INNVICTIS CROP CARE, LLC is an innovative development, manufacturing and marketing company whose focus is on six key crop input segments: Crop Protection; Adjuvant Technology; Seed Care; Crop Nutrition; along with Nitrogen and Fertilizer Management Tools. Strategically located in Northern Colorado, Innvictis has easy access to all US crop markets.

Innvictis works only with reputable synthesizers, formulators, laboratories and partners with many of the well-known chemical companies. When it comes to quality rates and ingredients, there is no substitute for the best to guarantee that customers enjoy first class performance from our products.
The INNVICTIS Nutritional Line contains our first class nutritional formulations of nutritionals that agronomists are familiar with.
TABLE OF CONTENTS

1 NUTRIENT ROLES
  PAGES 6–9

2 4R MANAGEMENT
  PAGES 10–11

3 OPTIGRO®
  PAGES 12–13

4 SOIL SAMPLING & VERIFY™
  PAGES 14–15

5 NUTRITIONAL LINE
  PAGES 16–44

18 ALLEVIA™
19 ANOVA™ 5-0-0
20 BORON V
21 BORON 10%
22 CAPTIVATE™ D
23 CAPTIVATE™ EDTA
24 CAVALIER™ G
25 CAVALIER™ OAC
26 DELIVERED K™ PLUS
27 DIVERSE K™
28 INNVICTIS™ MICROMIX
29 IVC™ WITH MNP
30 INNVITA™ MNP

NUTRITIONAL LINE

• ALLEVIA™
• ANOVA™ 5-0-0
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• BORON 10%
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• CAVALIER™ OAC
• DELIVERED K™ PLUS
• DIVERSE K™
• INNVICTIS™ MICROMIX
• IVC™ WITH MNP
• INNVITA™ MNP
6 NITROGEN MANAGEMENT

PAGES 46-53

7 ELEMENTS OF NUTRITIONALS

PAGES 54-61

8 GLOSSARY

PAGES 62-63

31 NOVUS™
32-33 NOVUS™ B
34 NOVUS™ K
35 PRO-V™
36-37 THRIVE™ 8-21-6
38 V-AGRI™
39 VELOCITY™ CS
40 VELOCITY™ IQ
41 VIRIDIS™
42 VITALYZE™ 3-0-0
43 VITALYZE™ C
44 ZINC™ 9% EDTA

50 PRESERVE N™ 18-0-0
51 PRESERVE N™ DF 66-0-0
52-53 N-VEIL™
The primary nutrients are:
- nitrogen
- phosphorus
- potassium

These nutrients are usually the first to be depleted from the soil.

1 NITROGEN

50-85% efficiency in most plants. Most N is lost to leaching, denitrification, volatilization and fixed to crop residue. Of all the essential nutrients, nitrogen is required by plants in the largest quantity and is most frequently the limiting factor in crop productivity.

- Necessary for formation of amino acids, the building blocks of protein
- Essential for plant cell division, vital for plant growth
- Directly involved in photosynthesis
- Aids in production and use of carbohydrates
- Affects energy reactions in the plant

2 PHOSPHORUS

10-30% efficiency in most plants. Most loss due to fixation at pH <6.3 to iron and aluminum, and pH >7.0 to calcium. Phosphorus is often the most limiting plant nutrient for yield. The orthophosphates, $\text{H}_2\text{PO}_4^-$ and $\text{HPO}_4^{2-}$, are the primary forms of phosphorus taken up by plants.

- Involved in photosynthesis, respiration, energy storage & transfer, cell division, and enlargement
- Promotes early root formation and growth
- Improves quality of fruits, vegetables, and grains
- Vital to seed formation, and hastens maturity
- Helps plants survive cold conditions
- Increases water-use efficiency

3 POTASSIUM

40%-75% efficient in most plants. Most loss is due to fixation between clay layers and leaching.

- Carbohydrate metabolism - the break down and translocation of starches
- Increases photosynthesis, and water use efficiency
- Essential to protein synthesis and fruit formation
- Activates enzymes and controls their reaction rates
- Improves quality of seeds and fruit
- Improves cold tolerance in early and late season crops
- Increases disease resistance
SECONDARY NUTRIENTS

The secondary nutrients are calcium, magnesium, and sulfur. For most crops, these three are needed in lesser amounts than primary nutrients. They are growing in importance in crop fertilization programs due to stringent clean air standards, and efforts to improve the environment.

1 CALCIUM

Like potassium, plant uptake is only one of the possible fates of calcium in soil solution. Since calcium is a very mobile nutrient in the soil, it may be lost to leaching, retained by soil particles or precipitated as secondary minerals.

- Utilized for continuous cell division and formation
- Involved in nitrogen metabolism
- Reduces plant respiration
- Aids translocation of photosynthesis from leaves to fruiting organs
- Increases fruit set
- Stimulates microbial activity

2 MAGNESIUM

Magnesium is held by the cation exchange capacity of the soil particles or resides in the soil solution. Magnesium in the soil solution may precipitate into secondary minerals, be taken up by plants, or leached from the soil.

- Key element of chlorophyll production
- Improves utilization and mobility of phosphorus
- Activator and component of many plant enzymes
- Increases iron utilization in plants
- Influences earliness and uniformity of maturity
- Increases water-use efficiency

3 SULFUR

Elemental S and those found in soil organic matter and fertilizers, are not available to crops. They must convert to the sulfate (SO$_4^{2-}$) form to become available to the crop. This conversion is performed by microbes and requires soil conditions that are warm, moist, and well drained. The sulfate form of sulfur is an anion (negative charge), and therefore is leachable. As a rule of thumb, sulfur can be considered to leach through the soil profile at about 50% as fast as nitrates (NO$_3^-$).

- Integral part of amino acids
- Helps develop enzymes and vitamins
- Promotes nodule formation on legumes
- Aids in seed production
- Necessary in chlorophyll formation
**BORON**

Boron is taken up by plants primarily as $\text{H}_3\text{BO}_3$ (boric acid) and $\text{H}_2\text{BO}_3^-$ (borate). While boron is essential, most crops are sensitive to boron at high rates.

- Needed to germinate pollen grains, and promote maturity
- Required for seed and cell wall formation
- Necessary for sugar translocation
- Affects nitrogen and carbohydrates
- Essential for directing other nutrients in the plant
- Affects energy reactions in the plant

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**CHLORINE (AS CHLORIDE)**

Although chlorine is classified as a micronutrient, plants may take-up as much chloride as secondary nutrients such as sulfur.

- Essential (with potassium) to the proper function of stomata in controlling water balance
- Major function in photosynthesis
- Interferes with phosphorus uptake
- Enhances maturity of small grains on some soils

---

**COBALT**

Cobalt has proven to be beneficial to at least some plants, but is essential in others, such as legumes where it is required for nitrogen fixation for the symbiotic relationship it has with nitrogen-fixing bacteria. It may also be substituted for molybdenum.

- The requirement of Co for $\text{N}_2$ fixation in legumes and non-legumes has been documented clearly
- Protein synthesis of Rhizobium is impaired due to Co deficiency
- It is still not clear whether Co has direct effect on higher plant growth

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**COPPER**

Copper is more tightly bound to organic matter where deficiencies can occur. Like zinc, copper can be immobilized by microorganisms, taken up by plants, or exchanged on soil particle surfaces. Copper may also form chelates with soluble organic matter.

- Catalyzes several plant processes
- Major function in photosynthesis and reproductive stages
- Indirect role in chlorophyll production
- Increases sugar content
- Improves color and flavor of fruits and vegetables

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**MICRONUTRIENTS**

The micronutrients are boron, chlorine, cooper, iron, manganese, molybdenum, and zinc. These plant food elements are used in very small amounts, but are just as important to plant development and profitable crop production as the major nutrients.
5 **IRON**
Iron is taken up by plants as either Fe$^{+2}$ (ferrous cation) or Fe$^{+3}$ (ferric cation). High soil pH reduces iron availability while acid soils increase iron availability.

- Promotes formation and function of chlorophyll
- Acts as an oxygen carrier (respiration) and metabolism
- Reactions involving cell division and growth
- Involved in nitrogen fixation
- Crucial to energy transfer within the plant.

6 **MANGANESE**
Manganese is used in plants as a major contributor to various biological systems including photosynthesis, respiration, and nitrogen assimilation. Manganese is also involved in pollen germination, root cell elongation and resistance to root pathogens.

- Functions as a part of certain enzyme systems
- Aids in chlorophyll synthesis
- Increases the availability of phosphorus and calcium
- Involved in assimilation of carbon dioxide in photosynthesis

7 **MOLYBDENUM**
Molybdenum is needed in the smallest quantities by plants. The normal range for most plant tissue is between 0.3-1.5 ppm, and in the growing medium between 0.01-0.20 ppm. Molybdenum is an essential component in two enzymes that convert nitrate into nitrite, and then into ammonia before it is used to synthesize amino acids within the plant.

- Required to form the enzyme “nitrate reductase” which reduces nitrates to ammonium in plant
- Aids in the formation of legume nodules
- Needed to convert inorganic phosphates to organic forms in the plant

8 **ZINC**
Zinc is a component of many organic complexes and DNA protein, and is an important enzyme for protein synthesis. Zinc is involved in growth hormone production and seed development.

- Aids plant growth hormones and enzyme system
- Necessary for chlorophyll production
- Necessary for carbohydrate formation
- Necessary for starch formation
- Aids in seed formation
4R MANAGEMENT

4R PRINCIPLES OF NUTRIENT STEWARDSHIP

- **RIGHT SOURCE**
  Matches fertilizer type to crop needs.

- **RIGHT RATE**
  Matches amount of fertilizer to crop needs.

- **RIGHT TIME**
  Makes nutrients available when crops need them.

- **RIGHT PLACE**
  Keeps nutrients where crops can use them.

IMPLEMENTING 4R'S ON THE FARM

**Step 1:** Identify farm-specific economic, social and environmental goals that the cropping system objectives should address.

**Step 2:** Select BMP’s that are specific to the grower’s goals, soil, climate and cropping system.

**Step 3:** Integrate BMP’s for all goals and adjust as needed.

**Step 4:** Document the 4R nutrient stewardship plan.

Although goals will vary among farm operations and even among fields, the following are commonly identified grower goals:

- Improve net farm income and regional economic development.
- Improve quality of farm family housing, diet and education.
- Reduce losses of nutrients to the environment.
4R?  
4R nutrient stewardship provides a framework to achieve cropping system goals — increased production, increased farmer profitability, enhanced environmental protection and improved sustainability. To achieve those goals, the 4R’s incorporate the Right Source, at the Right Rate, at the Right Time, and in the Right Place.

4R FARMERS & THE LAKE  
Sustainable Crop Nutrition for the Western Lake Erie Basin  
nutrientstewardship.org  

Fertilizer Benefits  
- Fertilizers replenish soil nutrient supplies depleted by crop production  
- Fertilizers are key to food security  
- 50% of food production is the result of fertilizer use

4R PRINCIPLES OF NUTRIENT STEWARDSHIP  

RIGHT SOURCE  
Matches fertilizer type to crop needs  
- Account for all sources of nutrients in recommendations

RIGHT RATE  
Matches amount of fertilizer to crop needs  
- Conduct soil tests regularly in uniform areas less than 25 acres  
- Document crop yield goals based on crop history  
- Base nutrient application on Tri-State recommendations or adaptive management using soil test and yield goals  
- Calibrate nutrient application equipment annually

RIGHT PLACE  
Keeps nutrients where crop can use them  
- Utilize variable rate application  
- Utilize phosphorus injection, subsurface banding or broadcasting with immediate incorporation  
- Don’t broadcast apply nutrients without incorporation unless the risk of phosphorus loss is demonstrated to be low  
- Apply nutrients using minimum setbacks from sensitive areas

RIGHT TIME  
Makes nutrients available when crops need them  
- Don’t apply phosphorus on frozen or snow covered ground  
- Don’t apply phosphorus or nitrogen if a large rainfall is in the weather forecast

Source: 4R Nutrient Stewardship- www.nutrientstewardship.org
OptiGro’s staff is fully trained in mapping, sampling and extracting data from farmer’s fields. They help you gather and compare the data in order to make better management decisions for the targeted farm. Through a secure, user-friendly online portal, there is 24/7 access to data and OptiGro’s state of the art analysis tools.
OptiGro® provides agricultural advice, information, and precision agriculture resources to grower-customers designed to provide maximum return on investment. OptiGro® includes trained Certified Crop Advisors utilizing the latest software applications paired with web transmission and integration for agricultural data processing, storage, and analysis. OptiGro® improves the productivity and profitability of each customer through an elevated level of management and expertise.

Winner of Precision Ag Crop Advisor/Entrepreneur Award of Excellence!
Soil testing is the most important approach to getting the most out of nutritional inputs for crops. Understanding soil fertility, deficiencies, and soil type among many other factors allows a farmer to accurately put down the correct nutritionals at the right place, saving time, money and increasing yield.

**SAMPLING TOOLS:**
It is important to use the proper sampling tools for differing soil types and seasons. A soil probe can be used in most conditions.

**SAMPLING SIZE:**
Sampling should be completed in a grid manner, giving 1 to 1½ cups of soil to be sent to the laboratory for analysis.

**SAMPLING DEPTH:**
Surface sampling to tillage depth should suffice for soil samples. This is because 80-90% of nutrient uptake comes from the tillage depth. Deeper samples can be taken for nitrate-nitrogen analysis.

**TIME TO SAMPLE:**
Soil samples can be taken any time during the year, however it is recommended to sample before each growing season. The closer the samples are taken to planting time, there is less chance of the soil conditions changing.

OptiGro is a great partner if you are considering conducting plant tissue sampling, or have questions! For More Information: Email at Info@OptiGro.com
To understand the nutrient status of your crops, plant tissue analysis is recommended. Taking an analysis will uncover deficiencies, and depending on when the sample is taken, allow for corrective nutrient applications to be made to young plants.

WHERE SHOULD YOU SAMPLE FROM:
It is critical to take the sample from the right part of the plant in the proper growth stage. A good rule of thumb is to take the most recently matured, fully developed leaf on more mature plants. For younger plants, you can generally use the entire plant. For high value crops, taking the petiole is recommended.

1 COTTON
Collect recently mature leaves from the main stem on 40 to 50 plants selected at random at full bloom.

2 CORN
From Tasseling to Silking: Collect the leaves below and opposite from the ear of 15 to 20 plants.

3 SOYBEANS
Collect recently mature trifoliate leaves from the top of 20 to 30 plants prior to, or during lowering.

4 SMALL GRAIN WHEAT & RICE
Collect the three or four uppermost leaf blades from the top of 25 to 40 plants. Sample should equal two cups.

HOW MUCH IS NEEDED:
In general, about 2 cups of material, or 15 to 30 leaves, is an adequate number to conduct a proper analysis.

SHIPPING:
Shipping samples is an important step in the analysis, in general you should follow these rules:
- Never send fresh samples in sealed plastic bags
- Never freeze samples
- Do not include roots with samples
- Get samples to the lab as soon as possible
The INNVICTIS Nutritional Line is a portfolio full of unique and high performance products.

These products are innovative and fit a new or specific market segment.
**Allevia™**

**Guaranteed Analysis**

- **Sulfur**: 1.5%
- **Boron**: 2.0%
- **Manganese**: 3.0%
- **Molybdenum**: 0.1%
- **Zinc**: 3.0%

**Use Rates:**
- **Ground**: 1-3 pt/acre
- **Aerial**: 1-3 pt/acre

**Use Restrictions:**

**Warning:** This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

**Warning:** This product is to be used only on crops which respond to molybdenum. Crops high in molybdenum are toxic to grazing animals.

**Benefits:**
- Compatible with most pesticides including glyphosate based herbicides
- Effectively delivers boron, a key nutrient for nitrogen metabolism and root nodulation formation
- Contains crucial nutrients such as zinc, manganese and sulfur
- Improves plant health, quality and yield
- Mitigates plant stress

**For Use On:**
- All crops

**Density:**
- 11.3 lb/gal

**Application Timing:**
- Season long foliar application versatility

**Tank Mixes:**
- Most commonly used pesticides and fertilizers. Always perform a jar test for compatibility
USE RATES:
RICE: Apply 1 qt/acre at the 2 - 3 leaf stage. Apply 1 qt/acre at the “green ring” (internode elongation) stage. Apply 1 qt/acre at the first fungicide application (usually 50% seed head emergence).
COTTON: Apply 1 qt/acre every two weeks starting the first application at pinhead square for a total of three applications.
CORN: Apply 2 qt/acre at the V3 - V5 stage.
PEANUTS: Apply 1 qt/acre every two weeks starting the first application 10 days prior to bloom for a total of three applications.
SOYBEANS: Apply 1 qt/acre at the 2-3 trifoliate leaf stage and again at R1.

BENEFITS
• Activates several beneficial biological and environmental responses in plants
• Increases yield potential, improves growth, plant health and quality
• For use in high phosphate materials

FOR USE ON
• Multiple crop use-- please reach out to your local INNVICTIS representative for specific crops and application rates

DENSITY
• 9.81 lb/gal

APPLICATION TIMING
• Foliar
• Soil
• Chemigation

TANK MIXES
• It is compatible with CAPTIVATE™ EDTA and other high phosphate fertilizers

ANOVA™ 5-0-0 is formulated for use in high phosphate materials commonly used in the row as a “starter” or “pop-up” fertilizer. It is compatible with CAPTIVATE™ EDTA and other high phosphate fertilizers. ANOVA™ 5-0-0, when used in a regular soil fertilization program, supplies essential nutrients to the germinating plant at a critical growth stage.

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
**BORON V**

**BENEFITS**

- Contains enhanced “ANOVA™” amino acid package, which results in a quick uptake
- Provides vital boron for plant health due to its role in forming and strengthening cell walls and nitrogen metabolism
- Participates in regulating starch production and translocation of sugars

**FOR USE ON**

- Multiple crop use—please reach out to your local INNVICTIS representative for specific crops and application rates

**DENSITY**

- 10.64 lb/gal

**APPLICATION TIMING**

- Foliar (on most crops)

**ADDITIONAL APPLICATION TIMING**

- **BORON V** application rate is determined by the crop growth stage and the nutrient demand curve at the time of application
- Due to immobility, **BORON V** should be applied multiple times to adequately satisfy crop needs, especially to newly formed tissue

**USE RATES:**

**FOLIAR:** 4 - 24 oz/acre, depending on crop stage and requirement.

**SOIL:** 16 - 32 oz/acre in irrigation water or when sidedressed with any NPK application.

**USE RESTRICTIONS:**

Applying more than 1 lb of actual boron per acre can cause plant injury.

**WARNING:** This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

**GUARANTEED ANALYSIS**

- **BORON** • 5.0%

**BORON V** is an enhanced liquid formulation with ANOVA™ amino acid technology for foliar application of boron on row crops, vegetables, fruit & nut trees and fruiting vine crops. ANOVA™ technology greatly improves the absorption and movement of nutrients from leaf cuticle to plant growing points for a longer period of time. **BORON V** is formulated for quick and effective boron nutrition delivery to prevent and correct boron deficiencies.

**APPLICATION TIMING**

- Foliar (on most crops)

**ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!**
BORON 10% is an effective, readily available liquid formulation of boron designed to correct or prevent boron deficiencies in crops. Boron plays an essential role in the development and growth of new cells in the plant. BORON 10% provides the required boron amounts to help increase flowering and fruit development during reproduction.

**GUARANTEED ANALYSIS**

- **BORON** • 10.0%

**USE RATES:**
- **FOLIAR:** 1-2 qts / acre
- **BROADCAST:** 2-8 qts / acre
- **SEVERE DEFICIENCY:** 8 qts/ acre
- **MODERATE DEFICIENCY:** 4 qts/ acre
- **MAINTENANCE:** 2 qts/ acre
- **ROW APPLICATION:** 1-2 qts / acre

**USE RESTRICTIONS:**

**WARNING:** This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

**1 BENEFITS**

- Superior formulation allows for more rapid uptake
- Convenient liquid formulation is easy to handle, measure and apply
- Excellent compatibility for mixing with most pesticides and fertilizers

**2 FOR USE ON**

- All crops that need boron
- Always check label

**3 DENSITY**

- 11.1 lb/gal

**4 APPLICATION TIMING**

- Broadcast
- Pre-emerge
- Sidedress
- Foliar

**5 TANK MIXES**

- Mixes well with most pesticides and fertilizers
CAPTIVATE™ D
STARTER FERTILIZER
10-20-5

USE RATES:
FOLIAR: 1-2 gallons per acre, per application on row crops and up to 4 gallons per acre in a season. Fruit / Nut trees apply 1-2 gallons per acre in a minimum of 50 gal/acre.
SOIL: Row crops when used alone, use up to 5 gal/acre prior to planting 2-4 inches directly below the seed drill. 3 gal of CAPTIVATE™ D 10-20-5 can also be mixed with additional 10-34-0 or 11-37-0 and placed in the soil. For Tree/nut crops inject up to 30 gal per 4-6 inches below the soil level under tree’s drip line.

GUARANTEED ANALYSIS
NITROGEN • 10.00%
AVAILABLE PHOSPHATE • 20.00%
SOLUBLE POTASH • 5.0%
ZINC • 0.43%

CAPTIVATE™ D is a low salt, 100% clear orthophosphate fertilizer. It is designed to be used in drip irrigation, in furrow, or 2x2 application to increase seedling root growth and development while keeping your phosphate fertilizer more available during the growing season.

1 BENEFITS
• Best in class seedling safety
• Early season root growth and development
• Young plants emerge stronger in cold weather
• Safe for all drip irrigation applications
• Low pH (less than 7) developed specifically for drip irrigation
• Sulfur free
• 100% available form of phosphate to plants

2 FOR USE ON
• Row crops
• Tree and nut crops

3 DENSITY
• 10.9 lb/gal

4 APPLICATION TIMING
• In-furrow
• 2x2

5 TANK MIXES
• Mixes with 100% EDTA micronutrients such as ZINC 9% EDTA. Or VITALYZE™ C or CAVALIER™ OAC.

"DO NOT" use on Seed Corn/Sweet Corn Production if Cation Exchange Capacity is less than 6.0 or Organic Material is less than 0.6%*

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
GUARANTEED ANALYSIS

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>10.00%</td>
</tr>
<tr>
<td>Available Phosphate</td>
<td>20.00%</td>
</tr>
<tr>
<td>Soluble Potash</td>
<td>5.00%</td>
</tr>
<tr>
<td>Sulfur</td>
<td>1.00%</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.43%</td>
</tr>
</tbody>
</table>

USE RATES:
Use 2-5 gal/acre in-furrow.

USE RESTRICTIONS:
Only EDTA Chelated nutrients can be used with this product. Do not mix with calcium based fertilizers.

*DO NOT* use on Seed Corn/Sweet Corn Production if Cation Exchange Capacity is less than 6.0 or Organic Material is less than 0.6%*

BENEFITS

- Low use rates allowing more treated acres
- Increased early season growth and vigor for maximum yield potential
- Increased phosphorous availability versus other starter fertilizers
- Flexible application timings like in-furrow, 2x2 or foliar
- Increased yield, up to 10 bushels more than 10-34-0 starter fertilizer
- Stronger early seedling growth in cool growing conditions allowing for earlier maturing and high yielding crops

FOR USE ON

- Multiple crop use-- please reach out to your local INNVICTIS representative for specific crops and application rates

CAPTIVATE™ EDTA is a starter fertilizer designed to be more plant available during the growing season. CAPTIVATE™ utilizes V-Row technology, known to stimulate rooting hormones, while acting as an extraction agent to keep phosphorus, potassium and other nutrients more plant available, even in heavy dry soils for increased growth and development.

1. BENEFITS
2. FOR USE ON
3. DENSITY
   - 11.2 lb/gal
4. APPLICATION TIMING
   - In-furrow
   - 2x2
   - Foliar (most crops)
5. TANK MIXES
   - Mixes with 100% EDTA micronutrients such as ZINC 9% EDTA. Or VITALYZE™ C or CAVALIER™ OAC

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
CAVALIER™ G

1 BENEFITS

• Increases soil CEC for more fertilizer holding capacity
• Increases nutrient uptake by increasing soil microbial activity
• Increases root growth and development as a result of the carbohydrate content

2 FOR USE ON

• All crops including row crops, field crops, trees, vines and vegetables

GUARANTEED ANALYSIS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CALCIUM</td>
<td>12.0%</td>
</tr>
<tr>
<td>MAGNESIUM</td>
<td>5.0%</td>
</tr>
<tr>
<td>SULFUR</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

CAVALIER™ G is a blend of organic acids derived from calcium lignosulfonate, wood derived carbohydrates and simple wood sugars. As a result, fertilizer efficiency and soil microbiology can be improved by the addition of CAVALIER™ G. Excellent source of secondary nutrients calcium, magnesium and sulfur.

USE RATES:
Soil application rates generally range from 10-40 pounds per acre per growing season

USE RESTRICTIONS:
Unless applied immediately, CAVALIER™ G should not be applied as a blend with UREA.

3 APPLICATION TIMING

• In-Furrow
• Side dress

4 TANK MIXES

• All dry phosphates, potash and micronutrient blends.

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
**ACTIVE INGREDIENTS**

**HUMIC ACID** • 18%

---

**BENEFITS**

- May increase uptake of all soil and foliar applied nutrients
- Aids in the release of tied up nutrients in the soil
- Maximizes yield potential
- Finer particulates produced by micro milling the leonardite compared to that of a caustic extraction of humic acids
- pH of approximately 4, making soil nutrients more available
- Excellent energy source for growing crops under stress
- Most convenient handling and storing humic acid product on the US market
- Can be tank mixed with soil and post-emerge herbicides for convenience and increased weed control

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**FOR USE ON**

- All crops

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**APPLICATION TIMING**

- Broadcast
- Sidedress
- 2x2
- In-furrow
- Foliar on most crops

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**USE RATES:**

**FOLIAR:** 8 - 32 oz/acre  
**SOIL:** 16 - 64 oz/acre

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**DENSITY**

- 9.41 lb/gal

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**DELIVERED K™ PLUS**

**FOLIAR FERTILIZER**

3-0-20

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### GUARANTEED ANALYSIS

- **NITROGEN**: 3.0%
- **SOLUBLE POTASH**: 20.0%
- **SULFUR**: 13.0%
- **BORON**: 0.10%
- **MANGANESE**: 0.20%
- **ZINC**: 0.05%

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### USE RATES:

- **FOLIAR**: 2 qt - 8 qts/acre, depending on crop and growth stage.

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### USE RESTRICTIONS:

May burn grass crops because of sulfur concentration. If mixing with UAN, you must use a 1:1 ratio of water prior to adding mix to the UAN solution.

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### WARNING:

This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

---

### BENEFITS

- Excellent crop safety and can be tank mixed with post emerge herbicides for convenience and weed control
- Provides a superior source of nitrogen, potassium and sulfur that is readily absorbed by the plant
- Contains the leading micronutrients that are deficient in plants
- Delivers potassium and sulfur during periods of rapid growth and development
- Increases water utilization and crop color

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### FOR USE ON

- Soybeans
- Cotton
- Rice
- Alfalfa

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### APPLICATION TIMING

- Foliar
- Drip
- Broadcast
- Sidedress

---

### DENSITY

- 11.74 lb/gal

---

### TANK MIXES

- Can be tank mixed with CAVALIER™ OAC, VITALYZE™ 3-0-0, and THRIVE™

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ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
**1 BENEFITS**
- Only In-furrow potassium and sulfur source for increased vigor
- Potash source gives plants stronger stalks
- Early season sulfur allows for maximum early development
- One of the safest materials tested in germination trials

**2 FOR USE ON**
- Corn
- Soybeans
- Wheat

**3 DENSITY**
11.5 lb / gal

**4 APPLICATION TIMING**
- In-Furrow
- Sidedress
- Foliar
- 2x2
- 2x0

**5 TANK MIXES**
- Mixes with poly and orthophosphate fertilizers. When mixing with UAN always add 1 gallon of water for every 1 gallon of DIVERSE K™ used. Always jar test applications to determine compatibility

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
**INNVICTIS™ MICROMIX**

**GUARANTEED ANALYSIS**

<table>
<thead>
<tr>
<th>Micronutrient</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>BORON</td>
<td>0.1%</td>
</tr>
<tr>
<td>COPPER</td>
<td>0.2%</td>
</tr>
<tr>
<td>IRON</td>
<td>0.5%</td>
</tr>
<tr>
<td>MANGANESE</td>
<td>2.0%</td>
</tr>
<tr>
<td>MOLYBDENUM</td>
<td>0.0005%</td>
</tr>
<tr>
<td>ZINC</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

**INNVICTIS™ MICROMIX** is a liquid formulation containing 100% EDTA chelated (except Boron and Molybdenum) micronutrients for easy mixing, even distribution, and consistent delivery to the plant. **INNVICTIS™ MICROMIX** provides maximum availability of micronutrients when tank-mixed with NPK liquid fertilizers to maximize plant uptake, growth, and development. It will tank mix with ALL poly and 100% orthophosphate fertilizers.

**BENEFITS**

1. Maximizes yield potential
2. Stable EDTA formulation that mixes with all NPK starters and glyphosate
3. Designed to meet the plants micronutrient requirements for the season
4. Mixes with all 100% orthophosphate and polyphosphates fertilizers

**USE RATES:**

**IN-FURROW/BANDED/2X2:** 1-4 pt/acre

**FOLIAR:** 1-2 pt/acre. Can be tank-mixed with glyphosate for foliar applications.

**USE RESTRICTIONS:**

**WARNING:** This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

**WARNING:** This product is to be used only on crops which respond to molybdenum. Crops high in molybdenum are toxic to grazing animals.

**FOR USE ON**

- All crops

**DENSITY**

- 10.1 lb/gal

**APPLICATION TIMING**

- In-Furrow, 2X2, 2X0, Side Dress, Fertigation systems, and foliar (Ground or Aerial)

**TANK MIXES**

- Mixes well with most pesticides and fertilizers
- Always do a jar test to verify compatibility

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!

**1 BENEFITS**

- Enhances early root development
- Provides crops with essential nutrients
- Helps crops to alleviate early season stress

**2 FOR USE ON**

- Multiple crop use-- please reach out to your local INNVICTIS representative for specific crops and application rates

**3 DENSITY**

- 10.4 lb / gal

**GUARANTEED ANALYSIS**

<table>
<thead>
<tr>
<th>NITROGEN</th>
<th>16.0%</th>
<th>IRON</th>
<th>0.15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOLUBLE POTASH</td>
<td>2.0%</td>
<td>MANGANESE</td>
<td>0.15%</td>
</tr>
<tr>
<td>BORON</td>
<td>0.02%</td>
<td>ZINC</td>
<td>2.70%</td>
</tr>
<tr>
<td>COPPER</td>
<td>0.15%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IVC™ WITH MNP**

SOIL AND FOLIAR FERTILIZER

16-0-2

**USE RATES:**

**SOIL APPLICATION:**

- Broadcast, Band or Side Dress: Apply 2 to 4 quarts per acre
  - In-Furrow: Apply 1½ to 2 quarts per acre at planting
  - Drip Irrigation: Apply 1 ½ to 2 quarts per acre

**FOLIAR APPLICATION:**

Apply 1 2/3 to 2 quarts per acre

**USE RESTRICTIONS:**

DO NOT mix with calcium-based fertilizers.

**WARNING:** This product contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

**IVC™ WITH MNP**

is intended for soil or foliar application on all types of crops. It contains complexed zinc citrate with potash and a balanced micronutrient package that allows the crop to reach its full yield potential. Contains V-ROW™ Technology to help increase early season plant growth and vigor when used in-furrow.

**APPLICATION TIMING**

- Call a local INNVICTIS representative for the specific application rates

**TANK MIXES**

- Applied alone or with compatible fertilizer

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
**INNVITA™ MNP**

**Guaranteed Analysis**

<table>
<thead>
<tr>
<th>Element</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>BORON</td>
<td>0.125%</td>
</tr>
<tr>
<td>MANGANESE</td>
<td>1.0%</td>
</tr>
<tr>
<td>MOLYBDENUM</td>
<td>0.01%</td>
</tr>
<tr>
<td>ZINC</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

**Use Rates:**

- **Foliar**: 13 oz/acre
- **Soil**: 13 oz/acre

**Use Restrictions:**

**WARNING:** This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

**WARNING:** This product is to be used only on crops which respond to molybdenum. Crops high in molybdenum are toxic to grazing animals.

**1 Benefits**

- Boosts plant uptake of nutrients, helping accelerate maturity
- Works with several different enzymatic pathways, improving micro and macro nutrient uptake and stimulating growth
- Safe for all glyphosate applications
- Application and timing flexibility

**2 For Use On**

- Multiple crop use—please reach out to your local INNVICTIS representative for specific crops and application rates

**3 Density**

- 9.47 lb / gal

**4 Application Timing**

- In-furrow
- 2x2
- Broadcast

**5 Tank Mixes**

- Mixes with poly and orthophosphate fertilizers

**INNVITA™ MNP** is an excellent foliar and soil applied micronutrient package designed to help increase nutrient uptake for growing plants. **INNVITA™ MNP** also works in the soil to increase nutrient availability to growing roots during the season.

*Always carefully read & follow label instructions!*
1 BENEFITS

- Does not volatilize when applied foliar to crop
- “Right Now Nitrogen” absorbs quickly into plants for key enzyme and amino acid formation for maximum fruit development and yield potential
- Best in class crop safety and helps promote uniform growth
- Product of choice to minimize leaf burning in hot and humid conditions

2 FOR USE ON

- Multiple crop use-- please reach out to your local INNViCTIS representative for specific crops and application rates

3 DENSITY

- 10.75 lb / gal

4 APPLICATION TIMING

- Foliar
- Soil
- Sidedress

Please refer to label for specific timing

5 TANK MIXES

- Please reach out to your local INNViCTIS representative for tank mixes

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
1 BENEFITS

- Does not volatilize when applied foliar to crop
- Unique form of nitrogen absorbs and translocates quickly into the plant for maximum plant development
- “Right Now Nitrogen” absorbs quickly into plants to help with key enzyme and amino acid formation
- NOVUS™ B gives the grower excellent crop safety and helps promote uniform growth
- NOVUS™ B contains Triazone nitrogen which has shown the ability to absorb quickly into the plant when foliar applied

2 FOR USE ON

- Multiple crop use-- please reach out to your local INNVICTIS representative for specific crops and application rates

3 DENSITY

- 10.0 lb/gal

4 APPLICATION TIMING

- Refer to label

5 TANK MIXES

- NPK fertilizers
- Most herbicides
- Insecticides
- Fungicides
- Avoid strong acids or contact with aluminum, mild steel and brass

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
USE RESTRICTIONS:
WARNING: This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

USE RATES:

<table>
<thead>
<tr>
<th>RECOMMENDED RATES:</th>
<th>2-4 qt/acre</th>
<th>2-12 qt/acre</th>
<th>4-6 qt/acre</th>
<th>4-8 qt/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>CROPS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grapes, Strawberries</td>
<td>Cotton</td>
<td>Alfalfa, Apples, Beans (Dry), Beans (Green, Lima), Caneberries, Cherries, Citrus</td>
<td>Cranberries, Grain Sorghum, Hops, Lentils, Lettuce, Okra, Olives</td>
<td>Onions, Peas, Pears, Peas, Pecans, Peppers, Sunflower, Sweet Potatoes, Canola</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RECOMMENDED RATES:</th>
<th>4-10 qt/acre</th>
<th>4-12 qt/acre</th>
<th>4-16 qt/acre</th>
<th>6-10 qt/acre</th>
<th>1-5 gallons/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>CROPS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christmas Trees, Nursery Stock, Ornamentals, Tomatoes, Soybeans, Cucumbers, Filberts, Grass, Peanuts, Potatoes</td>
<td>Cucumbers, Filberts, Grass, Peanuts, Potatoes</td>
<td>Almonds, Asparagus, Broccoli, Cabbage, Cantaloupe, Cauliflower, Flax, Nectarines</td>
<td>Peaches, Plums, Rice, Spinach, Squash, Sugar Beets, Tobacco, Watermelon</td>
<td>Corn (Seed, Sweet)</td>
<td></td>
</tr>
</tbody>
</table>

6 CLEAN UP

- Always ensure application equipment is clean before and after spraying. It is recommended to use INNVICTIS™ PREMIUM TANK CLEANSER to clean, rinse and emulsify pesticide and adjuvant residues.

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
**NOVUS™ K**

**SLOW RELEASE FOLIAR FERTILIZER**

**20-0-6**

---

**BENEFITS**

- **NOVUS™ K** provides essential nutrients at optimum growth stages, for maximum yield
- Increases plant health and stalk strength with a balance of macro and micronutrients
- Helps crop overcome stress generated by wet or dry weather

---

**FOR USE ON**

- Designed specially for corn, cotton, soybeans and wheat
- Please refer to label for all crops and rates

---

**GUARANTEED ANALYSIS**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>20.00%</td>
</tr>
<tr>
<td>Soluble Potash</td>
<td>6.00%</td>
</tr>
<tr>
<td>Sulfur</td>
<td>3.00%</td>
</tr>
<tr>
<td>Boron</td>
<td>0.25%</td>
</tr>
<tr>
<td>Iron</td>
<td>0.10%</td>
</tr>
</tbody>
</table>

---

**USE RATES:**

1 - 2 gallons per acre on most crops

**USE RESTRICTIONS:**

**WARNING:** This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

---

**DENSITY**

- 10.53 lb / gal

---

**APPLICATION TIMING**

- Foliar early season, midseason or late season to developing crops. Check label for proper timing

---

**TANK MIXES**

- Mixes well with most pesticides and fertilizers. If mixing with additional fertilizers always do a jar test first

---

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
PRO-V™

GUARANTEED ANALYSIS

NITROGEN • 9.00%
AVAILABLE PHOSPHATE • 24.00%
SOLUBLE POTASH • 3.00%

PRO-V™

FOLIAR FERTILIZER

9-24-3

USE RATES:
FOLIAR: Apply 1 - 3 gallons per acre in a minimum of 5 gallons of water per acre.
SOIL: Refer to label for specific crop and use rates

USE PRECAUTIONS:
This product may cause foliar burn if applied in higher than recommended rates or concentrations. Use only as a supplement to a regular fertilization program.

"DO NOT" use on Seed Corn/Sweet Corn Production if Cation Exchange Capacity is less than 6.0 or Organic Material is less than 0.6%*

1 BENEFITS

• Provides phosphorus for critical early plant health
• Seed safe for in-furrow application to ensure maximum germination
• Contains a balance of nitrogen and potassium to provide early stalk development

2 FOR USE ON

• Multiple crop use-- please reach out to your local INNVICTIS representative for specific crops and application rates

3 DENSITY

• 11.0 lb / gal

4 APPLICATION TIMING

• Foliar
• Soil

5 TANK MIXES

• Always check compatibility with other products prior to use
• DO NOT mix with calcium-based fertilizers

PRO-V™

9-24-3 is a seed safe starter fertilizer for in-furrow, 2x2 or surface application to most crops. PRO-V™ 9-24-3 placed in-furrow around the seed, provides developing plants with the needed phosphorus to maximize early season growth and development.

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
1 **BENEFITS**

- Increases plant growth
- Better uptake and translocation of nutrients to developing crops
- Poly and orthophosphates for quick and slow release
- Contains B, Mo, and EDTA chelated micronutrients to safely mix with glyphosate
- Jump starts growth for crops under extreme environmental stress

**THRIVE™** is a blend of ortho and polyphosphates designed to be more plant available during foliar applications. **THRIVE™** includes an organic acid package to help improve nutrient absorption through the leaf tissue, for more efficient fertilizer uptake and translocation.

2 **FOR USE ON**

- All crops

3 **DENSITY**

- 11.3 lb/gal

4 **APPLICATION TIMING**

- Broadcast
- Sidedress
- 2x2
- In-furrow
- Foliar (on most crops)

5 **TANK MIXES**

- **THRIVE™** can be tank-mixed with most pesticides and will mix well with other fertilizers. Consult the label and talk with your dealer for specific pesticide recommendations

**ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!**
GUARANTEED ANALYSIS

<table>
<thead>
<tr>
<th>Component</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>8.00%</td>
</tr>
<tr>
<td>Available Phosphate</td>
<td>21.0%</td>
</tr>
<tr>
<td>Soluble Potash</td>
<td>6.0%</td>
</tr>
<tr>
<td>Boron</td>
<td>0.05%</td>
</tr>
<tr>
<td>Copper</td>
<td>0.10%</td>
</tr>
<tr>
<td>Iron</td>
<td>0.20%</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.10%</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>0.0005%</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.10%</td>
</tr>
</tbody>
</table>

USE RESTRICTIONS:

WARNING: This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

WARNING: This product is to be used only on crops which respond to molybdenum. Crops high in molybdenum are toxic to grazing animals.

6 USE RATES

SOIL: 2 - 4 qt per acre at planting as a row starter or in covering soil.
FOLIAR: 1 - 4 qt per acre

7 CLEAN UP

- Always ensure application equipment is clean before and after spraying. It is recommended to use INNVICTIS™ PREMIUM TANK CLEANSER to clean, rinse and emulsify pesticide and adjuvant residues

8 STORAGE & HANDLING:

- Store in cool, dry place in original container in a locked storage area above 32 °F and inaccessible to children, pets, domestic animals or wildlife.
- This product may be corrosive to aluminum, mild steel and brass. Store in HDPE, fiberglass or stainless steel containers. Use only stainless steel, P.V.C., or polypropylene fittings.

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
1 **BENEFITS**

- Contains a balanced NPK and micronutrient package to maximize crop growth and yield
- When applied at the vegetative stage in dicots, it promotes bloom retention
- Offers flexible crop application (vegetative/ reproductive)
- Versatile product designed to jump start the crop
- V-AGRI™ is packed with the essential micronutrients for healthy yields

2 **FOR USE ON**

- Corn, Soybeans, Alfalfa, Cotton, Peanuts, Wheat, Rice, and other crops

3 **DENSITY**

- 10.4 lb / gal

4 **APPLICATION TIMING**

- In-Furrow
- 2x0
- 2x2
- Sidedress
- Foliar

**USE RESTRICTIONS:**

**WARNING:** This material contains boron and should be used only as recommended. It may prove harmful when misused. Boron may be injurious to certain crops, use as directed.

**WARNING:** This product is to be used only on crops which respond to molybdenum. Crops high in molybdenum are toxic to grazing animals.

**GUARANTEED ANALYSIS**

- **NITROGEN**
- **12.00%**
- **IRON**
- **0.10%**
- **SOLUBLE POTASH**
- **10.00%**
- **MANGANESE**
- **0.20%**
- **BORON**
- **6.00%**
- **MOLYBDENUM**
- **0.0005%**
- **COBALT**
- **0.22%**
- **ZINC**
- **0.05%**

**USE RATES:**

**FOLIAR:** 1-4 qt/acre

**SOIL:** 2 - 4 qt/acre

**V-AGRI™**

12-9-6 is a soil or foliar applied plant fertilizer containing NPK, plus a fully chelated micronutrient package. V-AGRI™ promotes vegetative growth and development by supplying vital nutrients needed by young plants under cool, wet spring conditions. Continue with multiple applications throughout the growing season based on the nutrient demand curve of the crop.
ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!

**VELOcity™ CS**

**SOil And Foliar Fertilizer**

**2-20-14**

### GUARANTEED ANALYSIS

<table>
<thead>
<tr>
<th>Component</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>2.0%</td>
</tr>
<tr>
<td>Available Phosphorus</td>
<td>20.0%</td>
</tr>
<tr>
<td>Soluble Potash</td>
<td>14.0%</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.20%</td>
</tr>
</tbody>
</table>

### USE RATES:

**VELOcity™ CS** can be soil applied by banding in or near the seed row, surface dribble, strip-till, bed placement or irrigation.

**Soybeans:** 2-4 gallons/acre  
**Cotton:** 2-4 gallons/acre  
**Corn:** 2-5 gallons/acre

### USE PRECAUTIONS:

This product may cause foliar burn if applied in higher than recommended rates or concentrations. Use only as a supplement to a regular fertilization program.

### BENEFITS

1. Increases plant growth  
2. Better uptake and translocation of nutrients to developing crop  
3. Contains orthophosphates in order to maximum uptake  
4. Jumpstarts growth for crops under extreme environmental stress  
5. Accelerates germination and maturity  
6. Improves fertilizer efficiency in soil

### FOR USE ON

- Multiple crop use-- please reach out to your local INNVICTIS representative for specific crops and application rates

### DENSITY

- 11.48 lb/gal

### APPLICATION TIMING

- In-furrow  
- 2x2  
- Foliar

### TANK MIXES

- Can be tank mixed with **CAVALIER™ OAC** for maximum growth and development

Is a starter fertilizer was developed specifically to improve early season fertility and vigor. Most crops require readily available phosphorus, potassium, and zinc to maximize early growth and development for optimum plant health. **VELOcity™ CS** utilizes two important technologies, V-ROW™ Technology prevents fertilizer tie-up in the soil, and VEEVA™ Technology, which improves the root-soil interaction increasing nutrient uptake.
**1 BENEFITS**

- Lowest salt index phosphorous source, while also being the highest available phosphorous fertilizer on the market
- Unique formula allows phosphate to remain plant available for an extended time
- Provides available nutrients to growing crops to promote quick, uniform emergence
- Highly soluble with ultra low application rates
- The market’s first water soluble starter fertilizer

**2 FOR USE ON**

- Multiple crop use—please reach out to your local INNVICTIS representative for specific crops and application rates

**3 APPLICATION TIMING**

- In-furrow
- 2x2
- Foliar
**USE RATES:**
**FOLIAR:** 1-2 lb per acre
For most applications, it is recommended to use a ratio of 1 lb VIRIDIS to 2 gallons of water.

**USE PRECAUTIONS:**
**VIRIDIS™** is a dark red, water soluble granular that may discolor objects it comes into contact with. Avoid unnecessary contact and/or wash discolored objects thoroughly with water.
**DO NOT** mix **VIRIDIS™** with glyphosate when foliar applied to any crop.

---

**1 BENEFITS**
- Aides in iron chlorosis
- Effective in soils with a high pH because of the 100% ortho-ortho EDDHA chelated iron
- Granular product for convenient handling

**2 FOR USE ON**
- Multiple crop use—please reach out to your local INNVICTIS representative for specific crops and application rates

**3 APPLICATION TIMING**
- Soil
- Foliar

**VIRIDIS™** is a highly active ortho-ortho iron EDDHA chelate micronutrient designed to correct iron deficiencies in crops.

**GUARANTEED ANALYSIS**
**IRON**
- **6.0%**
VITALYZE™ 3-0-0

**BENEFITS**
- Helps increase phosphorus, potassium and all other nutrients
- Improves plant growth and enhances yield
- Excellent impregnation and mixing properties for dry or liquid fertilizers

**FOR USE ON**
- Multiple crop use-- please reach out to your local INNVICTIS representative for specific crops and application rates

**USE RATES:**
- **STARTER FERTILIZER OR SIDE DRESS FERTILIZER:** 1 to 4 pints per acre of **VITALYZE™**
- **BROADCAST:** 2 to 8 pints per acre of **VITALYZE™**. Apply 1 to 4 times per growing season for best results
- **RESIDUE MANAGEMENT:** Apply 3-4 pints broadcast / Acre + 2-3 gallons of UAN or Ammonium thiosulfate (12-0-0-26 S)

**USE PRECAUTIONS:**
- DO NOT mix with fungicides. Liquid fertilizers in the pH range of 5 to 9 are compatible with **VITALYZE™ 3-0-0.**

**GUARANTEED ANALYSIS**
- **NITROGEN**
  - 3.0%

**CONTAINS NON-PLANT FOOD INGREDIENTS**
- **MICROORGANISMS**
  - <1%

**DENSITY**
- 8.65 lb / gal

**APPLICATION TIMING**
- In-Furrow
- Sidedress
- Broadcast
- **Starter**
- **Dry fertilizer impregnation**

**TANK MIXES**
- Mixes with fertilizers and herbicides

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
USE RATES:

STARTER FERTILIZER OR SIDE DRESS FERTILIZER: 1 to 4 pints per acre of VITALYZE™ C.

BROADCAST: 2 to 8 pints per acre of VITALYZE™ C.

Apply 1 to 4 times per growing season for best results.

RESIDUE MANAGEMENT: Apply 3-4 pints broadcast / Acre + 2-3 gallons of UAN or Ammonium thiosulfate (12-0-0-26 S).

USE RESTRICTIONS:

DO NOT mix with fungicides. Liquid fertilizers in the pH range of 5 to 9 are compatible with VITALYZE™ C.

VITALYZE™ C is a concentrated proprietary blend of biological organisms. VITALYZE™ C works when applied in-furrow, broadcast, or on dry fertilizers to increase uptake of all nutrients, including N-P-K and all Micronutrients. VITALYZE™ C can help re-vitalize your soils and your fertility program for improved yields and quality.

1 BENEFITS

• Increases fertilizer availability
• Improves plant growth and enhances yield
• Improves soil tilth and enhances natural microbial activity

2 FOR USE ON

• Multiple crop use-- please reach out to your local INNVICTIS representative for specific crops and application rates

3 DENSITY

• 8.35 lb/gal

4 APPLICATION TIMING

• Sidedress
• Broadcast
• Starter
• Dry Fertilizer Impregnation

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
ZINC 9% EDTA

GUARANTEED ANALYSIS
ZINC • 9.0%

ZINC 9% EDTA has a protective barrier that prevents the zinc from reacting or binding with other elements in the soil and in liquid fertilizers (high orthophosphates). This 100% EDTA chelation ensures that nutrients remain mobile and available in the soil for plant uptake. This chelation also means ZINC 9% EDTA will mix with all ortho and polyphosphate fertilizers for best in class application and mixing.

USE RATES:
FOLIAR: 1 - 2 qts/acre
SOIL: 1 - 4 pints/acre

1 BENEFITS
• Stability, longevity, quality and reliability for storing and mixing
• Compatible with most pesticides and fertilizers
• Suitable for soil, foliar and aerial applications including all fertigation systems
• Mixes with all 100% orthophosphate and polyphosphate fertilizer

2 FOR USE ON
• Any crop where zinc is needed

3 DENSITY
• 11.0 lb / gal

4 APPLICATION TIMING
• In-Furrow
• 2x2
• 2x0
• Side dress
• Fertigation
• Systems
• Foliar (ground or aerial)

ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!
1. The INNVICTIS Nitrogen management line supports the adequate supply of nitrogen.

2. This portfolio is more critical today as crops fail to reach maximum yield potential to feed the world and many other ecosystems.
Nitrogen is the number one essential nutrient to crops around the world, and is the one nutrient that is most commonly deficient. Nitrogen exists in the soil in many forms, and changes very easily from one form to another. Nitrogen behavior in soils is complex and involves rapid conversion between the different nitrogen forms. This complexity is what makes predicting nitrogen loss from soils difficult. The transformation of nitrogen in and out of the soil system is collectively called the “nitrogen cycle.” The nitrogen cycle involves five major steps listed below and can be seen on above Nitrogen Cycle map.

- Nitrogen fixation
- Nitrification
- Ammonification
- Denitrification
- Nitrogen Immobilization
1 NITROGEN FIXATION
An anaerobic (without Oxygen) process in which atmospheric (N₂) is reduced to NH₃ (Ammonia). Soil and water bacteria are responsible for this process to transform nitrogen. These organisms must have a special enzyme known as dinitrogenase to convert this nitrogen. Legumes like Alfalfa, Peanuts and Soybeans all have a special symbiotic relationship with these types of soil bacteria which allow these legumes to transfer atmospheric nitrogen (N₂) directly to (NH₃) ammonia nitrogen, which is converted by the plants into useful N. There are microbes that fix nitrogen independent of other organisms, these are called free living. They have been and are being studied to determine how they accomplish the amazing feat of nitrogen transformation. There has been little success in getting these types of bacteria to fix enough nitrogen to grow an entire crop.

2 NITRIFICATION
A biological process that rapidly proceeds in warm, moist, well-aerated soils. Nitrification slows at soil temperatures below 50 °F. Nitrate (NO₃⁻) is a negatively charged ion and is not attracted to other negatively charged soil particles like Ammonium (NH₄⁺). Nitrate (NO₃⁻) is water soluble and can move below the crop rooting zone under certain conditions. Plants receive the components of the “fixed” nitrogen using nitrates and ammonium in the soil to provide the nutrients they need. Bacteria such as Nitrosomonas, Nitrooccus, and Nitrobacter participate. Nitrification involves two steps. First, the ammonium ion (NH₄⁺) is oxidized into NO₂⁻. This compound is further oxidized into nitrate (NO₃⁻). Again, bacteria in the soil participate in both processes to convert the nitrogen.

3 AMMONIFICATION
Ammonification is an important stage in the nitrogen cycle, a natural cycle which makes the Earth’s supply of this essential element available to living organisms. It is carried out by a variety of microorganisms found in soil and water, which break down proteins and amino acids in dead plants and animal manure, releasing ammonia, which is usually retained in soil or water in the form of the ammonium ion. Other groups of microorganisms then convert this into nitrate, which can be absorbed by plants, maintaining the nitrogen cycle. Ammonification is therefore essential to all plant and animal life on the planet. In agriculture and horticulture, the addition of compost and manure to soil provides an extra source of nitrogen for ammonification.

4 DENITRIFICATION
This is the reverse process of nitrification. Denitrification occurs when nitrate nitrogen is converted into nitrogen gas by microorganisms and escapes into the air. Two to three days of saturated soil are required for the process to begin. Warm soil temperatures accelerate the denitrification process. Research indicates denitrification rates range from 2-3% per day at soil temperatures from 55-65 °F or 4-5% per day if soil temperatures exceed 65 °F. This loss does not start until a few days after soils are saturated when bacteria initiates denitrification. Denitrification leads to the loss of nitrogen (Nitrate nitrogen) from the soil which results into the depletion of an essential nutrient for plant growth and productivity, and causes unwanted nitrogen into streams, rivers and lakes, which are a major environmental concern. Significant losses from some surface applied nitrogen sources can occur through a process called Volatilization. In this process, nitrogen is lost as ammonia gas (NH₃). Nitrogen can be lost this way from manure or fertilizer products containing urea nitrogen. Loss of nitrogen from volatilization is greater when soil pH is higher than 7.3, the air temperature is high and the soil surface is moist and there is a lot of crop residue on the soil.

5 NITROGEN IMMOBILIZATION
A temporary reduction in the amount of plant available nitrogen can occur from immobilization (tie-up) of soil nitrogen. Bacteria that decompose high carbon residues like wheat straw and corn stalks need more nitrogen to digest the material than is present in the residue. Immobilization occurs when nitrate (NO₃⁻) or ammonium (NH₄⁺) present in the soil are used by the growing soil microbes to build proteins. The actively growing bacteria that immobilize some of the soil nitrogen also break down soil organic matter to release available nitrogen during the growing season.
**PRESERVE N™**
**NITROGEN FERTILIZER ADDITIVE**

18-0-0

---

**PRESERVE N™** is a new liquid formulation of DCD designed to limit nitrogen loss by stabilizing applied nitrogen in the soil for several weeks after application*. **PRESERVE N™** provides a unique delivery system which enables more efficient coating of urea and mixing with UAN solutions for optimal performance.

---

**1 BENEFITS**
- Keeps nitrogen in the ammonium form (NH₄⁺) to increase yield
- Prevents nitrogen loss due to leaching and denitrification for better plant health and crop yield
- Protects nitrogen from leaching into ground water
- Stabilizes the ammonium-N up to 10 weeks

**2 FOR USE ON**
- Multiple crop use—please reach out to your local INNVICTIS representative for specific crops and application rates

**3 USE RATES**
- **ANHYDROUS AMMONIA**: 36 - 72 oz/acre
- **UAN**: 26 oz/acre or 2-8 qts/ton
- **UREA**: 26 oz/acre or 2-8 qts/ton
- **NH₃**: 26-32 oz/acre

**4 DENSITY**
9.67 lb/ gal

**5 APPLICATION TIMING**
- Anytime anhydrous ammonia, UAN or urea is applied

---

**GUARANTEED ANALYSIS**

**NITROGEN**
- 18.0%

---

*DEPENDING ON SOIL CONDITIONS

**ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!**
PRESERVE N™ DF is a slowly available nitrogen fertilizer (66% N), designed to be added to nitrogen solutions, granular or prilled fertilizer and animal waste. It should be mixed with nitrogen solutions and broadcast or banded with late fall applications or applied preplant for spring seeded crops. PRESERVE N™ DF is recommended for use in light, sandy soils where losses of nitrogen occur due to leaching; and, in heavy, wet soils where losses are due to denitrification.

**1 BENEFITS**
- Protects from volatility and leaching
- Increases yield
- Easy to handle crystalline form
- Nonflammable and chemically stable
- Better plant health
- Protects nitrogen from leaching into ground water
- Stabilizes ammonium-N up to 10 weeks

**2 FOR USE ON**
- Multiple crop use -- please reach out to your local INNVICTIS representative(s) for specific crops and applications rates

**3 USE RATES**
- **BROADCAST:** 3 lbs / Acre or 15 lbs / ton
- **SIDE DRESS:** 1.5 lbs/Acre or 7.5 lbs / ton

**4 APPLICATION TIMING**
- Broadcast
- Band
- Sidedress

**GUARANTEED ANALYSIS**
- **NITROGEN** • 66%

**ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!**
N-VEIL™ is a nitrogen stabilizer designed for urea or urea ammonium nitrate (UAN) applications. N-VEIL™ inhibits urease from breaking down the urea molecule on the soil surface and releasing ammonia gas into the atmosphere. This protection provides more time for urea and UAN to be incorporated into the soil.

1 BENEFITS

- Improved viscosity which enables lower temperature impregnation
- Increased penetration of urea prill for improved control of volatility
- Provides 30% higher nitrogen stabilization than the leading brand
- Ease of mixing with UAN solutions
- Now has 23% more dye for improved coloring of urea nitrogen
- Reduced loss of ammonia by volatilization
- Faster blending times speed up workflow
- Dries faster on the prill

2 FOR USE ON

- All crops

3 USE RATES

- **UREA**: 2 - 4 qt/ton
- **UAN**: 1 - 2 qt/ton

4 DENSITY

9.13 lb/ gal

5 APPLICATION TIMING

- Can be applied anytime urea or UAN is applied.

**N-(n-Butyl) thiophosphoric triamide (NBPT)**

• 26.7%

**ALWAYS CAREFULLY READ & FOLLOW LABEL INSTRUCTIONS!**
Days After Application | 3 | 6 | 10 | 12 | 17
--- | --- | --- | --- | --- | ---
Nitrogen Source | Cumulative NH₃ Loss (% of N applied)
Urea | 2.47 | 15.34 | 23.56 | 26.84 | 29.84
Competitor (3 qt/ton) | 0.23 | 0.9 | 2.37 | 4.0 | 7.63
*N-VEIL™* (3 qt/ton) | 0.13 | 0.46 | 1.27 | 2.33 | 5.41
*N-VEIL™* (4 qt/ton) | 0.09 | 0.35 | 0.94 | 1.73 | 4.01

Lower the number, the less volatility given off by each treatment.
Work done at Mississippi State University

**N-VEIL™ REDUCES NITROGEN NH₃ LOSS**

*Numbers represent % N loss cumulative. N-VEIL™ significantly reduces nitrogen loss.*

*N-VEIL™* has higher absorption than competitors for better coverage of actives!

*N-VEIL™* required 30 rotations for complete coverage, while the competitive brand required 35 rotations. This indicates that *N-VEIL™* requires less mixing effort than the competitive brand to obtain the same amount of coverage, and is also evidenced by the lower viscosity.

A visual comparison of the urea coverage after 6 turns for *N-VEIL™* (left) and the competitive brand (right). Coverage was faster and more complete with the *N-VEIL™*. *

*Studies conducted at W.Texas A&M University*
Humic acid is a concentrated material derived from the bio-degradation of organic material. It is one of the components of humic substances. Often the parent material is plants. It can be extracted from soil, manure, peat, leonardite (a form of lignite or brown coal), and some other materials. The most common source of humic acid is from leonardite. Leonardite is named after Dr. Leonard, from the University Of North Dakota, who identified the usefulness of leonardite for use in agriculture. Leonardite contains up to 80% humic acid by weight, usually 40 to 65%, depending from where it is mined and the amount of foreign material mixed in with the leonardite. Leonardite deposits are found in several locations in the USA and around the world and are usually surface mined making it the most common source of material used to manufacture humic acid. Leonardite contains the four parts of humic substances, humic acid, fulvic acid, ulmic acid, and humins. All parts have activity that benefits plant growth.

Humic acid is commonly extracted from leonardite by solubilizing the humic acid with caustic materials such as KOH or NaOH. The solution containing humic and fulvic acid are decanted and the rest of the material that settled out is discarded. Most humic products on the market are a combination of humic and fulvic acid and have a pH in the alkaline range, usually about pH 9 to 12. The definition of humic acid is the fraction of humic substances that is soluble in alkaline solutions and precipitates in acidic conditions. Fulvic acid is soluble in both alkaline and acidic conditions. Ulmic acid is not soluble in either alkaline or acid conditions but can be solubilized with alcohols. Humic acid molecules commonly have a molecular weight around 200,000. Fulvic acid molecules have a much smaller molecular weight. Ulmic acid and humins have larger molecular weights. Ulmic acid and humins have binding characteristics that increase soil tilth.

There are several methods to test for humic acid. The most common test is the California test. The test is comprised of solubilizing the humic acids, then precipitating the solubilized humic acid, drying the precipitate and weighing the product. This method does not measure fulvic acid. Although there are methods to measure fulvic acid, none of the methods are accepted by most organizations in the USA. The Humic Products Trade Association, HPTA, is working on a method to measure fulvic acid. They have developed a better method to measure humic acid that has been accepted by AAPFCO, the American Association of Plant Food Control Officers, the body of science that recommends fertilizer and soil amendment regulations. Testing laboratories may start using the new method to test for humic acid in the next few years. The fulvic acid test is still in development.

Extracted humic acid most commonly contains both humic and fulvic acid. Ulmic acid and humins are not extracted during the caustic extraction process and discarded with the rest of the waste material. Most liquid extracted humic acids contain 12% or less humic acid due to higher concentrations forming a gel and become very difficult to handle. Some processes dry extracted humic acid then use the dried material in other processes or it is reconstituted into liquid humic acid before being sold.
Plants treated with humic acid usually have more nutrients in the plant tissue during the growth of the plant, especially those nutrients that may be limited.

Plants often grow longer and larger roots, grow larger plants including the reproductive parts, and usually produce a higher yield of the harvested part of the plant.

Treated plants often have higher quality produce and/or more uniform produce when graded. This often increases the value of production for the grower with less wasted produce.

Although not well understood, chemistry in the plants can be modified. The modifications can include phenols that can increase stalk stiffness especially in grass species such as corn. Increased chlorophyll in the plant during the growing season. Growth regulator concentrations in the plant can be modified. These results may also be affected by plant variety and the environment. These reasons are most likely why plants grow larger and yield more. Increased phenolic content can explain why stalks are stiffer and can hold up longer in the fall or through a windstorm where stalks would normally break.

Healthier plants are recognized as being less susceptible to disease and insect damage. Plants treated with humic products are recognized as being healthier but increased health is an ambiguous term and difficult to measure. All of the above items can also be influenced by environment compounding the difficulty in identifying direct effects caused by humic acid.
<table>
<thead>
<tr>
<th>LIQUID PRODUCT</th>
<th>ANALYSIS</th>
<th>LB/GAL</th>
<th>GAL/TON</th>
<th>APPROX. pH</th>
<th>FREEZE PT/SALT OUT (°F)</th>
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<tbody>
<tr>
<td>ALLEVIA™</td>
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<td>INNVITA™ MNP</td>
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<td>IVC™ WITH MNP 16-0-2</td>
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# PRODUCT PROPERTIES

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<tr>
<th>LIQUID PRODUCT</th>
<th>ANALYSIS</th>
<th>LB/GAL</th>
<th>GAL/TON</th>
<th>APPROX. pH</th>
<th>FREEZE PT/SALT OUT (°F)</th>
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<td>VIRIDIS™</td>
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<tr>
<td>VITALYZE™ C</td>
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## CROP REMOVAL RATES

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<th>UNIT</th>
<th>$P_2O_5$</th>
<th>$K_2O$</th>
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<tr>
<td>COTTON</td>
<td>lb/bale</td>
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<tr>
<td>RICE</td>
<td>lb/bu</td>
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<tr>
<td>SORGHUM</td>
<td>lb/cwt</td>
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<td>0.38</td>
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<tr>
<td>SOYBEANS</td>
<td>lb/bu</td>
<td>0.80</td>
<td>1.40</td>
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<tr>
<td>WHEAT</td>
<td>lb/bu</td>
<td>0.50</td>
<td>0.35</td>
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*Source: International Plant Nutrition Institute - http://www.ipni.net*

## SOIL TEST VALUE CONVERSION

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<tr>
<th>Conversion</th>
<th>Formula</th>
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<tr>
<td>To convert ppm/acre to lbs/acre:</td>
<td>ppm x 2 = lbs/acre</td>
</tr>
<tr>
<td>To convert lbs/acre to ppm/acre:</td>
<td>lb/2 = ppm</td>
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## Quick Conversions

### Temperature

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<th>Celsius</th>
<th>Fahrenheit</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>212</td>
</tr>
<tr>
<td>80</td>
<td>176</td>
</tr>
<tr>
<td>60</td>
<td>140</td>
</tr>
<tr>
<td>40</td>
<td>104</td>
</tr>
<tr>
<td>20</td>
<td>68</td>
</tr>
<tr>
<td>0</td>
<td>32</td>
</tr>
</tbody>
</table>

To convert °C to °F, use this formula:
\[(9/5 \times °C) + 32\]

To convert °F to °C, use this formula:
\[5/9 \times (°F - 32)\]

### Bushel Weights

<table>
<thead>
<tr>
<th>Field Crop</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEANUTS</td>
<td>22 lb</td>
</tr>
<tr>
<td>OATS</td>
<td>32 lb</td>
</tr>
<tr>
<td>RICE</td>
<td>45 lb</td>
</tr>
<tr>
<td>BARLEY</td>
<td>48 lb</td>
</tr>
<tr>
<td>CORN</td>
<td>56 lb</td>
</tr>
<tr>
<td>RYE</td>
<td>56 lb</td>
</tr>
<tr>
<td>SORGHUM</td>
<td>56 lb</td>
</tr>
<tr>
<td>SOYBEANS</td>
<td>60 lb</td>
</tr>
<tr>
<td>WHEAT</td>
<td>60 lb</td>
</tr>
</tbody>
</table>
GLOSSARY

NUTRITIONAL TERMS

ANALYSIS
The percentage composition as found by chemical analysis, expressed in those terms that laws require or permit.

BEST MANAGEMENT PRACTICES
Measures taken to prevent air and water pollution during the manufacture, transport, storage, and use of crop inputs such as fertilizer.

BROADCAST
Application of fertilizer or other material to the soil surface

FERTILIZER
Any material or mixture used to supply one or more of the essential plant nutrient elements.

FORMULA
Quantities of various ingredients combined to make a fertilizer

GRADE
The guaranteed analysis of a fertilizer containing one or more of the primary plant nutrient elements. Grades are stated in terms of the guaranteed percentages of total nitrogen (N), available phosphate ($P_2O_5$), and soluble potash ($K_2O$).

IMMOBILIZATION
The process of converting inorganic N to organic form—usually by microbes that incorporate the N into their own proteins, making the N unavailable to plants.

MICRONUTRIENTS
Nutrients required in very small quantities including: boron, chlorine, cobalt, copper, iron, manganese, molybdenum, nickel, sodium and zinc.

MINERALIZATION
The process of converting nitrogen in organic compounds to inorganic form, which makes the N available to plants.

NITRIFICATION
A process whereby bacteria form nitrates from ammonium nitrogen.

pH
An abbreviation for potential hydrogen, expresses a measurement of hydrogen ion activity or concentration in a solution. A neutral solution has pH of 7.0, values below 7.0 denote progressively more intense acid conditions, above 7.0 are more intense alkaline conditions.

PLANT NUTRIENT
Also called plant food or plant food elements. Each is essential for plant growth.

PRIMARY NUTRIENTS
These are needed in relatively large quantities for healthy plant growth and are the most common constituents of commercial fertilizer. These elements are nitrogen, phosphorous, and potassium.

SALT INDEX
An index used to compare solubilities of chemical compounds. Most nitrogen and potash compounds have a high index, and phosphate compounds have a low index. Ones with high salt index can cause salt injury.

SECONDARY NUTRIENTS
Calcium, magnesium and sulfur.

SLURRY
A fluid that contains undissolved solids.

SURFACE BAND
Fertilizer applied in a relatively narrow band along the surface, where seed will be planted. Contrast with broadcast application.

SUSTAINABILITY
Refers to the use of a resource in such a way that the resource is not depleted or irreparably degraded.

VOLATILIZATION
The process by which N fertilizers such as ammonia or urea are lost to the atmosphere under certain conditions.
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The direction for use of these products reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with the use of these products. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or use of the product in manner inconsistent with its labeling, all of which are beyond the control of INNVICTIS CROP CARE, LLC or the seller. All such risks shall be assumed by the buyer and user.

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