposition management and water conditioning agent containing the TransGard® System technology.

Cornbelt® DRI-GARD® is a milled ammonium sulfate that contains a unique combination of polymers that provide drift management and improved deposition.

Cornbelt® DRI-GARD® is designed to be used with herbicides that call for the use of AMS and in applications where drift, deposition and foaming are issues.

Cornbelt® DRI-GARD® is formulated with a patented polymer system that improves spray penetration and performance.

Cornbelt® DRI-GARD® contains silicone antifoam to minimize the formation of foam in the spray tank.

USE RATE: Spray pressure below 30 psi or when using cone or raindrop nozzles: 9 pounds per 100 gallon of spray solution. 9 pounds of Cornbelt® DRI-GARD® per 100 gallon delivers 8.5 pounds of ammonium sulfate.

Spray pressure greater than 30 psi or when using flat fan or flood nozzles: 9 to 12 pounds per 100 gallon of spray solution.

# CORNBELT® PRO-ONE XL™

## NONIONIC SURFACTANT, DRIFT & DEPOSITION MANAGEMENT, AMMONIUM SULFATE AND DEFOAMER

Ingredients:

| | |
|---|---|
| Ammonium sulfate, carbonyl diamine, polyoxyethylene-polyoxypropylene, beta-Hydroxy-tricarboxylic acid, polyacrylamide, dimethysiloxane | 99.8% |
| Constituents ineffective as Spray Adjuvants | 0.2% |
| Total | 100.0% |

Cornbelt® PRO-ONE XL™ contains a proprietary clathrate nonionic surfactant and a multifunctional drift & deposition management and water conditioning agent containing the TransGard® System technology.

Cornbelt® PRO-ONE XL™ is a milled ammonium sulfate and proprietary nonionic surfactant that contains a unique combination of polymers that provide drift management and improved deposition.

Cornbelt® PRO-ONE XL™ is designed to be used with “non-loaded” glyphosate and other herbicides that call for use of nonionic surfactant and AMS and in applications where drift, deposition and foaming are issues.

Cornbelt® PRO-ONE XL™ is formulated with a patented polymer system that improves spray penetration and performance.

Cornbelt® PRO-ONE XL™ contains silicone antifoam to minimize the formation of foam in the spray tank.

USE RATE: Spray pressure below 30 psi or when using cone or raindrop nozzles: 10 pounds per 100 gallon of spray solution. 10 pounds of Cornbelt® PRO-ONE XL™ delivers 8.5 pounds of ammonium sulfate and one quart of nonionic surfactant.

Spray pressure greater than 30 psi or when using flat fan or flood nozzles: 10 to 13 pounds per 100 gallon of spray solution.

# SPRAY ADJUVANTS…
# What Are They? Why Use Them? How Do They Work?

## WHAT ARE THEY?

An adjuvant is something which is added to the product formulation or spray solution to enhance the effectiveness of the herbicide, insecticide, or fungicide. Adjuvants are specialized chemicals which must be matched to a particular pesticide, weed spectrum and environmental range to ensure that they enhance, and not detract from the effectiveness of the pesticide.

## WHY USE THEM?

There are two main reasons why adjuvants are used in spray solutions.

1. REDUCE SPRAY APPLICATION PROBLEMS
2. IMPROVE HERBICIDE PERFORMANCE

Researchers have found that **up to 70% of the effectiveness** of a pesticide can be dependent on the spray application. Spray Application is the weakest link the pesticide follows through its synthesis, testing, registration, and final use.

Spray tank problems that can be observed by the applicator can be corrected with adjuvants such as compatibility or anti-foaming agents. **Many problems are invisible** to the applicator but have a **greater effect on the herbicide's activity** than those that are more visible. Activator adjuvants correct many of these invisible problems by increasing the wetting, spreading, sticking, emulsifying, and dispersing of the herbicide.

## HOW DO THEY WORK?

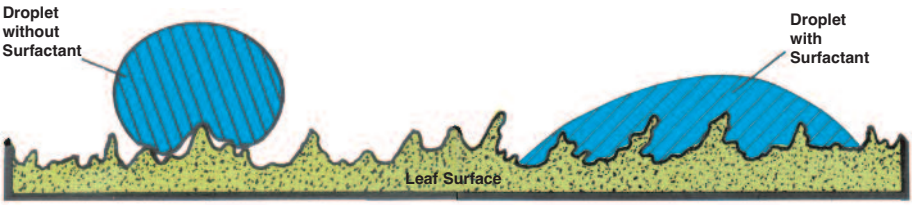
Activator adjuvants are the group of adjuvants that increase the biological activity of the herbicide beyond that obtained without the material added. Activator adjuvants are usually classified by their physical characteristics. There are four major classes of activator adjuvants:

1. NON-IONIC SURFACTANTS
2. CROP OIL CONCENTRATES
3. FERTILIZER SOLUTIONS
4. METHYLATED SEED OILS

Activator adjuvants enhance the performance of the herbicide in the following ways: wetting, reducing surface tension and improving penetration.

Wetting agents improve spray droplet spreadability by reducing the surface tension of the spray droplets. The greater the surface tension of a spray droplet, the more it will bead up on the surface of the leaf. This means the drop covers less area, and is also more likely to roll off the leaf. Reducing surface tension allows the droplet to spread out, thus aiding in penetration into the leaf and helping keep the droplet from rolling off the leaf. The waxy covering of the leaf surface also affects how much a droplet will bead up or spread out. This waxy covering varies with the species of plant and the environmental conditions under which the plant is growing.

The use of a high quality non-ionic surfactant will reduce the surface tension and contact angle of the spray droplet by 2/3's compared to water droplets alone.




# NON-IONIC SURFACTANTS

## "SURFACE ACTIVE AGENT"

Non-ionic surfactants are classified as Activator Adjuvants. They increase the activity of pesticides such as contact or systemic herbicides. They increase chemical contact with plant surfaces and facilitate penetration of chemicals into small openings and help dissolve the wax in the cuticle of leaves.
Surfactants lower the surface tension of the spray increasing spray coverage and penetration. Surface tension is a measure of the surface energy in a liquid and is measured in terms of force or dynes/cm. Water has a surface tension of 72.9 dynes/cm, while oils and solvents have surface tensions from 20 to 40 dynes/cm.

## "TRUE" ACTIVE INGREDIENT

### ALCOHOL VERSUS SURFACTANT

Most herbicide labels state that a non-ionic surfactant should contain at least 80% Active Ingredient. Because non-ionic surfactants are not regulated by the EPA, the "active ingredient" often includes an alcohol solubizer, but is not a "true" active ingredient.
Why is more alcohol added to non-ionic surfactants versus surfactant? The answer is to reduce cost. Alcohol costs less than half what a surfactant costs. Some non-ionic surfactants contain as much as 25% alcohol and as little as 55% surfactant and are called 80% active ingredient on the label.

## FREE FATTY ACIDS

Free Fatty Acids in the product resist wash-off compared to surfactants that do not contain them.

# CORNBELT® SPRAY ACTIVATOR 85

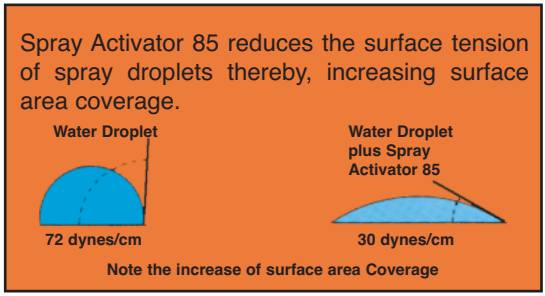
Non-ionic spray adjuvant for use with herbicides recommending the addition of a non-ionic surfactant.

PRINCIPAL FUNCTIONING AGENTS:

| | |
|---|---|
| Alkyl Aryl Polyalkoxylated non-ionic Surfactant blend | 85% |
| Inert Ingredients | 15% |
| Total | 100% |

Cornbelt® SPRAY ACTIVATOR 85 is a non-ionic general purpose spreader activator for use with herbicides to improve the effectiveness of the herbicide by providing a more uniform coverage without excessive run-off of the spray, increasing activity and aiding penetration.

Cornbelt® SPRAY ACTIVATOR 85 reduces the contact angle and surface tension of a spray droplet. This increases the surface area covered by the herbicide and helps the herbicide penetrate the weed.




Cornbelt® SPRAY ACTIVATOR 85 is a low foam adjuvant which prevents slow down of loading the spray tank and avoids uneven mixtures in the tank.

# CORNBELT® PREMIER 90

High active ingredient non-ionic spray adjuvant designed to enhance the effectiveness of herbicides which recommend the addition of a non-ionic surfactant.

PRINCIPAL FUNCTIONING AGENTS:

| | |
|---|---|
| Alkyl Aryl Polyalkoxylated non-ionic surfactant and free fatty acids | 90% |
| Inert Ingredients | 10% |
| Total | 100% |

Cornbelt® PREMIER 90 is a low foaming, non-ionic spreader activator with superior rain wash-off resistant properties.

Superior composition of Cornbelt® PREMIER 90 incorporates the properties of a wetter/spreader surfactant when used in herbicide spray mixtures. Cornbelt® PREMIER 90 is designed to quickly wet and spread a more uniform spray deposit over the leaf and stem surface. After drying, Cornbelt® PREMIER 90 resists wash-off compared to surfactants that do not contain free fatty acids.

Cornbelt® PREMIER 90 is low foaming because additional anti-foam agent is added. Foam slows down the loading of spray tanks and can lead to uneven mixtures in the tank.

Cornbelt® PREMIER 90 reduces the surface tension and contact angle of the spray droplet by 2/3's compared to water, which increases the surface area covered by the herbicide and helps the herbicide penetrate the weed.

Cornbelt® PREMIER 90 reduces the surface tension of spray droplets thereby, increasing surface area coverage.


Note the increase of surface area Coverage

CORNBELT® PREMIER 90 IS THE INDUSTRY STANDARD FOR NON-IONIC SURFACTANTS TO MEASURE UP TO!

# METHYLATED SURFACTANTS

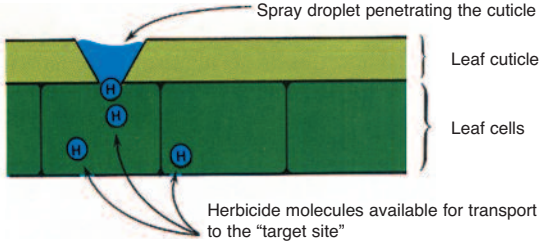
## Methylated Oils

Methylated oils are derived from free fatty acids extracted from oil crops such as soybeans. These fatty acids are then reacted with methanol alcohol to produce methyl esters of these fatty acids. Methylated Oils have properties that make them desirable as Spray Adjuvants.

A. **Methylated oils do not evaporate from the plant surfaces.** They have high boiling points that cause them to remain on the plant surface until they penetrate the cuticle.

B. **Methylated oils remain as an oily liquid on the plant surface for maximum contact with the plant surface.** A crystalline or solid form of a herbicide cannot easily penetrate the cuticle. Herbicides dissolved in an oily liquid are better able to penetrate plant cuticles because liquids flow or move more easily than solids.

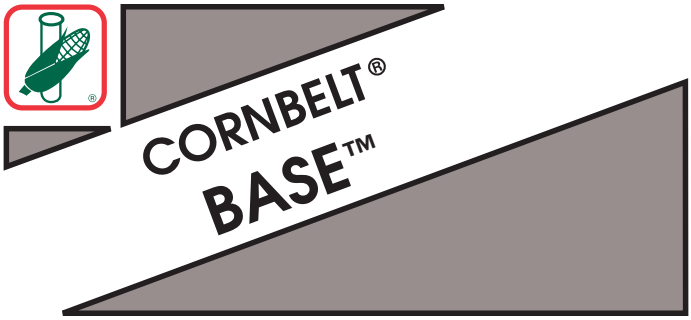
A major component of the plant cuticle is wax. Cuticular wax has a chemical structure similar to methylated oils. Methylated Oils tend to be liquids while cuticular waxes are solids. Because the methylated oils are liquids, they tend to lubricate the wax molecules and cause the wax molecules to **"slip apart"** as the methylated oils penetrate the waxy leaf surface. Because methylated oils begin to penetrate the plant cuticle as soon as the spray droplet is applied the herbicide molecules easily penetrate this cuticular barrier and are transported to the "target site" in the weed.




CORNBELT® METHYLATED SOY-STIK®

A blend of methylated soybean oil and surfactant emulsifier.
Functioning agents .....100%

**Cornbelt® SOY-STIK®** methylated soybean oil is a multi-component spray adjuvant designed to **enhance the performance** of many post-emergence herbicides by increasing the amount of herbicide that penetrates through the plant cuticle to reach the “target site” within the weed. **Cornbelt® SOY-STIK®** includes a defoamer and should be used when methylated crop oil is recommended on the herbicide label.




# CORNBELT® BASE™ IS A BLEND OF ALKALINE BUFFERED METHYLATED SEED OIL, NONIONIC SURFACTANT, AMMONIATED NITROGEN AND COMPATIBILITY AIDS.

Ingredients:
Alkaline buffered methylated seed oil,
nitrogen-based fertilizer solution,
nonionic surfactant and antifoam agent .....100%

**Cornbelt® BASE™** is a "a basic blend adjuvant" that enhances the performance of many herbicides including sulfonylurea herbicides such as Accent®, Accent Gold® and UpBeet®, and imidazolinones such as Pursuit® and Raptor®, and sugarbeet "microrate applications."

**Basic Blend Adjuvants** increase water pH which increases water solubility of certain herbicides and are referred to as blends because they contain very different components that have different functions within the composition of the adjuvant.

**Cornbelt® BASE™** combines the surfactant advantages of non-ionic surfactants, methylated seed oils, and fertilizer adjuvants, while raising the pH of the solution which enhances the solubility of many sulfonylurea and imidazonlinone herbicides.

Example: Accent® is 3 times more soluble at a pH of 8.5 than at a pH of 7.

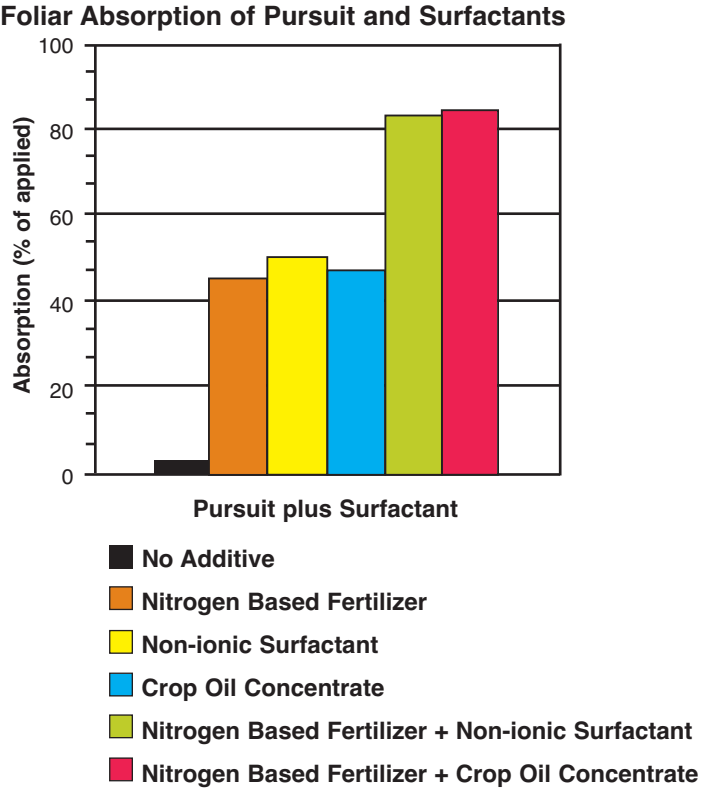
UpBeet® is 100 times more soluble at a pH of 9 than at a pH of 5.

Pursuit® is twice as soluble at a pH of 9 than at a pH of 7.

# NITROGEN BASED FERTILIZER AS AN ADJUVANT

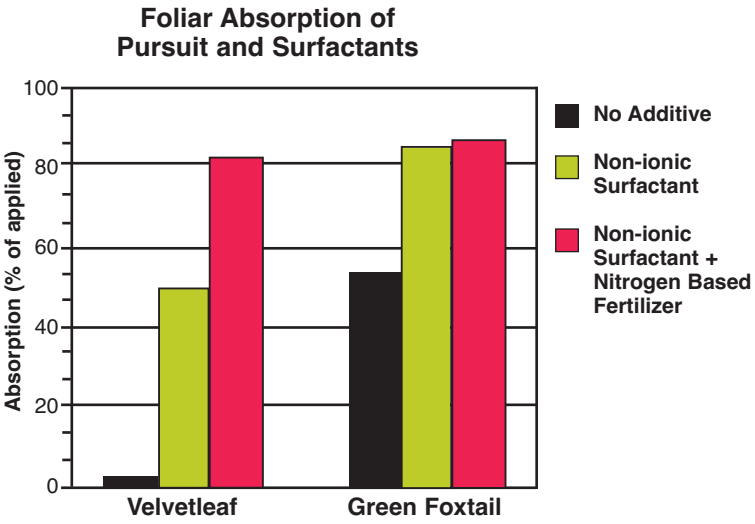
Most postemergence herbicides recommend or require the addition of a nitrogen based fertilizer as an adjuvant either alone or in combination with a non-ionic surfactant or a crop oil concentrate. Many of the reasons why nitrogen based fertilizers work are unclear but the positive results are obvious.

Field tests have shown that the addition of a nitrogen based fertilizer to a herbicide application increases the absorption of the herbicide into the leaf. The two graphs below show how the absorption of Pursuit is increased by the addition of various adjuvants, but when a nitrogen based fertilizer is added with a non-ionic surfactant or a crop oil concentrate the results are dramatic.




It appears that nitrogen based fertilizer, by enhancing the uptake of herbicides, are able to counteract the effects of unfavorable weather conditions, which make certain weed species more resistant to herbicides. A nitrogen based fertilizer may also aid the movement of systemic herbicides into the phloem of the plant, thereby increasing the amount of herbicide that can translocate to growing points.

The effectiveness of a nitrogen based fertilizer as an adjuvant depends on the weed species being targeted. When the herbicide label offers a choice between a crop oil concentrate, a non-ionic surfactant or a nitrogen based fertilizer, the problem weed species in the field should become the determining factor of which type product to use.




CORNBELT® PREMIUM AMS

Cornbelt® PREMIUM AMS is the highest quality spray grade Ammonium Sulfate adjuvant available. The pure white crystals dissolve easily in water making a clear solution. Cornbelt® PREMIUM AMS is impurity-free and non-foaming. Cornbelt® PREMIUM AMS is an approved spray adjuvant to enhance the performance of herbicides including:

Abundit Extra
Accent Q
Affinity Brands
Agility SG
Aim EC
Ally Brands
Anthem Brands
Armezon
Assure II
Autumn Super
Banvel
Basagran
Basis Blend
Beyond
Buccaneer Brands
Cadet
Callisto Brands
Capreno
Cimarron Brands
Clarity
Classic
Cobra
Detonate
Distinct
Duramax
Durango DMA
Encompass
Enlite
Expert
Express
Extreme
Fallow Star
Firstshot SG
FirstRate
Flexstar Brands
Fusilade DX
Fusion
Gangster
Goldsky
Halex GT
Harmony Brands
Harness Brands
Hornet
Huskie Brands
Impact 2.8SG
Laudis
Liberty
Matrix SG
Marvel
Metribuzin DF
Northstar
Outlook
Peak
Permit
Phoenix
Poast
Powerflex HL
Pursuit
Python WDG
Realm Q
Raptor
Reflex
Resolve Q
Resource
Rimfire Max
Roundup Brands
RT 3
Select Max
Sequence
Sonic
Spartan Charge
Spartan Elite
Spirit
Status
Steadfast Q
Storm
Surpass NXT
Surveil
Synchrony XP
Thunder
Thunder Master
Touchdown Brands
Traxion
Tricor DF
Ultra Blazer
Valor Brands
Volunteer
Yukon


## Water Conditioning Agent & Potentiating Adjuvant

Ingredients:

| | |
|---|---|
| Monocarbamide dihydrogen sulphate, amine phosphates and viscosity reducing agents | 90% |
| Inert Ingredients | 10% |
| Total | 100% |

Cornbelt® *N-TENSE™* is a new technology water conditioner based on amide chemistry designed to replace ammonium sulfate in tank mixes primarily with glyphosate.

Cornbelt® *N-TENSE™* reduces glyphosate "tie-up" by preventing calcium, iron, magnesium and manganese from antagonizing glyphosate.

Cornbelt® *N-TENSE™* reduces the pH of the glyphosate tank mix to 3.5 and converts the glyphosate into the ammonium acid form which is more actively absorbed into the plant and into the plant transport system.

Cornbelt® *N-TENSE™* contains a powerful potentiating agent which facilitates active movement of glyphosate into the plant.

Cornbelt® *N-TENSE™* improves herbicide performance by improving the rate and efficiency of movement into the leaf and translocation through the plant.

Add Cornbelt® *N-TENSE™* to the spray tank before adding the glyphosate at 1 to 2 quart per 100 gallon. Cornbelt® *N-TENSE™* is compatible with Cornbelt® *GARDIAN®* and other deposition agents.

The concentrated formula of Cornbelt® *N-TENSE™* means less warehouse space is required compared to ammonium sulfate and it is easier to handle and mix for the applicator. Cornbelt® *N-TENSE™* makes lifting heavy bags of ammonium sulfate a thing of the past.


## A Unique Seed Oil Derived Nonionic Surfactant which Replaces Oil Concentrates.

| | |
|---|---|
| Ingredients: | |
| Fatty acid complex alkoxylate, free fatty acids and Alkylarylalkoxylate | 95% |
| Inert Ingredients | 5% |
| Total | 100% |

Cornbelt® TROPHY GOLD™ is a unique surfactant which improves the deposition and penetration of active ingredients into the target plant and contains free fatty acids to improve rain fastness and wash-off resistance.

Cornbelt® TROPHY GOLD™ is ultra safe. Unlike traditional crop oil concentrates, Cornbelt® TROPHY GOLD™ does not break down the cell wall of the leaf.

Cornbelt® TROPHY GOLD™ migrates rapidly to the droplet/leaf surface interface pulling the pesticide with it. The result is a much higher pesticide concentration at the droplet/leaf surface interface compared to traditional nonionic surfactants or crop oil concentrates. Since the plant does not recognize the soybean oil derivative as a hostile substance, it allows it into the leaf without causing cell wall disruption. This speeds up the absorption rate into the plant delivering increased efficiency with crop safety.

Cornbelt® TROPHY GOLD™ may be used any time the pesticide label calls for the use of a crop oil concentrate or a nonionic surfactant.

One quart of Cornbelt® TROPHY GOLD™ replaces one gallon of traditional crop oil concentrate – 75% less product to handle – less warehouse space required and less work for the applicator and unsurpassed performance.

# CORNBELT® LOCKTITE™

**Active Ingredients:**

Proprietary Blend of Fatty Acid Complex Alkoxylate, Oligomeric Resin and Isomeric Alcohol Alkoxylate .....100%

Cornbelt® LOCKTITE™ is a multifunctional nonionic surfactant and drift & deposition management agent with anti-bounce technology.

Cornbelt® LOCKTITE™ is designed to be used with all glyphosate delivery systems, including straight glyphosate and glyphosate tank mixes with dicamba and phenoxy herbicides.

Cornbelt® LOCKTITE™ is designed for air induction nozzles and coarse sprays.

The adhesive properties of Cornbelt® LOCKTITE™ provide superior anti-bounce of the spray droplet and greater retention on the leaf surface as demonstrated in the photos below.

Use Rate: 1 to 2 quart per 100 gallon of spray solution

# CORNBELT® VAPORGARD™

**Active Ingredients:**

Beta-hydroxy Tricarballylate, Alkyl Polyglucoside, Monocarbamide Dihydrogen Sulfate and Acrylamide Sodium Acrylate Linear Copolymer.....34.75%

Cornbelt® VAPORGARD™ is an ammonium free water conditioning agent designed for glyphosate tank mixes with dicamba and phenoxy herbicides.

Cornbelt® VAPORGARD™ is a strong water conditioner that is designed to increase the activity of glyphosate in hard water. VAPORGARD™ is NOT an acidifier but is a true buffer that tends to hold the pH of a spray solution of a glyphosate tank mix with dicamba in the range of 5.0 to 5.5.

Cornbelt® VAPORGARD™ is patent pending technology that helps to manage the volatility of dicamba salts.

Cornbelt® VAPORGARD™ contains a nonionic surfactant specifically designed to improve the performance of glyphosate.

Cornbelt® VAPORGARD™ contains patented TRANSGARD® polymer technology designed for use with nozzles (such as AI, Turbo-T nozzles, etc.) which deliver coarse spray quality droplets. This system balances drift mitigation with properly sized droplets so as not to interfere with herbicide activity.

Cornbelt® VAPORGARD™ contains a high technology defoaming system to control foaming in the spray tank.

Use Rate: 1 to 3 quart per 100 gallon of spray solution based on water hardness.

| Water Hardness | # of Quarts per 100 Gallon |
|---|---|
| < 300 ppm | 1 qt |
| 300-500 ppm | 2 qt |
| > 500 ppm | 3 qt |

# PETROLEUM OILS AS ADJUVANTS

Crop Oil Concentrates are petroleum oil based products typically containing 80-85% base oil and 15-20% of a surfactant/emulsifier and are formulated for maximum dispersibility.

## HOW DO YOU SELECT A QUALITY CROP OIL CONCENTRATE ADJUVANT?

**BASE OIL selection is critical for adjuvant quality as well as crop safety.** The level of oil refinement determines the quality of oil.

**Adjuvant Effectiveness is determined by the paraffin content of the oil.** Paraffin hydrocarbons are arranged in open chains rather than in rings as are Naphthenes (unsaturated rings). Naphthenic oils are more phytotoxic. A 70% paraffinic structure is considered highly refined or mineral quality oil.

**Crop Safety is determined by the unsulfonated residue and the viscosity of the base oil.** Phytotoxicity has been shown to increase in oils with an unsulfonated residue content below 90%. Viscosity influences how much and how long the oil stays on the leaf surface affecting the potential for an oil to burn a crop. Viscosity should be a "60-100 Second" type oil with optimum viscosity of 70 second type for relative crop safety. The optimal molecular weight of the base oil for crop safety and performance is C23.

**The Surfactant/Emulsifier should have maximum surfactant load to provide adjuvant activity on the weeds and should provide:**

- Good emulsifying characteristics that allow the oil to stay in suspension within the water herbicide tank mixture.
- Physical properties that prevent the base oil and surfactant/emulsifier from separating in the package container.

## HOW DO CROP OIL CONCENTRATES WORK?

Crop Oil Concentrates have at least three ways of aiding the herbicide in controlling weeds, these are listed in order of importance:

1. Penetrate the waxy layer of cuticle on the leaf surface, providing increased penetration of the herbicide.
2. Reduce the surface tension of the spray droplet thereby insuring uniform spray coverage of the spray solution.
3. Increase the retention and the drying time of the spray solution on the leaf surface thereby increasing the amount of time the herbicide can penetrate the leaf.


Ingredients:

| | |
|---|---|
| Paraffinic Mineral Oil | 80% |
| Nonionic Surfactant/Emulsifier | 20% |
| Total | 100% |

The base oil used in Cornbelt® PREMIUM Crop Oil Concentrate is a highly refined mineral quality oil with **70% paraffinic hydrocarbons**. The **molecular weight** of the oil is carefully controlled at the **optimal medium range of C23**. Research has shown that optimal molecular weight and high paraffinicity are the key criteria in defining the effectiveness of agricultural spray oil.

Mineral base oil assures crop safety with an **unsulfonated residue of 95%** to protect sensitive crop plant tissues from injury.

The surfactant/emulsifier used in Cornbelt® PREMIUM Crop Oil Concentrate **contains no alcohol** and provides excellent emulsifying and spreading qualities.

Cornbelt® PREMIUM Crop Oil Concentrate contains 20% surfactant/emulsifier. This is **almost 18% more surfactant/emulsifier** than most crop oil.


Ingredients:

| | |
|---|---|
| Paraffinic Petroleum Oil | 83% |
| Surfactant Blend/Emulsifier | 17% |
| Total | 100% |

Cornbelt® Crop Oil Concentrate contains a paraffinic base oil which is over 90% unsulfonated, reducing the amount of residues that could damage sensitive plant tissues.

The surfactant/emulsifier used in this formulation is field proven and provides excellent emulsifying and spreading qualities.

# PESTICIDE EMERGENCIES
# PHONE: (800) 424-9300

Damage caused by an accident involving transportation of pesticides or other possible emergencies, phone the toll free number for the Pesticide Safety Team Network (PSTN).

The PSTN of the Crop Life America represents a joint effort of technically qualified manufacturers to respond to emergency situations where the involuntary release of agricultural chemicals has occurred. The PSTN can be reached by telephone 24 hours a day through this CHEMTREC number.


## four keys to pesticide safety

1. READ THE LABEL ON EACH PESTICIDE CONTAINER BEFORE EACH USE. Follow instructions; heed all cautions and warnings. Why read the label each time? Because the chemical nature of pesticides and their uses vary greatly. You should refresh your mind each time on the material's specific uses.

2. DISPOSE OF EMPTY CONTAINERS SAFELY. It is almost impossible to remove all material from a container. "Empty" containers contain small amounts of pesticides that could harm children or animals who might get into them. Refer to label instructions for proper disposal directions.

3. STORE PESTICIDES IN THEIR ORIGINAL, LABELED CONTAINERS. Keep them out of reach of children and irresponsible people. They cannot be properly identified unless they are the original labeled containers. Lock pesticides in a shed away from feed, seed, farm supplies and all food items.

4. SPILLS. First contact the local sheriff, then your State Department of Agriculture.

**All information contained in this Handbook is subject to change at any time and is contingent on continued Federal and State registration of pesticides listed. In addition to information contained in this Handbook, LABELS OF EACH PRODUCT MUST BE CONSULTED BEFORE USE OF SUCH PRODUCT. Always follow product label instructions. Responsibility cannot be assumed by VAN DIEST SUPPLY COMPANY for any results that may follow or any conclusions or inferences that may be drawn following the use of the material presented here. No person has authority to make any representation not contained on individual pesticide labels.**

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