



KALO

SEED CARE SOLUTIONS GUIDE

Additives, Utility Products and Equipment to Enhance
Seed Care Operations and Improve Post-Seed
Treatment Handling Characteristics and Appearance



July 2017

ABOUT KALO

Since 1932, KALO has served professional turf and agriculture by providing solutions to challenges that custom applicators, growers, and turf managers face with the utilization of plant protection products.

Look to KALO for solutions. We provide innovative technical support encompassing formulation development, packaging, label design, shipping and order fulfillment operations.

KALO supplies customers with a complete line of adjuvant and specialty products that cover a broad range of uses.



Since 1932, KALO has been helping growers and turf managers operate more efficiently.



The information used in this product guide is thought to be reliable. Consult plant control and adjuvant product labels to confirm use recommendations.

ALWAYS READ AND FOLLOW ALL DIRECTIONS ON THE PRODUCT LABEL AND THE LABEL OF THE PESTICIDE BEING USED.

CONTENTS

SECTIONS

Seed Treatment, Custom Blends, and Seed Treatment Recipes.....	4-5
Spray Care vs Seed Care.....	6
Seed Flow Complications.....	7
Additives to Improve Coverage.....	8
Uneven or Reduce Treatment Coverage.....	9
Seed Flow and Plantability Problems.....	10
Seed Stick and Abrasion.....	11
Managing Seed Stick and Abrasion.....	12
Managing Application Volume + Add Seed Shine.....	13
Dust-Off.....	14
Testing Seed for Dust-Off.....	15
Seed Treating Equipment.....	16
Advances in Measuring Loss-In-Weight.....	17
Static Mixing vs Slurry Mixing.....	18
Mixing System Comparisons.....	19
Handling Treated Seed.....	20
Transporting Treated Seed.....	21

TREATMENT PRODUCTS

FreeFlow.....	22-23
Colorizer.....	24-25
Custom Coverage.....	26-27
FGVO.....	28-29
Impress.....	30-33
Pixy.....	34
Pixy Applicator.....	35
Turbo Cleanse.....	36-37
Vigor.....	38-41
Legacy.....	42-43
EZ-MIZER.....	44-45
NOVO.....	46-51
SIRA.....	52-53
TERMINOLOGY.....	54-55
CONVERSION TABLES.....	56

SEED TREATMENT, CUSTOM BLENDS AND SEED TREATMENT RECIPES

SEED TREATMENT RECIPE EXAMPLE

SEED TREATMENT

Seed treatment is the application of biological organisms/products and chemical ingredients onto seed to suppress, control, or repel plant pathogens, insects, or other pests that attack seeds, seedlings or plants. Other products such as inoculants, herbicide safeners, micronutrients, plant growth regulators, seed coating materials, colorants, etc., may also be applied to the seed. Treated seed is intended for planting and may not be used for food, feed, or oil purposes.

CUSTOM BLENDS

Custom blends are mixtures of independently registered products blended together by manufacturers or distributors for applicators to reduce the number of products that need to be combined on site. Ready-to-use products are commercially marketed pre-mixtures of registered seed treatment products designed to properly treat seed, typically without the use of additional components other than water. If other active components are added to a ready-to-use product, then it becomes a custom seed treatment recipe.

SEED TREATMENT RECIPES

Seed treatment recipes may include individual products, custom blends, and/or ready-to-use seed treatment products. A seed treatment recipe is the combination of all the registered and unregistered treatment products identified by a manufacturer, seed company, or other entity for a specific purpose on a crop. The components may be sourced from one or multiple manufacturers. The products may be combined in a slurry on-site prior to application or pumped individually into the treating equipment. Each recipe should be evaluated and verified to be suitable for each crop. Reputable consultants with specialized understanding of seed treatment products and application technology may be needed to help develop seed treatment recipes.

DATE:	06/06/2011
TIME:	12:35:51
SYSTEM:	SS-A10

PRINTOUT #:	BATCH #:	TICKET #:
183	K00000335	207

OPERATOR:	
OPERATOR NAME	Demo Operator
LOCATION ID	
BUSINESS NAME	CUSTOM SEED CARE SERVICES
ADDRESS	
ADDRESS	441 E LUCAS STREET
CITY/STATE/ZIP	RUSSELL, KS 67665-
PHONE	(785)445-3497
FAX	(785)445-3498
DEALER LICENSE	
APP LICENSE	

DELIVER TO:	
ACCOUNT #	2222
NAME	FARMER, BOB
ADDRESS	
ADDRESS	3487 R ROAD
CITY/STATE/ZIP	ANYWHERE, KS 67626-
PHONE	(111)111-1111

SIRA ADJUSTED CALCULATIONS	YES
SIRA CALIBRATION RATE	6.73 OZ/CWT
STANDARD CALIBRATION RATE	5.00 OZ/CWT

BATCH CALCULATIONS AND SPECIFICATIONS			DESIGNED TO TREAT		3,718 LBS OF SEED
SEED SIZE	TARGET TREATMENT UNITS	TARGET GAL	SLURRY TANK		
3,765 seeds/lb	100.0 treat units	2.0 gal	SEED SLURRY TANK		
PRODUCT NAME	BATCH TARGET	TARGET UNIT	BATCH ACTUAL	ACTUAL UNIT	ACTUAL GAL
Cruiser Maxx	11.24	Lbs	11.95	Lbs	1.25
WATER	6.52	Lbs	6.95	Lbs	0.82
TOTAL	17.76	Lbs	18.90	Lbs	2.07

PRESCRIPTION DESIGN	PRESCRIPTION NAME	CROP		SEED STANDARD
	CRUISER MAXX	BEANS		140,000 SEEDS
PRODUCT NAME	EPA REGISTRATION NUMBER	STANDARD RATE (oz/owt)	SIRA RATE (oz/owt)	DENSITY(lbs/g)
Cruiser Maxx	100-1247	3.0000	4.0350	8.5910
WATER		2.0000	2.6900	8.3400



SPRAY CARE VS SEED CARE

SEED FLOW COMPLICATIONS



SPRAY CARE (ADJUVANTS)

With crop protection delivered through spray systems, we move the applicator past the target.

SEED CARE (SEEDJUVANTS)

With crop protection delivered through seed care, we move the target past the applicator.

ADDITIVE PURPOSE	SPRAY CARE (ADJUVANTS)	SEED CARE (SEEDJUVANTS)
COVERAGE	Spreads and wets the leaf (surfactants)	Spreads and covers the seed
DEPOSITION	Prevents drift and increases rain-fastness (drift control and spray-stickers)	Reduces sticking to equipment and manages dust-off during handling
DRY-TIME	To speed or slow dry time	Generally to speed dry time
INDICATOR	Spray dyes or foam markers	Seed color and cosmetic enhancements
UTILITY	Antifoam, pH adjusters	Cleaners and others

COMPLICATIONS THAT CAN ARISE WITH TREATED SEED:

- Seed flow
- Plantability
- Seed stick
- Sticking in equipment
- Clumping
- Abrasion
- Dust-off
- Inconsistent treatment coverage





ADDITIVES TO IMPROVE COVERAGE

ADDITIVES TO IMPROVE COVERAGE

Binders, such as polymers, reduce the amount of dust produced by the finished product in handling, shipping and sowing.

Seed coating polymers perform by spreading the treatment droplets and smoothing the valleys between coverage drops.

This alone helps reduce abrasion and dust-off and improves flowability, compared to rough tacky seeds without treatment polymer.



WITH SEED COATING POLYMERS

- Spreads the treatment droplets
- Smooths the valleys between coverage drops
- Helps reduce abrasion
- Reduces dust-off
- Improves flowability

WITHOUT POLYMERS

- Seeds are abrasive, dusty and sticky

UNEVEN OR REDUCED TREATMENT COVERAGE

If you are experiencing uneven or reduced treatment coverage on your seed, one of the following reasons may be the issue.

CLOGGED ATOMIZER

Atomization is the first step to getting the treatment on the seed. The better the atomization, generally the better the coverage. If the atomizer is plugged or dirty, treatment drizzles through to the seed and equipment resulting in reduced initial coverage. Additionally, the plugged atomizer continues to drip and drain following the flow of seed, which accumulates on equipment, and then exasperates the treatment problem with the next batch of seed that is treated. As the problem worsens, first and last seed of a batch is treated inconsistently. Read about the SLEEK-SPINNING EZ-MIZER™ atomizing wheel in this guide for the solution to clogged atomizers!



UNLEVEL TREATING DRUM

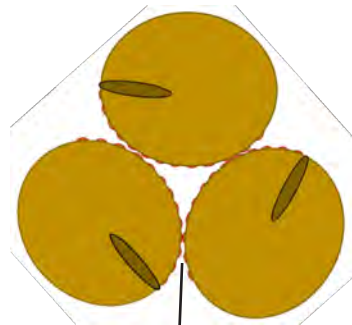
Check the degree of levelness from the front of the treating drum to the exit point of the treating drum. The decline/incline impacts the time the seed is in the drum. Very typically, operators with problems need to adjust the degree of decline/incline to increase the amount of time the seed is in the drum.



SEED FLOW AND PLANTIBILITY PROBLEMS

SEED FLOW AND PLANTIBILITY PROBLEMS RESULT FROM SEED STICK AND ABRASION

Seed treatments that do not dry well and/or dry to a “tacky” finish, stick together.



Inconsistent treatment coverage creates added points of abrasion, resulting in reduced seed flowability and increased “dusting-off” of the seed treatment during handling.

BY REDUCING STICK & ABRASION, THE SEED'S FLOWABILITY IS MUCH IMPROVED AND DUST-OFF IS REDUCED!

SEED STICK AND ABRASION

SEED STICK AND ABRASION

Vegetable oil has become a popular management tool for reducing the tendency towards seed sticking.

To reduce sticking of seed to each other and from equipment, add vegetable oil at a rate of 0.25 to 0.75 ounces per 100 pounds of seed.

So how does this work??

Oil and water do not mix. When the non-emulsified vegetable oil is mixed into the heavy water-based slurry, the lighter oil fights to reach the surface of the container or the droplet. Once on the seed, the oil moves to the outer surface of the seed coat, thereby reducing sticking to each other and the equipment!

The industry has accepted the seed safeness of vegetable oil, but, operators must be very careful to prevent seed injury. **DO NOT SIMPLY START ADDING THINGS TO YOUR TREATMENT WITHOUT ASSURANCE OF SEED SAFETY!**



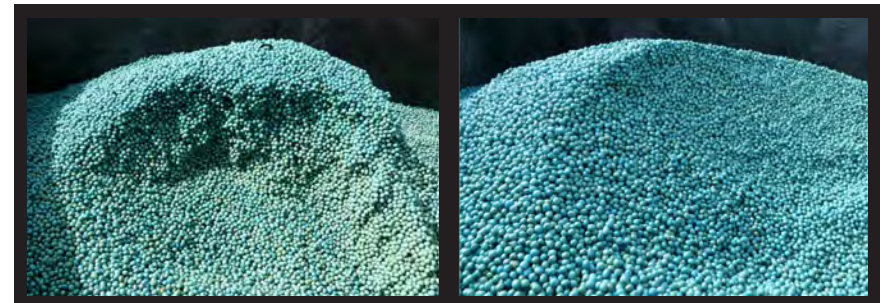
MANAGING SEED STICK & ABRASION

MANAGING APPLICATION VOLUME + ADD SEED SHINE

Element of Treatment Application	Impact on Stick & Abrasion	Management Technique	Common Problem or Misunderstanding
The Treatment Mixture	Very High	The use of additives to impact coverage and handling.	<ul style="list-style-type: none"> • Failure to use water • Misunderstanding of treatment slurry volume
Volume of Application	High	Understanding seed capacity for fluid and carrying rates	<ul style="list-style-type: none"> • Seed volumes too low • General misconception is that wetness equals stickiness; this is not always true
Secondary Mixing	High	Controlling time seed remains in the secondary drum.	<ul style="list-style-type: none"> • Drum decline too steep • Seed moves through too quickly
Atomization	Moderate	Maintaining a clean atomizer .	<ul style="list-style-type: none"> • Dirty atomizer • Plugged atomizer
Seed Type and Size	Moderate	Adjusting rates to accommodate the crop and seed size.	<ul style="list-style-type: none"> • Large seeds result in over-treatment • Small seeds results in under-treatment

REDUCING APPLICATION VOLUME DOES NOT REDUCE TREATMENT STICK!

MISUNDERSTOOD: Reducing application volume does not always reduce treatment stick, sometimes reducing volume makes it worse!



Example of Treatment **WITHOUT** Polymer Added

CruiserMaxx: 3.2 oz
Water: 0.3 oz

Total Slurry Application: 3.5 oz/100 pounds of seed

Example of Treatment **WITH** Polymer Added

CruiserMaxx: 3.2 oz
Water: 1.00 oz
Polymer (Pixy): 0.75 oz

Total Slurry Application: 4.95 oz/100 pounds of seed

Adding water and polymer to the slurry increased the volume with positive impacts!
• Better Coverage • Better Drying • Reduced Bridging • Better Appearance •



ADD PIXY® (POLYMER) FOR BETTER SEED SHINE AND FLOWABILITY!

FILTER SHOWING DUST-OFF FROM SEED

DUST-OFF

DUST-OFF IS A SIGNIFICANT INDUSTRY CONCERN (FOR WORKERS AND THE ENVIRONMENT) FROM THE POINT OF SEED TREATMENT TO THE POINT OF SEED PLANTING.

Definition of Dust from Treated Seed: Fine particulate matter contained in or easily dislodged from treated seed. It consists of both the naturally occurring Untreated Seed Dust as well as components of the Seed Treatment.

Many factors influence the dust-off susceptibility of a treated seed. Here are just a few:

- Crop Seed Type
- Smooth regular shaped seeds vs. abrasive irregular shaped seeds.
- Pre-treat seed cleaning and conditioning. The quality of the seed cleaning and conditioning can play a major roll in the dust-off tendencies.
- Dusty seed prior to seed treating leads to dusty seed following seed treatment.
- Seed treatment formulation. Inert ingredients which improve coverage and retention vs. lack thereof.

TESTING SEED FOR DUST-OFF

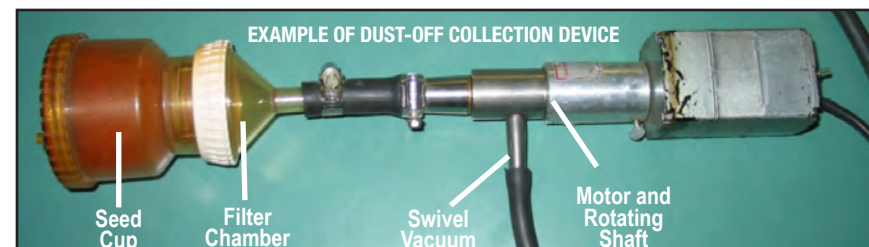
TESTING TREATED SEED FOR DUST-OFF SUSCEPTIBILITY

A dust-off collection device can be used to test how much active ingredient is “dusted-off” the seed.

The treated seeds are placed into a seed cup that rotates/tumbles the treated seed for a set amount of time. A vacuum is pulled through the seed cup and through a filter collecting the dust into a collection chamber. Filters are then collected and compared. Dust collected on the test filter is analyzed to determine how much active ingredient “dusted-off” the seed during the test.

DUST-OFF EVALUATION INCLUDES:

- The amount of actual “dust” that is lost from the treated seed during the test.
- The levels of active ingredients within the dust.





SEED TREATING EQUIPMENT

ADVANCES IN MEASURING LOSS-IN-WEIGHT

TYPES OF SEED TREATING EQUIPMENT

Treating Systems:	Designed to effectively calibrate varied application rates.
Prescription Management Systems:	Precisely measures and prepares varied treatments.
Batch Treating:	Commonly used in seed conditioning plants. A pre-measured batch of seed is treated with a pre-measured dose of treatment.
Continuous Flow:	Typically used in retail seed treating operations. A flowing stream of seed is treated with a flowing stream of seed treatment.
Loss-In-Weight:	Measures the rate at which a scaled measure of seed is disappearing from the scale tank(s). <i>(See next page.)</i>

CHALLENGES OF SEED TREATING EQUIPMENT

Calibration of Seed Flow to Fluid Pump:	Complicated by seed size and/or multi-crop.
Handling Characteristics of Treated Seed:	Complications include sticking in equipment, plantability and dust-off.
Mixing Treatment & Rate Calculations:	Complicated by diverse prescriptions, seed size, rate calculation, record keeping and preventing worker exposure.

LOSS-IN-WEIGHT SYSTEM USING...

...SEED WHEELS:	<p>Seed wheels control the flow of seed by the operator adjusting the speed of the wheel.</p> <p>A sample of seed is weighed prior to treating.</p> <p>Based upon the weight of the sample, a calculation is used to then determine how many pounds of seed are in each rotating "pocket" of the seed wheel.</p> <p>In contrast to the seed wheel, new loss-in-weight systems measure the rate at which a scaled measure of seed is disappearing from the scale tank(s).</p>
...FLOW METERS:	<p>Before flow meters, calibration involved a measuring pitcher and a stop watch.</p> <p>Now, many flow meters are available to provide real-time measured flow of the liquid treatment.</p> <p>The flow meter is often automated in conjunction with the seed flow device to achieve calibration.</p> <p>In contrast to liquid flow meters, new loss-in-weight treatment slurry systems measure the rate at which a scaled measure of treatment is disappearing from the scaled treatment tank(s).</p>

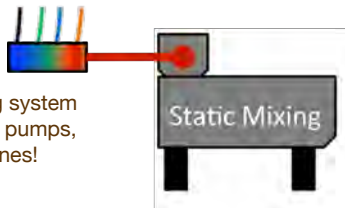


STATIC MIXING SYSTEM VS HOMOGENOUS SLURRY SYSTEM

MIXING SYSTEM COMPARISONS

STATIC MIXING SYSTEMS

Flowing individual streams, each calibrated with seed flow, are co-mingled as they pass through a small device prior to application. With static mixing systems, mixing generally happens at the treator and treatment calibration happens at the ingredient pumps, all DURING the treating process. There are multiple pumps, scales and lines for every product in the chosen treatment.



The static mixing system requires multiple pumps, scales and lines!

HOMOGENOUS SLURRY SYSTEMS

Individual products are **pre-measured and mixed together** into a homogenous slurry. A slurry system has **one** slurry pump and the **single** slurry stream is applied at a rate calibrated with seed flow.



The homogenous slurry system feeds from one line, pump and scale!

COMPARE	The NOVO Homogenous Slurry System	Static Mix System
Treatment Technology	Prescription	Recipe
Treatment Type	A Homogenous Slurry of Tank-Mixed Products	A Static Mix of Ingredients
Pumps Required During the Treating Process	ONE One calibrated with seed flow for application of the slurry prepared by the NOVO system	MULTIPLE Each ingredient in the recipe requires a calibrated pump with seed flow
Product Pumps	Standard Drum Pumps (or hand-adds) transfer products from original packaging to the NOVO system	Specialized Pump/Scale Interface for each ingredient
Definitions	SIMPLE <i>Freedon from complexity, intricacy or division into parts</i>	COMPLEX <i>Having parts that connect or go together in complicated ways</i>

NOVO
DO IT RIGHT. EVERY TIME.

NOVO® is a homogenous slurry based prescription system. Refer to this guide for more information about NOVO.





HANDLING TREATED SEED

HANDLING TREATED SEED

Care should be taken when handling treated seed, just as when working with any pesticide, to help prevent pesticide exposure to the handler, non-target organisms and water resources. Always check the seed bag label for specific details on the products you are using.

Always wear a long-sleeved shirt, long pants and chemical-resistant gloves when handling treated seed. Avoid breathing in dust or fumes when opening and/or emptying treated seed packaging, and avoid contact with eyes and skin. Wash thoroughly with soap and water after handling treated seed.

Some products are toxic to bees or pollinators so care should be taken to minimize dust drifting.

Treated seed should be stored away from feeds, foodstuffs, children, pets and/or livestock.

Treated seed needs to be protected from extreme temperatures and moisture therefore the facility should have good ventilation, block direct sunlight, and be dry.

NEVER COMPOST TREATED SEED AND NEVER BURN TREATED SEED IN A STOVE THAT IS USED IN THE HOME, FARM SHOP, ETC.



TRANSPORTING TREATED SEED

TRANSPORTING TREATED SEED

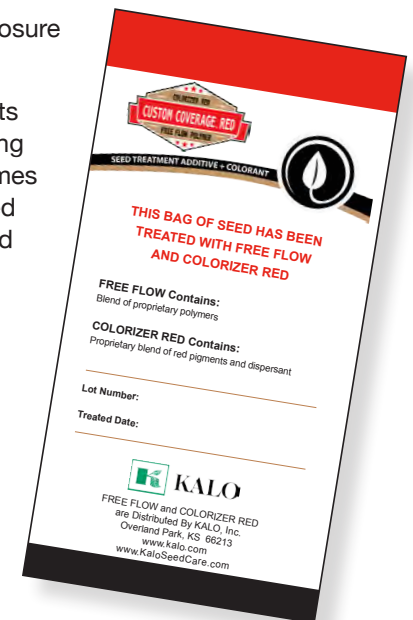
Ensure that seed treatment tag language is printed on or attached to the treated seed containers/packages or is contained in shipping documents for bulk treated seed.

Transport seed in a way that no seeds are spilled. In case of spills, collect the treated seed immediately.

Properly dispose of spillage to prevent exposure to humans, animals or the environment.

Always wear a long-sleeved shirt, long pants and chemical-resistant gloves when handling treated seed. Avoid breathing in dust or fumes when opening and/or emptying treated seed packaging, and avoid contact with eyes and skin.

Protect treated seed from direct sunlight, extreme heat and moisture.



TREAT TAG EXAMPLE

FREE FLOW™

IMPROVES TREATED SEED FLOW & PLANTABILITY & SUPPRESSES DUST-OFF

FREE FLOW™ reduces seed stick, reduces abrasion and increases flowability.

FREE FLOW performs by enhancing treatment coverage and dries as a hardened water soluble film on the treated seed coat.

Treated seed with FREE FLOW added to the mix flows and plants better with less susceptibility to dust-off.

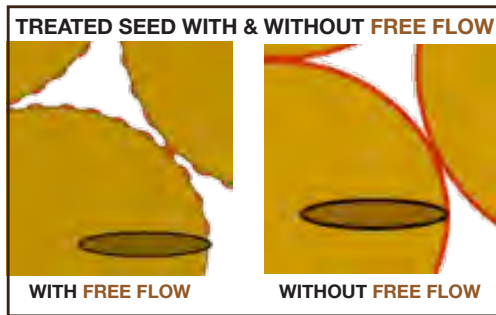
FREE FLOW is different than most other “polymer” products that are difficult to handle and prone to settling in the container. FREE FLOW remains free-flowing in the jug before use and helps seed remain free flowing after treatment.

FREE FLOW is broadly compatible with insecticides, fungicides, nematicides, plant growth regulators, biologicals, and other seed treatment products labeled for slurried seed treatment.

FREE FLOW is designed for use on a broad range of crops and is especially effective in applications with soybeans as well as with high volume treatment applications such as those used on cotton.

FREE FLOW is rhizobia friendly when mixed and applied with inoculants and other growth promoting biologicals.

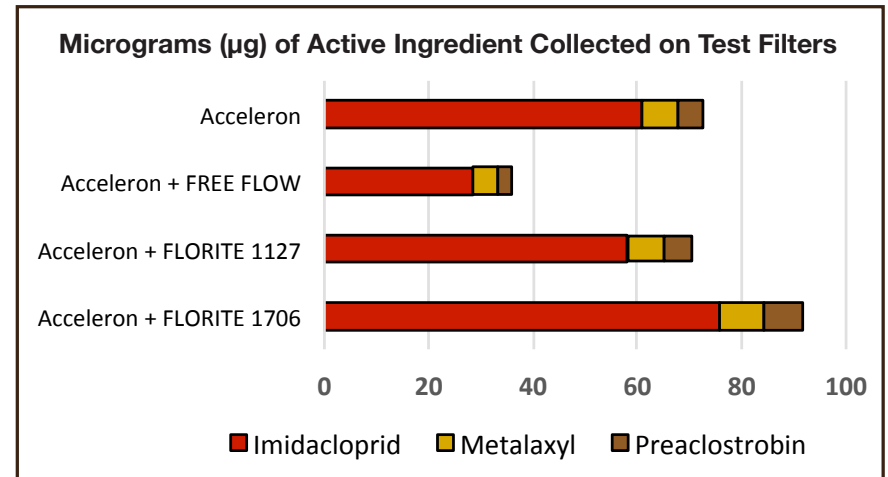
FREE FLOW is part of the CUSTOM COVERAGE program. Refer to the CUSTOM COVERAGE section of this book for more information.



FALL 2014 TREATED SOYBEANS DUST-OFF EVALUATION*

FREE FLOW suppressed active ingredient dust-off compared to the standard treatment by 50% and out-performed competitive polymer products.

*Dust-off collection filter residue analysis was completed by Bio Diagnostics (Eurofins); analytical method HPLC treatment concentration.



FREE FLOW™



2 x 2.5 Gallon Case (AC-FF-225)

15 Gallon Drum (AC-FF-15)

30 Gallon Drum (AC-FF-30)

265 Gallon Tote (AC-FF-265)

Typical Use Rates

COTTON: 0.25 to 0.5 fluid ounces per 100 pounds of seed.
SOYBEANS: 0.75 fluid ounces per 100 pounds of seed.

COLORIZER™

Aqueous Color Dispersions Designed for Seed Treatment

COLORIZER™ is a highly concentrated and safe colorant, which when added to the seed treatment, will produce a highly visible colored seed.

These highly loaded colorants are designed for use in seed treatment and manufactured with ingredients approved for this use.

COLORIZER is available in red, orange, blue and green. Custom blended colors are available upon request.

COLORIZER is part of the CUSTOM COVERAGE program. Refer to the CUSTOM COVERAGE section of this book for more information.

These soybean seeds have been treated with Colorizer RED.



COLORIZER™ RED

2 x 2.5 Gallon Case (AC-COR-225)
15 Gallon Drum (AC-COR-15)
30 Gallon Drum (AC-COR-30)
265 Gallon Tote (AC-COR-265)

COLORIZER™ BLUE

2 x 2.5 Gallon Case (AC-COB-225)
15 Gallon Drum (AC-COB-15)
30 Gallon Drum (AC-COB-30)
265 Gallon Tote (AC-COB-265)

COLORIZER™ ORANGE

2 x 2.5 Gallon Case (AC-COO-225)
15 Gallon Drum (AC-COO-15)
30 Gallon Drum (AC-COO-30)
265 Gallon Tote (AC-COO-265)

COLORIZER™ GREEN

2 x 2.5 Gallon Case (AC-COG-225)
15 Gallon Drum (AC-COG-15)
30 Gallon Drum (AC-COG-30)
265 Gallon Tote (AC-COG-265)



Suggested Use Rates

0.25 to 1.5 fluid ounces per 100 pounds of seed.
Rates can be adjusted to achieve a wide range of performance and hues.



Custom Mixed Polymer & Colorant Seed Treatment Additive

CUSTOM COVERAGE™ is a combination seed treatment additive of FREE FLOW™ polymer additive and COLORIZER™ seed treatment colorant.

CUSTOM COVERAGE is designed to enhance treatment coverage & retention on the seed coat and impart a color to the treated seed.

CUSTOM COVERAGE may be used with any aqueous based seed treatment product designed for mixed slurry application to any type of seed grown for food, feed, or other vegetative purpose.

CUSTOM COVERAGE is available in several color options.

THE CUSTOM COVERAGE PROGRAM

The key components of the CUSTOM COVERAGE menu of options include FREE FLOW polymer additive combined with choice of COLORIZER product.

The CUSTOM COVERAGE product program is designed to empower retail seed treating operations with a menu of seed treating polymer and color intensity levels designed to fit a broad range of performance and value points.

COLORIZER products are highly loaded colorants designed for use in seed treatment and manufactured with ingredients approved for this use.

FREE FLOW is a liquid seed treatment additive that when mixed with slurry improves coverage on the seed speeding drying time and dries to hardened water soluble micro-film which reduces dusting-off.

CUSTOM COVERAGE COMBINATION EXAMPLE		FREE FLOW™		
		0.75 oz/cwt	1.00 oz/cwt	1.25 oz/cwt
COLORIZER RED	0.50 oz/fl oz	CC CODE: 075050	CC CODE: 100050	CC CODE: 125050
		RATE OZ/100: 1.25 oz	RATE OZ/100: 1.50 oz	RATE OZ/100: 1.75 oz
	0.75 oz/fl oz	CC CODE: 075075	CC CODE: 100075	CC CODE: 125075
		RATE OZ/100: 1.50 oz	RATE OZ/100: 1.75 oz	RATE OZ/100: 2.00 oz
	1.00 oz/fl oz	CC CODE: 075100	CC CODE: 100100	CC CODE: 125100
		RATE OZ/100: 1.75 oz	RATE OZ/100: 2.00 oz	RATE OZ/100: 2.25 oz

Combinations with varied levels of FREE FLOW and COLORIZER RED.

When to choose a LOWER level of color intensity.

When treating soybeans with a pre-mix combination of fungicide and insecticide that already has a color included, but desire to improve coverage and color intensity.

When to choose a HIGHER level of color intensity.

When treating soybeans with a tank-mix of fungicide and insecticide that has no color with those products.

The use of a jar-test to confirm compatibility is recommended prior to large volume mixing of any new treatment slurry.

FREE FLOW + COLORIZER™



Custom Coverage Red (75/50 Blend) Blend consists of 75% Free Flow & 50% Colorizer Red
 2 x 2.5 Gallon Case (AC-CCR-075050-225)
 15 Gallon Drum (AC-CCR-075050-15)
 30 Gallon Drum (AC-CCR-075050-30)
 265 Gallon Tote (AC-CCR-075050-265)

CUSTOM COVERAGE RED AVAILABLE IN MULTIPLE VARIATIONS

For example, CCR 075 050 delivers 0.75 fl oz of FREE FLOW and 0.50 fl oz of COLORIZER RED when applied at a rate of 1.25 fl oz per 100 lbs of seed.

CCR 075050 has been widely used to enhance color of pre-colored seed treatments along with the convenience of FREE FLOW all in the same product.

Custom Coverage Red (75/75 Blend) Blend consists of 75% Free Flow & 75% Colorizer Red
 2 x 2.5 Gallon Case (AC-CCR-075075-225)
 15 Gallon Drum (AC-CCR-075075-15)
 30 Gallon Drum (AC-CCR-075075-30)
 265 Gallon Tote (AC-CCR-075075-265)

Custom Coverage Red (75/100 Blend) Blend consists of 75% Free Flow & 100% Colorizer Red
 2 x 2.5 Gallon Case (AC-CCR-075100-225)
 15 Gallon Drum (AC-CCR-075100-15)
 30 Gallon Drum (AC-CCR-075100-30)
 265 Gallon Tote (AC-CCR-075100-265)

Custom Coverage Red (100/50 Blend) Blend consists of 100% Free Flow & 50% Colorizer Red
 2 x 2.5 Gallon Case (AC-CCR-100050-225)
 15 Gallon Drum (AC-CCR-100050-15)
 30 Gallon Drum (AC-CCR-100050-30)
 265 Gallon Tote (AC-CCR-100050-265)



Custom Coverage Blue
 2 x 2.5 Gallon Case (AC-CCB-225)
 15 Gallon Drum (AC-CCB-15)
 30 Gallon Drum (AC-CCB-30)
 265 Gallon Tote (AC-CCB-265)



Custom Coverage Orange
 2 x 2.5 Gallon Case (AC-CCO-225)
 15 Gallon Drum (AC-CCO-15)
 30 Gallon Drum (AC-CCO-30)
 265 Gallon Tote (AC-CCO-265)



Custom Coverage Green
 2 x 2.5 Gallon Case (AC-CCG-225)
 15 Gallon Drum (AC-CCG-15)
 30 Gallon Drum (AC-CCG-30)
 265 Gallon Tote (AC-CCG-265)



Suggested Use Rates

Refer to chart for FREE FLOW rates plus COLORIZER rates. Rates can be adjusted to achieve a wide range of performance and hues.

FGVO™

RECOMMENDED ADDITIVE TO REDUCE SEED SET & MANAGE RESIDUE BUILD-UP



Oil and water don't mix! When non-emulsified FGVO is mixed into water-based seed treatment slurry, the lighter FGVO fights to reach the seed coat surface. Once on the seed, the oil surfaces the seed coat and reduces sticking to each other and the equipment!

FGVO reduces seed-to-seed stick and residue build-up on treating equipment surfaces.

FGVO is a Food Grade Vegetable Oil which has been conveniently packaged and made available for use in seed and other grain handling operations.

FGVO is safe and approved for use on raw agricultural commodities used for feed processing purposes, or may be mixed and applied with seed treatment products that do not prohibit the use of vegetable oil.

FGVO may be sprayed or misted directly upon flowing streams of raw grain commodities to suppress fugitive dust during processing.

Off the shelf vegetable oil has become a popular management tool. Adding FGVO at a rate from 0.25 to 0.75 fluid ounces per 100 pounds of seed, helps reduce sticking of seeds to each other and from equipment.

BE VERY CAREFUL! The industry has accepted seed safeness of vegetable oil. Operators must be very careful to prevent seed injury. **DO NOT SIMPLY START ADDING THINGS TO YOUR TREATMENT WITHOUT ASSURANCE OF SEED SAFETY!**

FGVO™



2 x 2.5 Gallon Case (AC-FGVO-225)
265 Gallon Tote (AC-FGVO-265)

FGVO may be used as an additive in seed treatment applications where slurred mixture of seed protectants maintained under continuous agitation are applied directly to the seed through atomization and secondary seed tumbling.

Suggested Use Rates

To Reduce Stickiness of Post-Treated Seed on Equipment, Conveyors and Other Processing Surfaces:

Add 0.25 to 0.75 fluid ounces of FGVO per 100 pounds of treated seed.

imPRESS™

PATENT PENDING

IMPROVES SEED TREATMENT COVERAGE & REDUCES DUST-OFF

IMPRESS is a patent pending seed treatment additive that is designed to improve the coverage and retention of seed treatments on the treated seed when mixed as an additive with EPA registered seed treatments such as fungicides and insecticides.

IMPRESS is Developed and Designed to:

- Improve Seed Treatment Coverage
- Improve Retention on Seed and Reduce Dust-Off During Seed Handling and Planting
- Mix Well with a Wide Range of Seed Treatment Products
- Be Safe for Use on a Wide Range of Seeds
- Reduce Worker and Environmental Exposure to Fugitive Seed Treatment Dust

IMPRESS is not a seed treatment polymer.

IMPRESS is a novel patent-pending seed treatment additive for use as an alternative to traditional seed treatment polymer products.

IMPRESS improves retention of the treatment slurry on the seed by enhancing coverage and deposition on the seed-coat during the application process.

The resulting performance of IMPRESS is reduced “dusting-off” of seed treatment active ingredients during the seed handling and planting process.

IMPRESS is not labeled for all crops at this time. While it is expected that IMPRESS has potential for use in a wide range of seed treatment applications, the initial release of the product is for use on cereals only.

IMPRESS has been fully tested and approved for use on cereals and validated to be safe for use on these crops.

IMPRESS Is Labeled For Use On Cereals* Such As:
Wheat • Barley • Oats • Rye • Triticale
**The initial release of this product is for use on cereals only. IMPRESS has been fully tested and approved for use on cereals and validated to be safe for use on these crops.*

IMPRESS KEEPS MORE PRODUCT ON THE SEED!

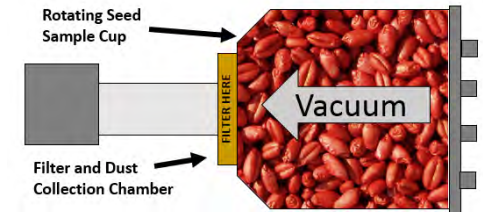
- Improved Opportunity for Performance
- Less Worker Exposure to Treatment Dust
- Better Environmental Stewardship



Seed Treated with IMPRESS looks and flows better with much less fugitive dust during handling and planting.

DUST-OFF TESTING METHOD

Seed samples are tumbled under vacuum; a filter catches dust that escapes the seed. Residue collected on the filters is analyzed for levels of active ingredient captured.



PROVEN DUST-OFF PERFORMANCE – Dust Collected on Test Filters



TEST RESULTS	IMPRESS REDUCED DUST-OFF OF ACTIVE INGREDIENTS BY:
WHEAT:	97.0%
OATS:	93.3%
BARLEY (hulled):	82.4%
BARLEY (hullless):	80.4%

Seed treatments with IMPRESS substantially REDUCED SUSCEPTIBILITY TO DUST-OFF!

RESULTS OF CEREAL DUST-OFF STUDY TO VALIDATE IMPRESS PERFORMANCE

WHEAT (alzada-a durum variety):

IMPRESS REDUCED DUST-OFF OF ACTIVE INGREDIENTS BY **97%**

OATS (everleaf-a spring oat variety):

IMPRESS REDUCED DUST-OFF OF ACTIVE INGREDIENTS BY **93.3%**

BARLEY (Hulled) (champion-a 2-rowed hulled spring variety):

IMPRESS REDUCED DUST-OFF OF ACTIVE INGREDIENTS BY **82.4%**

BARLEY (Hullless) (BG 012-a hullless, 6-rowed, spring, waxy endosperm variety):

IMPRESS REDUCED DUST-OFF OF ACTIVE INGREDIENTS BY **80.4%**

Seed Treatment Brand	AI / Purpose	TREAT-1	TREAT-2
		OZ / 100 lbs of seed	OZ / 100 lbs of seed
Dividend Extreme	Difenoconazole / Fungicide	3.000	3.000
	Mefenoxam / Fungicide		
Cruiser SFS	Thiamethoxam / Insecticide	1.330	1.330
Rancona 3.8	Iproconazole / Fungicide	0.051	0.051
Vibrance	Sedaxane / Fungicide	0.080	0.080
IMPRESS™	Non-Active / Retention Additive	0.000	1.000
Water	Non-Active / Carrier Solution	9.069	8.069
Mixed Treatment Application Rate (OZ / 100 lbs of seed)		13.530	13.530

APRIL 2015 CEREALS DUST-OFF STUDY TO VALIDATE IMPRESS PERFORMANCE STUDY OVERVIEW

- 4 cereal crop seeds were selected for treatments: Oats, Hullless Barley, Hulled Barley, and Wheat
- All seeds were treated with the same levels of the same active ingredients including: Difenoconazole, Iproconazole, Mefenoxam, Sedaxane, Thiamethoxam
- All seeds received two treatments, one WITH and one WITHOUT IMPRESS additive. Applied slurry application rates for both treatments were equalized.

Treated seed was tested for DUST-OFF through a device that captures dust on filter papers. A seed cup rotates tumbling seed while a vacuum is pulled through the seed cup and through a filter collecting the dust. 100 gram samples of each treated seed were dusted-off for a period of 2 minutes, filter papers were sent to the lab for analysis. Lab analysis was completed by BioDiagnostics, Inc. in River Falls, Wisconsin. The analytical method used was HPLC treatment concentration.

imPRESS™

Beginning in 2016 Impress is Available for Purchase in all Regions Except the Pacific Northwest

imPRESS™

Patent Pending Seed Treatment Additive

Impress is not available for purchase in Washington, Oregon, Idaho, Montana, Western Wyoming, or Northern Utah



SEED SAFETY GERM TESTING IOWA STATE UNIVERSITY SEED LABEL SERVICES

Standard Treatment...

Dividend Extreme (3oz) + Cruiser 5FS (1.33) + Rancona 3.8 (.051) + Vibrance (.08) + additives

WHEAT TEST RESULTS

% GERM - 3DAT 3 DAYS AFTER TREATMENT	STANDARD	STANDARD + IMPRESS (1oz)	STANDARD + IMPRESS (2oz)	IMPRESS (2oz)	UNTREATED
Standard Germination	98	97	98	99	97
Cold Test Germ	96	98	95	99	96
Accel Aging Germ	98	98	99	90	94

% GERM - 50DAT 50 DAYS AFTER TREATMENT	STANDARD	STANDARD + IMPRESS (1oz)	STANDARD + IMPRESS (2oz)	IMPRESS (2oz)	UNTREATED
Standard Germination	97	95	97	96	96
Cold Test Germ	97	98	93	92	97
Accel Aging Germ	95	96	94	96	66

% GERM - 80DAT 80 DAYS AFTER TREATMENT	STANDARD	STANDARD + IMPRESS (1oz)	STANDARD + IMPRESS (2oz)	IMPRESS (2oz)	UNTREATED
Standard Germination	98	97	96	97	98
Cold Test Germ	97	98	93	87	98
Accel Aging Germ	98	98	98	96	97

TESTED AND PROVEN SAFE FOR USE ON CEREALS!!

Increases Color Intensity

imPRESS

With Color Infusion

ADDED COLOR AND VALUE WITH COLOR-INFUSED IMPRESS*



Premixed Red Fungicide/
Insecticide **WITHOUT** IMPRESS iR

COLOR & COVERAGE

Color-infused IMPRESS iR enhances the color intensity of pre-colored seed treatments. Use IMPRESS iR as a convenient color and coverage additive with tank-mixed cereal seed treatments requiring the addition of a colorant.



Premixed Red Fungicide/
Insecticide **WITH** IMPRESS iR

imPRESS™

Impress (no color added)

2 x 2.5 Gallon Case (AC-IMPRESS225)

30 Gallon Drum (AC-IMPRESS30)

50 Gallon Drum (AC-IMPRESS50)

265 Gallon Tote (AC-IMPRESS265)



imPRESS iR™

Impress iR (infused with red)

2 x 2.5 Gallon Case (AC-IMPIR225)

30 Gallon Drum (AC-IMPIR30)

50 Gallon Drum (AC-IMPIR50)

265 Gallon Tote (AC-IMPIR265)



Suggested Use Rates

Rates should be adjusted to obtain the desired coverage and performance based upon the seed size, seed coat, total slurry mix volume, and seed treatment application equipment.

Suggested Use Rate for Use On Labeled Crops (wheat, barley, oats, rye, triticale): Add 0.75 to 2 fluid ounces of Impress per 100 pounds of seed. Impress should be used with a minimum total mixed slurry application volume of 6 fluid ounces or more applied per 100 pounds of seed.



POWDERED SEED SHINE & FLOW AID

Just a little dash of PIXY goes a long ways towards shining seed with a fancy appearance and smooth flowing characteristic that growers notice and value.

As a dry powdered product, PIXY may be applied with application devices designed for talc, graphite, dry inoculant, or other powdered products used for seed or grain.

PIXY rates can be adjusted to achieve a wide range of performance from simple cosmetics to seed lubrication.

PIXY hastens drying, reduces abrasion, & enhances appearance of treated seed!

The ideal PIXY treatment zone is within the final third of the secondary mixing phase (polishing drum), after slurry based seed treatment has been distributed on the seed, but while treated seed remains in a post-treatment “tack” stage.



PIXY treated seed, in a commercial operation, flowing and handling with virtually no bridging or impact from treatment. In this instance, the operator was not required to use the bin vibrator to empty the treated seed tank.

THE SEED LOOKS GREAT!

These soybean seeds have been treated with Colorizer RED + PIXY.

SEED SHINE & FLOW AID APPLICATOR

Designed to be mounted on the rear of the treater with application tube positioned within the polishing drum to deliver treatment on tumbling seed.

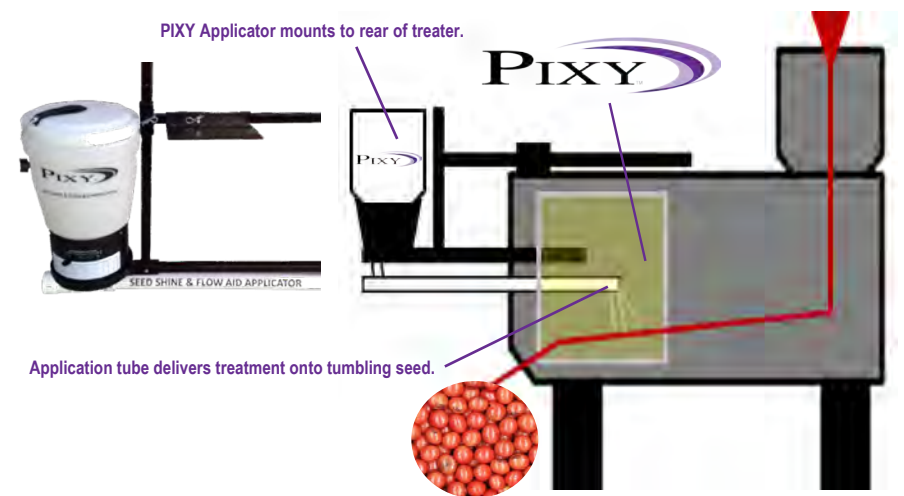


PIXY TREATMENT PROCESS

PIXY is designed for low use rate dry application within the final 1/3 stage of the secondary mixing drum on continuous treating systems.

This approach allows liquid treatments to coat seed and begin cure prior to powder application.

As a result, PIXY performs at low rates, has minimal impact on the liquid treatments applied, and has less susceptibility to build-up in the drum and on equipment.



4 x 5-lb Bags/Case (AC-PIXY-20)

50-lb Case (AC-PIXY-50)

Suggested Use Rates

Add 0.2 to 0.6 ounces per 100 pounds of seed.
The higher the rate, the more the shine!

TURBO CLEANSE™

POST-SEED TREATING SURFACE CLEANER AND STAIN LIFTER



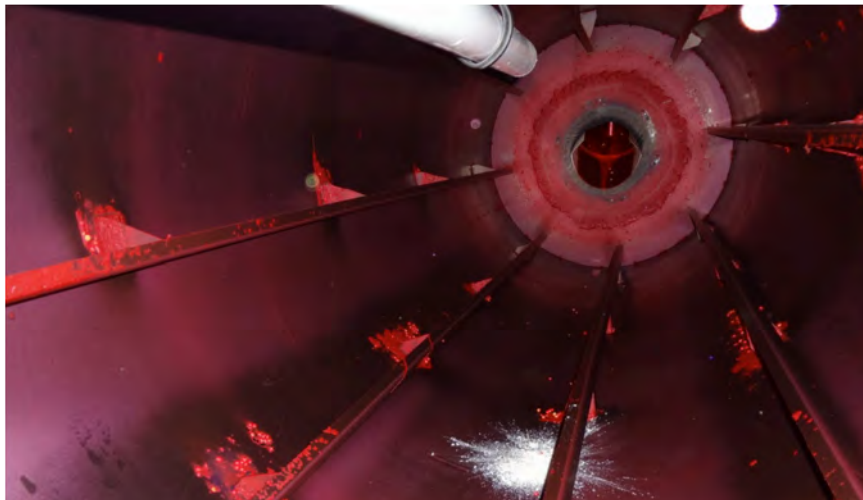
Anyone who has ever treated seed knows the frustration of treatment stains on equipment, clothes, floors, and more.

TURBO CLEANSE is a surface cleaner and stain lifter designed to help lift and remove the persistent stains left behind from a splash or a spill.

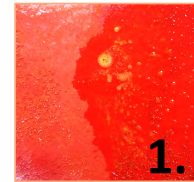
TURBO CLEANSE works by loosening the bond of persistent color pigments from stained surfaces so that the color residue can be rinsed or wiped away.

If you treat seed... You will Love TURBO CLEANSE!

TURBO CLEANSE IS NOT RECOMMENDED on painted, varnished, or acrylic surfaces, leather, aluminum, glass, chrome, clear coated, or laminated surfaces.

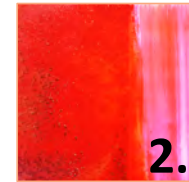


Stain Cleaning Demonstration Interior of a Stained White Seed Treatment Package Drum



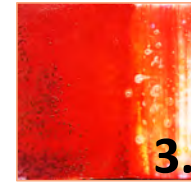
STEP 1.

TURBO CLEANSE was sprayed and allowed to soak for 20 seconds.



STEP 2.

Wiped and rinsed dissolved residue.



3.

STEP 3.

TURBO CLEANSE sprayed and repeated as needed.



FINAL!

Extreme drum stain cleaned with **TURBO CLEANSE!**

TURBO CLEANSE™



- 5 x 1 Quart Bottle (AC-TC-1QT)
- 2 x 2.5 Gallon Case (AC-TC-225)
- 15 Gallon Drum (AC-TC-15)

Suggested Use Rates

Seed Treatment Stains/Surface Cleaning: Spray, brush or sponge Turbo Cleanse onto dirty surface and allow to penetrate and soak stained areas. After soaking, remove by wiping or water rinsing treated areas. **DO NOT ALLOW TO DRY.**

Laundry Aid: Spot-treat, or add 1/4 cup per wash-load, to aid with removal of stains on soiled or stained work clothing.

VIGOR FOR SOYBEANS



Contains

Part A - Bradyrhizobium Japonicum	10 billion (1 x 10 ¹⁰)
Part B - Azospirillum Brasilense	1 billion (1 x 10 ⁹)
Part C - Liquid Activator and Stabilizer Synergist	

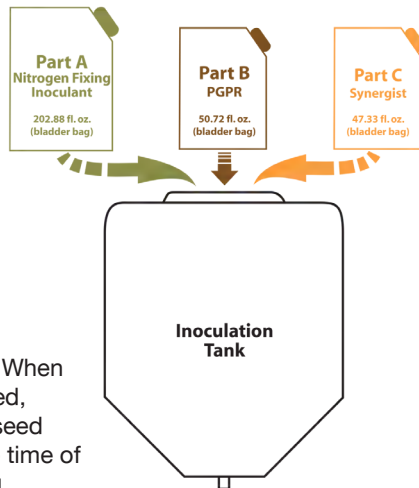
Vigor Is An At-Planting-Time Soybean Seed Enhancer

Vigor inoculates and hastens early growth and establishment of the crop, delivers two types of bio-active performance (nitrogen fixing inoculant/ plant growth promoting rhizobacteria) has a high level of viable bacteria, has advanced on-seed survival and has yield proven results.



Triple-Action Inoculant

The tri-pak contains a three-part system. When the three parts of the system are combined, the resulting mixture is a ready-to-apply seed treatment, designed for application at the time of planting or up to 95 days prior to planting.



Part A – Industry Leading Count of Viable Bacteria

Contains a **nitrogen fixing inoculant concentrate**.

VIGOR for soybeans ultimately delivers living bacteria to the seed that hastens the plant's ability to fix and manufacture the nitrogen it needs to grow.

VIGOR is very concentrated so that more viable bacteria can be available for effective inoculation when the plant is ready. Specifically, 1 x 10¹⁰ bacteria cfu/ml means that every milliliter of VIGOR nitrogen fixing product contains 10 billion viable bacteria!

As a result, VIGOR for soybeans delivers an industry leading count of viable bacteria to the seed when properly applied and used according to label instructions.

In addition to improving the inoculation rate under a broad range of conditions, the concentrated VIGOR product results in a very high number of bacteria delivered per seed regardless of the seed size.

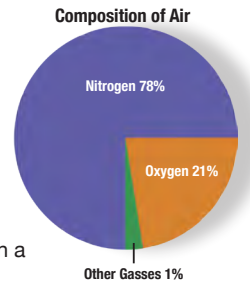


Soybean Inoculation–

The Most Efficient Way To Fertilize Soybeans With Nitrogen

Soybeans need nitrogen to grow just like all other plants. However, soybeans and other legumes, like alfalfa, clover, and peas, can manufacture their own nitrogen through a process called nitrogen fixation.

Nitrogen fixation occurs when a rhizobia bacteria in the soil infect legume plant roots, initiating plant response to nodulate and begin a plant process of pulling needed nitrogen from the air.



Nitrogen Fixation Taking Place



What Happens:

Seedling roots grow and inoculating bacteria multiply.

The bacteria take nitrogen from the air and convert it to nitrogen fertilizer for the plant.

The bacteria colonize root nodules creating a life giving nitrogen rich environment for the plant.

Formation of nodules on the roots.



Large, dark pink/red nodules indicate active nitrogen fixation is taking place within the plant. This is caused by leghemoglobin in the plant nodules; very similar to hemoglobin in the blood of vertebrates. Dark pink/red means alive and functioning!

VIGOR FOR SOYBEANS



Part B – Plant Growth Promoting Rhizobacteria (PGPR)

PGPR interacts synergistically with nitrogen fixing bacteria (inoculant) to promote improved nodulation and nitrogen fixation.

Phytohormones produced by the VIGOR PGPR, have been shown to promote epidermal-cell differentiation in root hairs that increase the number of potential sites for rhizobial infection, leading to the enhanced nodulation and nitrogen fixation, among many other biological benefits.

Most importantly, VIGOR is designed to deliver premium inoculation with the backup co-inoculation of PGPR, giving the crop a better start and hastened stand establishment.



Soybean Nutrient Demand

The demand for nutrients depends on the soybean growth stage. Since the soybean seed has high levels of protein, demand for nitrogen is extremely high during seed formation.

	Nutrient	Concentration—lbs of nutrient per bushel raised			Total Crop Nutrient		
		Grain	Straw	Total	50 bu	60 bu	70 bu
Primary NPK	Nitrogen	4.20	1.30	5.50	275	330	385
	Phosphorus	0.40	0.13	0.53	26.5	31.8	37.1
	Potassium	1.25	0.75	2.00	100	120	140
Secondary Nutrients	Calcium	0.20	1.50	1.70	85	102	119
	Magnesium	0.23	0.22	0.45	22.5	27	31.5
	Sulfur	0.20	0.25	0.45	22.5	27	31.5

Untreated vs. Treated with VIGOR

Treatments	Stem Length	Root Length	Nodules N° p/Plant	Nodules N° Principal Roots	Nodules N° p/Secondary Roots	Yield (bushels/acre)
Untreated	24	37	23	9	14	31.4
Inoculant Alone	26	39	29	15	14	40.4
VIGOR®	30	41	34	20	18	46.2

Part C – Synergist

Synergist liquid activator is a nutritional and stabilizing agent for use with the VIGOR tri-pak system. Synergist protects and enhances VIGOR's nitrogen fixing bacteria (Part A) and plant growth promoting bacteria (Part B) to sustain viability of bacteria and extend on-seed stability up to 95 days after inoculation.



Directions For Use

IMPORTANT! Prepare only as much VIGOR as will be applied to seed that day. DO NOT OPEN PACKAGE UNTIL THE TIME OF APPLICATION. Once all components have been mixed, it is recommended that this product be applied to seed within 24 hours. If mixed in a dedicated inoculant tank, on-seed survival of 95 days or more can be achieved. Seed treatment products are recommended to be applied sequentially for best results. If mixing VIGOR in same tank with fungicide or insecticides, apply to seed within 4 hours.

VIGOR FOR SOYBEANS



1 x 200 Units/Case (VIGTP)



Suggested Use Rates

3.0 fluid ounces per 100 pounds of seed.
The Vigor Tri-Pak inoculates 10,000 pounds of seed!

LEGACY FOR SOYBEANS



Contains

Bradyrhizobium Japonicum	10 billion (1 x 10¹⁰) cfu/ml
Chitosan Based Bio-Stimulant Plus Extender*	Contains .021 pounds (0.25%) of Poly-D-Glucosamine/Gallon
<small>*EPA Establishment No. 91967-TX-1 / *EPA Registration No. 91439-1-91967</small>	

Dual-Action Liquid Soybean Inoculant For Faster Emergence and Higher Yields

The Legacy system is formulated to inoculate 50 units (2,500 pounds) of soybean seed. When the two parts of the system are combined, the resulting mixture is a ready-to-apply seed treatment, designed for application at the time of planting or up to 95 days prior to planting.

10 billion active nitrogen-fixing bacteria per milliliter for stronger emergence and higher stand counts

No other soybean inoculant on the market today offers a higher concentration of nitrogen-fixing Bradyrhizobium japonicum bacteria for superior inoculation and higher yields. Field trial show that Legacy increases stand counts by an average of 12% at 14 DAE.



Increased Early Season Vigor

Legacy stimulates the plant's hormones responsible for root formation, stem growth, fruit formation, and development.

An EPA-Registered Chitosan Bio-Stimulant To Promote Protection From Invading Pathogens

Chitosan acts as an immuno-stimulant by triggering a defense response within the plant, leading to the formation of physical and chemical barriers against invading pathogens.

A Low-Viscosity Rhizobium Extender That Eliminates Bridging and Clumping While Extending Time-On-Seed Viability

Up to 30% thinner than the leading brands of extender on the market, the rhizobium extender in Legacy eliminates treatment system problems along with bridging and clumping of seed. Plus, it offers excellent time-on-seed compatibility with today's most popular seed treatments.

LEGACY SEED TREATMENT COMPATIBILITY		
Untreated Seed	Simultaneous	95 Days
CruiserMaxx® Plus	Simultaneous	80 Days
CruiserMaxx® Plus + Avicta	Simultaneous	75 Days
Apron® Maxx XL LS + Maxum 4FS	Simultaneous	70 Days
Acceleron®	Sequential	60 Days
Rancona + 1.5 Meta Star	Simultaneous	55 Days
Trilex® 6000	Simultaneous	45 Days

Average Yield Increases of 4.8 Bushels per Acre, Versus Untreated Beans, Across Multiple Midwest Locations

In trial after trial, Legacy has proven itself across a wide variety of soil and climatic conditions.

EPA Registered Chitosan Based

Bio-Stimulant Chitosan is a low-use rate product that is contained in the rhizobium extender biological plant immuno-stimulant which triggers a defense response within the plant, leading to the formation of physical and chemical barriers against invading pathogens.



4 x 50 Units/Shipper (LEG4CS)



Suggested Use Rates

2.5 fluid ounces per 100 pounds of seed.
The Vigor Tri-Pak inoculates 10,000 pounds of seed!



AN AFTER-MARKET SEED TREATING ACCESSORY

The EZ-MIZER™ is designed to replace basket-type atomizers found on many popular seed treating systems.

The SLEEK SPIN™ design of the EZ-MIZER is much less susceptible to the build-up and accumulation of treatment slurry and fugitive residue that can accumulate on basket-type atomizers if not properly maintained.

EXAMPLE OF A POORLY MAINTAINED BASKET ATOMIZER



Here Are What Some EZ-MIZER Users Have To Say:

“It was great, there was no build up at all. What we would normally clean out 15 to 20 times a season with the old atomizer, we never had to clean out once with the new EZ-Mizer.”

~ Johnny Owens of Meherrin Ag, Mullins, SC

“The EZ-Mizer was very easy to install. What usually took several hours to clean the atomizer and surrounding area only took a little over a half hour. Very happy with the performance and made clean up so much easier.”

~ Adam Balk of Poynter’s Ag, Sawyer, ND

“It’s good...perfect...a trouble free addition...like it and it works very well!”

~ Allan Jaspers of Vance Ag, Steamboat Rock, IA

“Definitely better coating; very nice. For sure a lot quieter, a good investment and even keeps the chute cleaner!”

~ Levi Willey of Jackson Jennings Coop, Seymour, IN

Take Off the
Old Basket Atomizer
and Replace It With the
EZ-MIZER SLEEK SPIN Wheel!



EZ-MIZER Kit Includes:

- SLEEK SPIN™ Atomizing Wheel
- TURBO-CLEANSE™ Surface/Stain Cleaner
- Necessary Wrenches and Screws
- Thread Locking Compound
- Installation Instructions

EZ-Mizer Kit (AC-EZM)

INSTALLATION IS QUICK AND EASY!

Installing the EZ-MIZER SLEEK SPIN and Slurry Feed Tube



1. Replace the old basket atomizer with the new **EZ-MIZER SLEEK SPIN** atomizing wheel. The **SLEEK SPIN** is affixed with two set screws. Dab each set screw with thread-locking compound.



2. Tighten the screws against the shaft with a 5/32" allen wrench. Tighten firmly to assure that the **SLEEK SPIN** is securely affixed.



3. Next, re-install the slurry feeding tube assembly (if it was required for removal). The atomizing chamber assembly may now be reassembled to complete the installation.

EZ-MIZER SLEEK SPIN has been tested and approved for use with SYNGENTA seed treating products.



NOVO® is a Seed Care Prescription Management System

Prescription management means localizing prescription seed treatments from farm-to-farm and field-to-field as needed to meet the agronomic and management needs of each producer. With NOVO it also means the ability to dose on a per-seed basis, delivering efficacious levels of active ingredient per seed regardless of the seed size.

NOVO sits beside, or near, the seed treater and is engineered to integrate work with all brands of slurry-based seed treating systems.

NOVO automates the precise mixing of localized seed treatment prescriptions and transfers the ready-to-apply mix to the seed treater application tank.

NOVO is available in 4 and 8 port models for direct connect product feeds from drums and totes and also accommodates hand-added products.

NOVO capabilities feature multi-crop functionality with virtually unlimited prescription capability.



Every NOVO purchase includes a royalty free license to the patented Size Indexed Rate Adjustment (SIRA™) calculator that empowers operators to treat all seed sizes with the same level of active ingredient per seed utilizing traditional seed treating systems.

NOVO measures products by weight and documents every treatment job with a detailed mixing record including SIRA application rate instructions.



NOVO AT WORK



1. MEASURES & MIXES

The NOVO measures and mixes products based on local prescriptions. Individual products are pumped directly to NOVO using standard drum/tote pumps or are hand-added by the operator when prompted.

2. TRANSFERS TO TREATER

Next NOVO transfers the slurry to the seed treater application slurry tank.

3. DOCUMENTS THE JOB

Throughout the process, NOVO documents detailed mix and job records which are automatically printed on-site and archived in an electronic data base for future reference.

Operating NOVO Is Simple With Touch Screen Interface

Step 1	Step 2	Step 3																								
Select Prescription	Input Seeds Per Pound	Input # Of Units To Treat																								
<p>Select Prescription</p> <p>LOCAL PRESCRIP A</p> <p>LOCAL PRESCRIP B</p> <p>LOCAL PRESCRIP C</p> <p>Enter</p>	<p>Enter Seeds / lb</p> <p>3742</p> <table border="1"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td><td>9</td></tr> <tr><td>Clear (-)</td><td>0</td><td>Enter</td></tr> </table>	1	2	3	4	5	6	7	8	9	Clear (-)	0	Enter	<p>Enter # of Units</p> <p>100</p> <table border="1"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td><td>9</td></tr> <tr><td>Clear (-)</td><td>0</td><td>Enter</td></tr> </table>	1	2	3	4	5	6	7	8	9	Clear (-)	0	Enter
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INSTALLATION / TRAINING / LICENSING

NOVO INSTALLATION AND TRAINING

The purchase of every NOVO[®] system includes one on-site visit by a NOVO technician for system installation and training on the use of the NOVO system. When planned well, this process will involve about 4 hours of time for installation and the remainder of the day for operator training. The buyers cooperation in preparing for the training and installation event is very important to insure that the NOVO representative is prepared to provide the very best service possible for all new NOVO purchases.

PRE-INSTALLATION CHECKLIST

The following is a pre-installation¹ checklist to help insure that both the customer and the NOVO representative are prepared and ready for scheduling the NOVO installation and training date.

⑥ Pressurized Water Supply.

It is the responsibility of the NOVO purchaser to make arrangements for the supply of pressurized water, via standard garden hose or equivalent, at the location of the NOVO placement. Water is an important part of many seed care prescriptions and is required for rinsing cycles used within the NOVO prescription management system. IF WATER AS DESCRIBED IS NOT AVAILABLE, then a 'demand' water-pump configured on a water tank, such as a 250-gallon poly caged tote, is recommended.

⑥ Pressurized Air Supply.

90-100 PSI pressurized, dry & filtered air supply is required at the NOVO location. The air is used for operation of the automated valves in the NOVO mixing system as well as to purge the slurry tank line between operations. There is no particular requirement other than the availability of an air line near the NOVO location. The NOVO technician will then "tap" into the air line for the installation.

⑥ Power Source.

110 volt, 20 amp service is required to power the NOVO system. It is the responsibility of the customer to provide such service at the location of the NOVO and/or to provide heavy extension cord or make other provisions to power the NOVO at the installation location.

⑥ Nearby Desk/Shelf.

Each NOVO system is installed with a printer that prints tickets upon completion of each batch. A desk or shelf near the NOVO system is required for convenient operation and use of the printer.

⑥ Seed Treating Prescriptions.

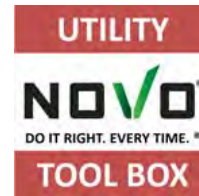
During the installation and training session, the NOVO technician will help set-up the preferred seed treatment prescriptions to be offered at the seed treating location. However, this means that the seed treatment prescriptions must be decided and planned by the location prior to the NOVO installation. A prescription planning worksheet is available to aid in the development of prescriptions in the context of new capabilities with the NOVO system.

¹A pre-installation workbook and prescription planning tool shall be provided separately.





NOVO Location	
Sales Agent/Representative	
Completed Installation Date	
Installation Representative	
NOVO Model Number	
Printer ID	
Control Panel Serial Number	
Tank/Frame Serial Number	



BUSINESS SUPPORT TOOLS AND RESOURCES

Each NOVO is preloaded with a collection of tools that can be useful in supporting the local seed care operation. One of these is a Novo Seed Care Data Base Tool which allows the local operator to retrieve NOVO transaction data from the system and provide access to it for business managers and accounting staff within the administrative offices. To utilize the NOVO Seed Care Data Base Tool, the NOVO customer must have Microsoft Access software on the administrative computer. Microsoft Access is typically provided with most Microsoft Office packages. Microsoft Access software is not included with the purchase of the NOVO and must be acquired by the location to utilize this feature of the NOVO tool.



SUPPLEMENTAL BUSINESS SUPPORT AND PROMOTION

Recognizing the ultimate objective is to help seed care operators profitably grow their business and grower customers to raise more crop. KALO and Agrilead are committed to providing supplemental support beyond technical installation and equipment training.

Supplemental support tools are available or can be considered for development at the request or discretion of the local NOVO location. Some examples of such support utilized by existing NOVO locations include:

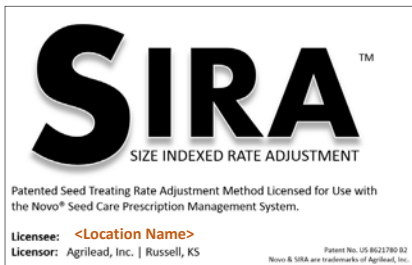
- Off-season or open-house LOCALIZED meeting presentations developed and provided to help educate and promote the new local capabilities.
- Development of LOCALIZED mailers to introduce customers to the locations new capabilities with NOVO.
- Development of LOCALIZED press-releases for local articles and media.
- Prescription planning consultation...access to the Agrilead seed care lab resources including treated seed sample fulfillment for testing, dust-off analysis, demonstration, etc.

POST-INSTALLATION AND SUPPORT

An operator's manual will be provided at the time of installation. Included in the manual will be a page with details of the installation (see chart below). The warranty period begins upon installation and training of the system.

LIMITED WARRANTY - 1 YEAR PARTS AND LABOR: Commencing with the date of installation of each System or component to the end Purchaser, and for a period of 12 months following, the Manufacturer unconditionally warrants that each unit shall remain free from defects in parts, materials and workmanship under normal use. Any costs associated with supply of power and air, local code inspection or regulatory certification shall be paid by the end Purchaser. The warranty herein shall not obligate the Manufacturer in any manner whatsoever with respect to, and shall not be applicable to, any defects, which after inspection by Manufacturer are not to its reasonable satisfaction demonstrably the result of defective parts, materials or workmanship.

SIRA™



SPECIAL LICENSING

The purchase of a NOVO system includes a royalty free license for the use of the patented SIRA™ methods programmed within the purchased system. Issuance of this license shall be marked on

the NOVO system with a sticker (as shown below), individualized with the location's name. This same license shall be included in the operators manual provided at the time of installation.

Access to SIRA through NOVO means a significant competitive advantage for seed care retailers who are able to offer their customers the same rate of active ingredient delivery on every seed, regardless of the seed size.

SIRA, Working Alongside the NOVO, Does A Better Job By:

Managing the variances of seed sizes during the seed treating process, treating seeds versus pounds of seed, delivering the same level of active ingredient on every seed, regardless of seed size and doing the best job possible for the dealer's business and the growers it serves!



SIRA ELIGIBLE

The option for offering a SIRA ELIGIBLE treatment is decided when treatment prescriptions are set up in the system.

For example; the dealer gives his local prescription a name of ROYAL SB FSP. This prescription is designed as a 5 oz slurry per 100 lbs of seed including 3 oz of CruiserMaxx and 2 oz of water. The local dealer has determined that this prescription IS SIRA ELIGIBLE for application.

NOVO Dispatcher Module

Below is an image of the NOVO DISPATCHER module. NOVO Seed Care Operators use this module to set up local treatment prescriptions.

On the treating floor, the NOVO Seed Care Operator is presented with important questions when preparing to treat seed.

First, the operator selects the prescription. IF the chosen prescription is SIRA ELIGIBLE, the operator will be asked to use SIRA or not?



This SIRA question for the operator only appears for SIRA ELIGIBLE prescriptions.

The operator is then prompted for seed size and number of units to be treated.

The Seed Care Operator then sets the treater to the treatment rate prescribed. X fluid oz per 100 lbs of seed. The

NOVO system builds the proper amount of slurry for the treatment job at hand, transfers the treatment slurry to the treater application tank.

NOVO takes it from there and makes the batch! NOVO then automatically prints a report for the batch.

SIZED INDEX RATE ADJUSTMENT (SIRA) – All Seeds Dosed the Same				
	Seeds Per Lb	Seeds Per Bag	Standard Rate	Oz Per Seed
SMALL	3,765	188,250	5 oz/100 lbs	.000013
MEDIUM	2,800	140,000	5 oz/100 lbs	.000018
LARGE	2,000	100,000	5 oz/100 lbs	.000025

additive	Something (such as a chemical) that is added in small amounts to a substance to improve it in some way.
aftermarket	The market for parts and accessories used in the repair or enhancement of a product.
aqueous	Containing water or similar to water.
atomizer	A device that forces a liquid out of a very small hole so that it becomes a fine spray.
bacteria	Micro-organisms that live in soil, water, plants, organic matter, or the bodies of animals or people. They are microscopic and mostly unicellular, with a relatively simple cell structure. Bacteria play a roll in the decomposition of organic matter and other chemical processes.
binders	Something that produces or promotes cohesion in loosely assembled substances.
clumping	A ball or mass of something that are stuck together.
colorant	Products whose primary function is to impart coloration to seed treatments and in turn color to treated seed. Treated seed is colorized or otherwise adulterated in appearance to allow visual identification that it is treated so as to identify it as unfit for human consumption and to identify the possibility of other hazards associated with treated seed.
custom blends	Mixtures of independently registered products blended together by manufacturers or distributors for applicators to reduce the number of products that need to be combined on site.
dust (field)	This refers to dust generated from the soil. Such dust may be picked up and dispersed in the air by the planting equipment during the planting process.
dust (treated seed)	Fine particulate matter contained in or easily dislodged from treated seed. It consists of both the naturally occurring untreated seed dust as well as components of the seed treatment. Treated seed typically contains less dust than untreated seed.
dust (untreated seed)	Fine particulate matter contained in or easily dislodged from untreated seed. It primarily consists of naturally occurring components of the seed such as chaff and the seed coat but may also contain some level of dust from soil.
dust drift	Drift of dusts such as treated seed dust and lubricant dust.
dust-off	Fine particulate matter contained in or easily dislodged from treated seed. It consists of both the naturally occurring untreated seed dust as well as components of the seed treatment.
flowability	The lack of resistance to flow for seed and treated seed.
handling	Handling includes the movement of products and treated seed, including but not limited to loading, unloading, weighing, bagging, sewing, stacking, and planter loading and operation.
herbicide safener	Molecules used in combination with herbicides to make them “safer” - that is, to reduce the effect of the herbicide on crop plants, and to improve selectivity between crop plants vs. weed species being targeted by the herbicide. Herbicide safeners can be used to pretreat crop seeds prior to planting, or they can be sprayed on plants as a mixture with the herbicide.
homogenous	Of uniform structure or composition throughout.
ingredients	Something that enters into a compound or is a component part of any combination or mixture.
inoculant	A seed or soil additive, especially for legume seed, composed of specific nitrogen-fixing bacteria that facilitate dinitrogen fixation in the subsequent crop.
inoculation	The introduction of a pathogen or antigen into a living organism to stimulate the production of antibodies.

micronutrient	A substance, such as a vitamin or mineral, that is essential in minute amounts for the proper growth and metabolism of a living organism.
mixing	To combine (two or more substances) to make a different substance.
nitrogen fixation	The changing of nitrogen into an available and useful form especially by bacteria.
nodules	A swelling on a leguminous root that contains symbiotic bacteria.
off-target exposure	For seed treatments, the seed is the target application location for the Seed Treatment. Anything other than this would a “off target”. Off target exposure therefore refers to things (such as other plants or animals) in the environment which may be contacted with the seed treatment or seed treatment dust during application or planting; or in the case of animals by ingestions of treated seeds.
organisms	A complex structure of interdependent and subordinate elements whose relations and properties are largely determined by their function in the whole.
pesticide	A substance used to destroy pests (as insects or weeds).
pathogen	An infectious agent such as a virus, bacterium, prion, a fungus, or even another micro-organism.
plantability	The ability of seed or treated seed to flow through planting equipment in the absence of build up on equipment to allow uniform and consistent planting of seed.
polymer	Products added to seed treatments whose primary function is to reduce dust of treated seed and to improve retention of seed treatment active ingredients on the seed
recipes	A formula or procedure for doing or attaining something.
seed flow	The uniformity and freedom of flow of seed through a system, generally through a seed conditioning or treating plant; or through a planter. Poor seed flow may be slow or inconsistent seed flow, or plugging of auger or conveyors or other handling equipment. Seed treatments may positively or negatively impact seed flow.
seed treater	Equipment designed to apply seed treatments to seed. Such equipment should be designed so it can be calibrated to accurately and uniformly apply the product to seed. Numerous types of seed treaters exist.
slurry	The combined treating composition for application to seed. It may be as simple as a single ready to use product, or a combination of several Seed Treatment Components and water.
static mixing	Mixing generally happens at the treater and treatment calibration happens at the ingredient pumps, all DURING the treating process.
susceptibility	The state of being predisposed to, sensitive to, or of lacking the ability to resist something (as a pathogen, familial disease, or a drug).
synergist	An agent that increases the effectiveness of another agent when combined with it.
systemic	Pesticides that are taken up and translocated within a plant in sufficient quantities to provide protection from the pest of interest.
toxic	Extremely harsh, malicious, or harmful.
transporting	To transfer or convey from one place to another.
vegetable oil	Oil extracted from seeds; typically those of corn, cotton, peanut, rapeseed, sunflower, canola, or soybean.
yield	A measure of the output per unit area of land under cultivation.

NOTICE-READ CAREFULLY

How to Calculate Liquid Nutrients

Formula Examples:

Nutrients per gallon of product

Weight per gallon × % nutrient = lbs. nutrient 18-3-6

10.33 lbs. per gal. × 18% nitrogen = 1.9 lbs. nitrogen per gallon

1.9 lbs. nitrogen per gal. ÷ 128 oz. = 0.0148 lbs. nitrogen per ounce

Liquid Conversions

Gals	Qts	Pts	Ozs	Cups	Tbl	Tsp	Mls	Ltrs
1	4	8	128	16	256	768	3,480	3.785
	1	2	32	4	64	192	960	0.946
		1	16	2	32	96	480	0.473
			1	1/8	2	6	30	0.030
				1	16	48	240	0.240
					1	3	15	0.015
						1	5	0.005

Parts Per Million

One part per million is one pound in a million pounds. 120,000 gallons of water equals 1,000,000 pounds (constant). To calculate ppm use this formula:

$$\frac{\text{Pounds of Ingredients Used} \times 120,000}{\text{Gallons of Water Treated}} = \text{ppm}$$

Area

1 sq. foot = 144 sq. inches
 1 sq. yard = 9 sq. feet
 1 sq. meter = 10.76 sq. feet
 1 sq. meter = 1.20 sq. yards
 1 sq. mile = 2.59 sq. kilometers
 1 sq. mile = 640 acres
 1 sq. mile = 259 hectares
 1 sq. kilometer = 0.386 sq. miles
 1 sq. kilometer = 247.10 acres
 1 sq. kilometer = 100 hectares
 1 acre = 43,560 sq. feet
 1 acre = 4,840 sq. yards
 1 hectare = 2.47 acres

Dry Weight Measure

1 gram = 0.035 ounces
 1/2 ounce = 14.17 grams
 1 ounce = 28.35 grams
 3 ounces = 85.05 grams
 3.75 ounces = 106.31 grams
 4 ounces = 113.4 grams
 8 ounces = 226.8 grams
 12 ounces = 340.19 grams
 16 ounces = 453.6 grams
 0.5 pounds = 226.8 grams
 1 pound = 453.6 grams
 1 kilogram = 2.20 pounds

CONDITIONS OF SALE, LIMITED WARRANTY, AND LIMITATIONS OF LIABILITY AND REMEDIES

Read the Conditions of Sale – Warranty and Limitations of Liability and Remedies before using this product. If the terms are not acceptable, return the product, unopened, and the full purchase price will be refunded. The directions of this label are believed to be reliable and should be followed carefully. Insufficient control of pests and/or injury to crop to which the product is applied may result from the occurrence of extraordinary or unusual weather conditions or the failure to follow the label directions or good application practices, all of which are beyond the control of KALO, Inc., the manufacturer or seller. In addition, failure to follow label directions may cause injury to crops, animals, workers or the environment. The Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purpose referred to in the directions for use subject to the factors noted above which are beyond the control of the Company. The Company makes no other warranties or representations of any kind express or implied concerning the product, including no implied warranty of merchantability or fitness for any particular purpose, and no such warranty shall be implied by law. The exclusive remedy against the Company for any cause of action relating to the handling or use of this product shall be limited to, at KALO, Inc.'s election, one of the following:

1. Refund of the purchase price paid by buyer or user for product purchased, or,
2. Replacement of the product used

To the extent allowed by law, the Company shall not be liable and any and all claims against the Company are waived for special, indirect, incidental, or consequential damages or expense of any nature, including, but not limited to, loss of profits or income. The Company, the manufacturer and seller offer this product and the buyer and user accept it, subject to the foregoing conditions of sale and limitation of warranty, liability and remedies.

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