



ALPINE PLANT FOODS

# PHAZED NUTRITION PROGRAM

A HANDBOOK TO EFFICIENT FERTILIZER USE

an ALPINE® publication • [www.alpineplantfoods.com](http://www.alpineplantfoods.com)

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# phazed nutrition program

Making the most efficient use of your dollars spent on crop nutrition is a constant goal of all growers today. As crop nutrition prices increase, each grower tries to maintain the balance between **obtaining higher crop yields** and staying within an overall crop inputs budget to obtain the highest possible profit level from each field.

ALPINE Plant Foods recognizes this continual challenge that growers face each year as they prepare their crop plans for another growing season. Trying to bring about the economic balance with the natural and ever changing environmental conditions has turned a lot of heads grey lately. ALPINE has been working cooperatively with several growers across western Canada developing its **Phazed Nutrition Program** to solve this yearly dilemma. The program's goal is to **reduce the risk** from variable weather conditions by managing the nutritional requirements for the crop in a timely manner to **maximize net profits**. This approach ensures the crop has the proper nutrition at each of its growth stages yet allows growers to be flexible in applying nutrients as the growing conditions vary during the season. The plant must have the proper nutrition to be able to succeed under a variety of adverse conditions.

**The phazed program is used in conjunction with a grower's base program of nitrogen, potash and sulfur.** By using a base program the grower has the ability to apply the bulk of the crop nutrition needs according to their normal practice. By using the Phazed Nutrition Program the grower delivers the rest of the crop nutritional needs in a timely cost effective manner that feeds the crop at the proper stage thereby providing efficient use of the applied nutrients.

"In most cases, nitrogen fertilizer is the most costly major nutrient in any fertilizer program. By placing all the nitrogen requirements at seeding, a producer must rely on adequate rainfall during the growing season so the crop can efficiently utilize the nitrogen. Split application is the process of matching nitrogen supply for a pre-established target yield and a given level of soil moisture, and then supplying the remaining nitrogen as moisture conditions improves."

"Split applications of nitrogen give producers greater flexibility in their fertilizer program. This practice minimizes the risk of placing all the nitrogen at the time of seeding. By providing nitrogen to meet the changing demands of a growing crop, producers can potentially increase nitrogen use efficiency. Split application reduces the exposure of nitrogen in saturated soils where the potential for losses such as leaching and denitrification are increased. It also reduces the amount of product a producer must handle during the busy seeding period. Finally, proper timing and placement of nitrogen may help reduce nitrous oxide emissions, a very potent greenhouse gas."

— Soil Facts, Nitrogen-Split Application, SK  
Soil Conservation Assoc.

The program's goal is to **reduce the risk** from variable weather conditions by managing the **nutritional requirements** for the crop in a timely manner to **maximize net profits**.

- 3-4 gallons highly available liquid phosphate fertilizer
- seed-placed and available in cold soils



**starter phase**

## STARTER PHAZE

Once the seed has germinated nutrition for the young seedling is provided by the starter nutrition program. One of the limiting factors affecting nutrient uptake of starter nutrition early in the season is soil temperature. Many growers today cannot seed all of their acres at the most opportune time so steps need to be taken to overcome this unavoidable problem. Healthy seedlings that are vigorous help to reduce the stresses brought on by harsh environmental conditions and seedling diseases. As in phase one **phosphate is a key nutrient for the establishment of a healthy crop** and it is during this stage that phosphate is the lead contributor to increasing root mass. Once the root mass has been established, the plant is able to take advantage of the nutrients from the base nutrition program. Normal starter fertilizers require time to dissolve the granular fertilizer or to break down the polyphosphate liquid fertilizers into the plant available orthophosphate form. **ALPINE seed-placed starter is already in a liquid soluble form and 70% of the phosphate is in the orthophosphate form.** ALPINE is very efficient in supplying phosphate for plant uptake even under cold, dry soil conditions. The low use rate of ALPINE helps to reduce the overall time and handling of supplying phosphate and helps increase seeding efficiency. Using ALPINE Starter to provide the first eight to ten pounds of plant available phosphate is a proven method to maximize phosphate efficiency.

## FOLIAR PHAZE

Staged foliar nutrition supplies the crop with further nutrition determined by environmental conditions and by soil and plant tissue tests, maximizing yield potential and nutrient efficiency. Second applications of a split nitrogen program have to be made before the fifth week of growth to ensure continued increase in plant biomass. Depending on the plants' requirements, staged foliar nutrition products can be applied economically as tank mixes with herbicides for early requirements and with fungicides for later requirements. This dual application increases a grower's time efficiency and reduces application costs. ALPINE has developed several staged foliar nutrition products which can be mixed with each other and with ALPINE micronutrients to provide the proper nutrition solution.

The **ALPINE Phazed Nutrition Program** gives the grower the flexibility to **reduce the base fertilizer program** and then manage the remaining nutrient budget in a manner which ensures the **efficient use of each nutrient by the plant**. In doing so, the grower is proactively reducing his risk with environmental conditions and increasing profit potential.

- herbicide timing



- fungicide timing



# starter nutrition

“A starter fertilizer is most beneficial when the crop is planted into cold, wet soils regardless of the total fertility status of the soil.”

—Agronomy Facts 51, Penn State

“Early season limitations in P availability can result in restrictions in crop growth, from which the plant will not recover, even when P supply is increased to adequate levels.”

—Grant ET AL. Canadian Journal Plant Science, 2001

“In the soil, polyphosphate converts to orthophosphate by hydrolysis (adding on water). The time required for hydrolysis to occur varies with soil conditions. In some cases, 50% of the polyphosphate hydrolyzes to orthophosphate within two weeks. Under cool, dry conditions, hydrolysis may take longer.”

—MSUE Agricultural Extension Bulletin  
N-P-K FERTILIZERS. M.L. Vitosh, Extension Specialist,  
Crop & Soil Science. 2005.

“A higher starter rate won’t compensate for fertilizer being farther from seed. The closer the starter is to the seed, the better the response is.”

—Ken Ferrie, Farm Journal Agronomist

The starter nutrition is a key component of any balanced nutrition program. Starters provide the emerging seedlings with essential nutrients which are accessible near the young roots just as the sugars and starches are being depleted from the germinated seed. By enhancing early rapid seedling development by use of seed-placed starter, nutrition yield can be positively impacted. Early robust seedlings can also better resist insect and disease attacks as well as compete more effectively with early weed pressures.

Starter nutrition is especially beneficial when soils are cold and wet. Under these conditions, early root growth is reduced along with a reduction in nutrient mobility and nutrient mineralization. These conditions are present across Western Canada in most years, especially as the increasing farm size has resulted in more acres being seeded earlier into colder, wetter soils. The adopted practice of conservation tillage has also contributed to seeding more acres into cooler soils due to the inherent surface straw mulch which accompanies this practice.

In starter nutrition, phosphorous is the key nutrient since it is practically non-mobile in the soil and is known to promote vigorous root growth. A small amount of nitrogen in the starter has two benefits to the seedling as it provides early nitrogen to the plant without causing seedling injury and it enhances the uptake of the phosphorous. The addition of potash in the starter also has a positive effect in phosphorous uptake. If the soil tests call for micronutrients, then placing them with the starter nutrition is an efficient manner to place them close to the seed for maximum benefit.

Plants take in phosphate in the orthophosphate form of  $H_2PO_4$  and  $HPO_4^{2-}$ . Traditional liquid phosphate fertilizers are 70% polyphosphate which must convert into the orthophosphate form in the soil solution by combining with soil moisture before the plant can uptake the nutrient.

Similarly, dry forms of phosphate fertilizer which are already in the orthophosphate form must convert into a solution in the soil before the plant can uptake the nutrient. The conversion rates of both of these processes are dependent on soil moisture conditions and soil temperature.

## Synergistic effect of nitrogen and potassium on the uptake of phosphorous:

Treatment	% P Absorbed
P alone	12.1
N + P	20.3
P + K	13.1
N + P + K	22.3

—Dr. John Strauss  
Director of Agronomy Services, Tulsa, Oklahoma

## ALPINE-STARTER APPLICATION

### GUARANTEED NUTRITIONAL ANALYSIS

lbs per litre applied

Total Nitrogen (N).....	0.169
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ).....	0.621
Soluble Potash (K <sub>2</sub> O).....	0.056

Derived from: ammonium hydroxide, phosphoric acid,  
and potassium hydroxide

WEIGHT: 1.28kg/L

### PRODUCT PROPERTIES

<b>SPECIFIC GRAVITY:</b>	1.28
<b>pH:</b>	6.3-6.6
<b>APPEARANCE:</b>	clear green liquid
<b>ODOUR:</b>	no apparent odour and/or mild ammonia

### GENERAL PRODUCT INFORMATION

ALPINE Starter is manufactured by utilizing the highest quality raw materials to provide a very agronomically efficient source of N-P-K. The quality of the raw materials used to formulate ALPINE Starter:

- Maximizes plant nutrient solubility
- Minimizes salt index
- Minimizes equipment corrosion
- Allows good cold weather storage
- Plant safe at recommended rates

Seventy percent of the phosphate is present in the orthophosphate form that is immediately available for plant absorption and metabolism. During times of limited phosphate availability (eg: cold and wet spring soil conditions present at seeding) ALPINE Starter provides a phosphate source that is positionally and nutritionally available.

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

SELLER WARRANTS THAT THE ABOVE PRODUCT CONFORMS TO ITS CHEMICAL DESCRIPTION AND IS REASONABLY FIT FOR THE PURPOSE ON THE LABEL WHEN USED IN ACCORDANCE WITH DIRECTIONS UNDER NORMAL CONDITIONS OF USE (INCLUDING NORMAL WEATHER CONDITIONS). NEITHER THIS WARRANTY NOR ANY OTHER WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXPRESS OR IMPLIED, EXTENDS TO THE USE OF THIS PRODUCT WHEN USED CONTRARY TO THE LABEL INSTRUCTIONS OR UNDER ABNORMAL CONDITIONS (INCLUDING ABNORMAL WEATHER CONDITIONS), AND THE BUYER ASSUMES THE RISK OF ANY SUCH USE. ALPINE STARTER OR FOLIAR APPLICATIONS ARE INTENDED TO SUPPLEMENT EXISTING SOIL FERTILITY PROGRAMS AND WILL NOT BY ITSELF PROVIDE ALL THE NUTRIENTS NORMALLY REQUIRED BY AGRICULTURAL CROPS.

# ALPINE starter nutrition

ALPINE Starter is a high quality, clear liquid solution that provides growers with an excellent opportunity to increase productivity, profit and nutrient efficiency.

ALPINE liquid starters have a neutral pH, are low in both salt content and impurities and are non corrosive. ALPINE Starters enable the product to be placed directly with the seed at planting time. Placement with the seed enables the phosphorous to be taken up at the earliest stages of growth. This is the stage at which young crops require a majority of their phosphorous. ALPINE is readily available and gives the plant a great start even under cold soil conditions. ALPINE is 70% orthophosphate – the plant available form of phosphate. ALPINE Starters result in increased plant health and crop yield.



## LOW SALT INDEX

SALT INDEX OF VARIOUS STARTER FERTILIZERS	
MATERIALS	Total salt index per equal weight of materials
Diammonium Phosphate (DAP) (dry)	34.2
Monammonium Phosphate (MAP) (dry)	29.9
10-34-0 (liquid)	25.5
ALPINE	17.3

## QUALITY OF PRODUCT

Quality of raw materials must always be considered. One problem with the fertilizer industry, as a whole, is the NPK analysis is the only thing that needs to be guaranteed. The level of impurities and the raw materials used to make the product are never considered. There is what is known as “Spent Acids” that make their way into the fertilizer industry from the bright dipping car part industry. These are very cheap raw materials but can cause problems with germinating seeds due to the high levels of impurities like aluminum. Dry phosphorous can even have as much as 10,000 ppm of Aluminum while ALPINE will run closer to 1500 ppm. Aluminum, at high levels, can be toxic to root growth – not a good idea for a seed-placed starter. ALPINE uses high quality raw materials to ensure the highest availability of crop nutrients and seed safety. The production process is monitored to ensure a high level of orthophosphate in the final product. Not all manufacturers can say the same.

## PROVEN SEED SAFETY

ALPINE liquid starters can be used on a variety of crops including, cereals, corn, canola, pulse crops, potatoes, soybeans, and edible beans. The combination of the low salt index and high quality raw materials makes ALPINE seed safe, even on phosphate sensitive crops such as canola, peas, lentils and flax.



# STARTER PHAZE

## APPLICATION RATES

When applying phosphorous, ALPINE considers the concentration per foot of row in determining the proper application rate. Phosphorous is the starter part of your program and concentration per foot of row needs to be considered to obtain maximum phosphate use efficiency.

The optimum ALPINE rate has been determined to be 3-4 imperial gallons per acre based on 10" row space for most crops and 4-5 imperial gallons per acre for corn. ALPINE recommends using the higher rate on narrower rows because you have more linear feet of rows per acre in a 7" row versus a 10" row. ALPINE also recommends that the first 8-10 pounds per acre of phosphate, of any nutrition program, to be ALPINE Starter seed place nutrition.

UP TO  
**\$2000**  
**EQUIPMENT REBATE**  
for new customers

## APPLICATION EQUIPMENT

To use ALPINE liquid starter nutrition, your seeding equipment may need modifications for in-furrow or precision placement. Precision-placed nutrition requires proper equipment for accurate application to achieve maximum nutrition efficiency. The experienced ALPINE sales team will guide you through the set up process and provide all season on farm service.

ALPINE STARTER NUTRITION APPLIED AT RECOMMENDED RATES LBS/AC			
NUTRIENT	3 IMP GAL/AC	4 IMP GAL/AC	5 IMP GAL/AC
Nitrogen	2.3	3.06	3.84
Phosphorous	8.5	11.24	14.12
Potassium	.76	1.01	1.27

## FIELD PROVEN IN WESTERN CANADA

DURUM DEMONSTRATION PLOT		
TREATMENT	MOISTURE	BU/ACRE
#1 No Starter	12.4 %	48.1 Bu
#2 ALPINE 6-22-2 @ 3 gals	12.4 %	58.5 Bu
#3 22 lbs seed-placed dry Phosphate	12.4 %	55.7 Bu



“Dry Phosphorous fertilizer is generally quite inefficient in terms of actual fertilizer phosphorous that gets into the plant. Various experiments indicate perhaps 5 to 8% is about all we expect with 30% being quite high. It will be more often below 10%.”

The Cooperative Extension,  
University of Nebraska

## LOW USE RATE

The low use rates of ALPINE Starters mean fewer fill ups, resulting in increased productivity. Growers gain efficiencies in product handling and storage, reducing overall workload and more acres planted in a day. These use rates also provide growers with an economical, environmentally friendly program that will fit well into a Nutrient Management Plan.

## EASY TO ADD MICRONUTRIENTS

ALPINE’s unique blend of orthophosphate and polyphosphates allows for rapid uptake of phosphorous, as well as flexibility when adding ALPINE Micronutrients to your starter program. The precision placement of nutrients that is obtained with ALPINE’s application equipment takes the inconsistency out of other micronutrient application methods. Micronutrients added through the ALPINE system gives even distribution of that micronutrient over every foot of every row.

# the **ALPINE** advantage

## 1. SEED-PLACED LIQUID ORTHOPHOSPHATE

- No conversion or dissolving required
- Immediately available in cold soils
- Increased root mass

## 2. NPK ANALYSIS WITH MICRONUTRIENTS

- Proven enhanced P uptake with a complete NPK starter
- Micronutrients available at germination
- Complete starter nutrition

## 3. CONVENIENT LOW RATE

- Air drill capacity increased
- Less storage and handling
- Seed more acres per day

## 4. QUALITY PRODUCT

- Low salt index
- Low impurity levels
- Non corrosive

## 5. HIGHER RETURNS

- 3+ bushels in Western Canadian trials
- More efficient nutrient utilization per dollar

### LIQUID ADVANTAGES

...as stated in Bertrand/Holloway Research-Australia

1. The differences between the efficiency of fluid vs granular fertilizers were significant - especially in clay soils.
2. Fluid fertilizers increased by 42% the amount of available "P" in the soil compared to granular applications.
3. Fluids are at least 20% more efficient than granular.

ALPINE

NO ALPINE

# staged foliar nutrition

The application of foliar nutrition has been in use for many years in high value specialized crops. As Western Canadian growers are looking to maximize net returns and nutrient efficiencies, the application of foliar nutrition is making its way into many of the progressive growers crop nutrition programs. Growers are seeing the positive effect this strategy has on increasing crop yields, nutrient efficiencies and reducing the risk of weather fluctuations on their nutrition program.

The effectiveness of foliar applied nutrition was first reported by the Michigan State University in the early 1950's. The U.S. Atomic Energy Department provided the University with a grant and radioisotopes of all nutrients for them to study the rates of absorption and movement within the plant. These early studies concluded that foliar applied nutrients were 8-10 times more effective in supplying the required nutrients, than soil applied nutrients.

More recent work has established the equivalency of foliar applied nutrients to soil applied nutrition. This type of work confirms what growers are seeing in their fields when a staged foliar nutrition is used with a base fertilizer program.

**The advantages of using foliar applied nutrition with a base fertility program are:**

- Correct nutrient deficiencies as determined from soil or tissue tests
- Strengthen damaged crops
- Speed growth
- Stimulate root uptake
- Provide nutrient efficiency

Foliar nutrition results are highest when the plant is showing high growth activity, going from the vegetative to reproductive stage and when deficiencies are present or when the crop has been damaged. To achieve the best results, the foliar product should contain nitrogen, to act as an

“One of the touted benefits of foliar fertilization is the increased uptake of nutrients from the soil.”

—George Kuepper, NCAT Agriculture Specialist, Foliar Fertilization, 2003

electrolyte to carry the other nutrients and phosphorous, to move the nutrients within the plant.

The foliar nutrients enter the plant through the leaf stomata and hydrophilic pores in the leaf cuticle. The nutrients are only absorbed while in solution on the leaf surface. For this reason, applications are best made in mornings and evenings, when heavy dew is on leaf surface, high humidity and temperatures below 20°C.

The beneficial effect of a foliar application is an increase in chlorophyll synthesis which can often result in leaves turning a darker green. The increase in photosynthetic activity will stimulate extra root growth;

in turn the root hairs excrete excess sugar which stimulates microbial colonies. These bacterial colonies provide auxins and other root stimulating compounds. With the increase in cellular activity gas exchange increases the uptake of water. As the roots take up more water they also bring in more of the nutrients from the soil solution. The foliar application stimulates the entire “pumping system” in the plant to increase the uptake of the base applied nutrition.

**The plant benefits in two manners by the foliar application of nutrients:**

- 1) by the rapid influx into the plant of the foliar applied nutrients
- 2) by the increased uptake of the base applied nutrients

This planned approach utilizing staged foliar applications delivers the highest efficiency of nutrients and in turn creates the highest return on the investment on the grower's crop nutrition program.

POUNDS OF SOIL APPLIED NUTRIENTS REPLACED BY ONE POUND OF FOLIAR APPLIED NUTRIENT		
NUTRIENT	FOLIAR	SOIL
N	1	4
P	1	20
K	1	6
S	1	5 - 7
B	1	30
Cu	1	12
Mn	1	30
Mg	1	75
Zn	1	12

# ALPINE staged foliar nutrition

## ALPINE-FOLIAR APPLICATION

### GUARANTEED NUTRITIONAL ANALYSIS

lbs per litre applied

Total Nitrogen (N).....	0.169
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ).....	0.621
Soluble Potash (K <sub>2</sub> O).....	0.056

Derived from: ammonium hydroxide, phosphoric acid, and potassium hydroxide

WEIGHT: 1.28 kg/L

### PRODUCT PROPERTIES

**SPECIFIC GRAVITY:** 1.28

**pH:** 6.3-6.6

**APPEARANCE:** clear green liquid

**ODOUR:** no apparent odour and/or mild ammonia

### GENERAL PRODUCT INFORMATION

ALPINE Foliar is manufactured by utilizing the highest quality raw materials to provide a very agronomically efficient source of N-P-K. The quality of the raw materials used to formulate ALPINE Foliar:

- Maximizes plant nutrient solubility
- Minimizes salt index
- Minimizes equipment corrosion
- Allows good cold weather storage
- Plant safe at recommended rates

Seventy percent of the phosphate is present in the orthophosphate form that is immediately available for plant absorption and metabolism.

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

SELLER WARRANTS THAT THE ABOVE PRODUCT CONFORMS TO ITS CHEMICAL DESCRIPTION AND IS REASONABLY FIT FOR THE PURPOSE ON THE LABEL WHEN USED IN ACCORDANCE WITH DIRECTIONS UNDER NORMAL CONDITIONS OF USE (INCLUDING NORMAL WEATHER CONDITIONS). NEITHER THIS WARRANTY NOR ANY OTHER WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXPRESS OR IMPLIED, EXTENDS TO THE USE OF THIS PRODUCT WHEN USED CONTRARY TO THE LABEL INSTRUCTIONS OR UNDER ABNORMAL CONDITIONS (INCLUDING ABNORMAL WEATHER CONDITIONS), AND THE BUYER ASSUMES THE RISK OF ANY SUCH USE. ALPINE STARTER OR FOLIAR APPLICATIONS ARE INTENDED TO SUPPLEMENT EXISTING SOIL FERTILITY PROGRAMS AND WILL NOT BY ITSELF PROVIDE ALL THE NUTRIENTS NORMALLY REQUIRED BY AGRICULTURAL CROPS.

ALPINE high quality, clear liquid solution foliar provides growers with an excellent opportunity to increase productivity, profit and nutrient efficiency.

Plants require phosphate throughout the growing season and are capable of absorbing phosphate thru the leaves. Once absorbed by the leaves, the nutrient is metabolized and translocated to the newest growing region of the plant. The effective response to foliar nutrition is determined by the nutrient insufficiency and the absorption rate at the time of application. Utilizing soil and plant tissue analysis is key to obtaining positive results. In the past, foliar applications of phosphate were often overlooked because there was not a true solution fertilizer available in the marketplace. ALPINE Foliar is a true solution that can be absorbed by the plant leaves.

“Thus, small amounts required to correct deficiencies can be easily introduced to the plant by foliar P application.”

—Mosali ET AL,  
Journal of Plant Nutrition, 2006

## FIELD PROVEN IN WESTERN CANADA

2009 FIELD DEMONSTRATION PEAS			
TREATMENT	MOISTURE	BU/AC	ADVANTAGE
ALPINE @ 2 L/ac	14.5%	26.7	+4.5 Bu
ALPINE @ 1L/ac	14.5%	25.1	+2.9 Bu
Check	14.5%	22.2	

2010 FIELD DEMONSTRATION WHEAT				
TREATMENT	YIELD BU/AC	\$ REVENUE/AC	\$ NUTRITION COST /AC	\$ RETURN/AC
#1) 200 lbs/ac 34-10-4-5 (15% seed-placed, 85% midrow)+ 2L/ac ALPINE Foliar	55	330	55	275
#2) 200 lbs/ac 34-10-4-5 (15% seed-placed, 85% midrow)	49	294	52	242
#3) 300 lbs/ac 34-10-4-5 (15% seed-placed, 85% midrow)	57	342	78	264
#4) 300 lbs/ac 34-10-4-5 (15% seed-placed, 85% midrow) + 2L/ac ALPINE Foliar	61	366	81	285

Based on \$6/bu wheat, \$1.50/L ALPINE Foliar, \$26/100# base nutrition program

TREATMENT #1

#2

#3

#4



# ALPINE CRN-B

## GUARANTEED NUTRITIONAL ANALYSIS

lbs per litre applied

Total Nitrogen (N).....	0.68
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ).....	0.0
Soluble Potash (K <sub>2</sub> O).....	0.0
Boron (B).....	0.013

Derived from: ammonia, urea, CRN solution and boric acid

33% of the total nitrogen found in ALPINE CRN-B is Controlled Release Nitrogen

100% of the total phosphate found in ALPINE CRN-B is orthophosphate

WEIGHT: 1.22 kg/L

## PRODUCT PROPERTIES

SPECIFIC GRAVITY: 1.22

pH: >8

APPEARANCE: clear

ODOUR: none

## GENERAL PRODUCT INFORMATION

ALPINE CRN-B is manufactured by utilizing the highest quality raw materials coupled with urea triazone technology to provide a very agronomically efficient source of N. Its use is suggested as a supplement to a regular, balanced nutrition program to enhance yields and improve overall quality. 33% of the total nitrogen in this product is in the controlled release form which allows the nitrogen release to be matched with the crop needs. The quality of the raw materials used to formulate ALPINE CRN-B:

- Maximizes plant nutrient absorption through the use of triazone technology
- Minimizes salt- index providing safe foliar use
- Minimizes equipment corrosion
- Is plant safe at recommended rates
- Compatible with other liquid fertilizers
- May be used with crop protection products

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THIS FERTILIZER CONTAINS BORON AND SHOULD BE USED ONLY AS RECOMMENDED. IT MAY PROVE HARMFUL WHEN MISUSED.

# ALPINE CRN-B

Foliar feeding is one of the most efficient methods of supplying nutrients during critical growing stages.

ALPINE staged foliar nutrition products can provide the nutritional requirements to the plants either alone or in combination with other ALPINE products to deliver the required balanced nutrition that is determined by soil and tissue tests. Foliar nutrition can make a good crop even better or it can supply a deficient, stressed crop the proper nutrients

for a quick recovery.

ALPINE CRN-B provides the plants with a quick uptake of nitrogen as well as a controlled release of nitrogen during 3-4 weeks to provide additional nitrogen in an efficient manner corresponding to crops needs. Application timing is usually done in conjunction with the application of crop protection products which result in application cost savings and efficient use of the grower's time.

FOLIAR N ABSORPTION, TRANSLOCATION AND REMOBILIZATION		
SOURCE	ABSORPTION MG N	TRANSLOCATION REMOBILIZATION
Triazone (ALPINE CRN)	9.6	62.2
Nitrate	7.4	28.5
Urea	7.31	24.7
Ammonia	6.75	18.1

Widders, MSU

## FIELD PROVEN IN WESTERN CANADA

2010 FIELD DEMONSTRATION-DURUM WHEAT		
TREATMENT	BU/AC	ADVANTAGE
ALPINE CRN-B @ 2.2L/ac + ALPINE Foliar @1.6L/ac	38.5	+ 3.5 Bu
Check	35	

## ADVANTAGES OF ALPINE CRN-B

- Efficient form of nitrogen
- Provides slow even release of Nitrogen
- Reduces leaching and volatilization
- Provides excellent foliar absorption
- Compatible with other liquid fertilizers
- Carrier for crop protection programs



## ALPINE-FOLIAR APPLICATION

### GUARANTEED NUTRITIONAL ANALYSIS

lbs per litre applied

Total Nitrogen (N).....	0.56
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ).....	0.0
Soluble Potash (K <sub>2</sub> O).....	0.0
Sulphur (S).....	0.08

Derived from: urea, CRN solution and ammonium sulphate

33% of the total nitrogen found in ALPINE CRN-S is Controlled Release Nitrogen

100% of the total phosphate found in ALPINE CRN-S is orthophosphate

WEIGHT: 1.21 kg/L

### PRODUCT PROPERTIES

**SPECIFIC GRAVITY:** 1.21

**pH:** 7.8-8.0

**APPEARANCE:** clear to slight yellow

**ODOUR:** none

### GENERAL PRODUCT INFORMATION

ALPINE CRN-S is manufactured by utilizing the highest quality raw materials coupled with urea triazone technology to provide a very agronomically efficient source of N. It's use is suggested as a supplement to a regular, balanced nutrition program to enhance yields and improve overall quality. 33% of the total nitrogen in this product is in the controlled release form which allows the nitrogen release to be matched with the crop needs. The quality of the raw materials used to formulate ALPINE CRN-S:

- Maximizes plant nutrient absorption through the use of triazone technology
- Minimizes salt- index providing safe foliar use
- Minimizes equipment corrosion
- Is plant safe at recommended rates
- Compatible with other liquid fertilizers
- May be used with crop protection products

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

SELLER WARRANTS THAT THE ABOVE PRODUCT CONFORMS TO ITS CHEMICAL DESCRIPTION AND IS REASONABLY FIT FOR THE PURPOSE ON THE LABEL WHEN USED IN ACCORDANCE WITH DIRECTIONS UNDER NORMAL CONDITIONS OF USE (INCLUDING NORMAL WEATHER CONDITIONS). NEITHER THIS WARRANTY NOR ANY OTHER WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXPRESS OR IMPLIED, EXTENDS TO THE USE OF THIS PRODUCT WHEN USED CONTRARY TO THE LABEL INSTRUCTIONS OR UNDER ABNORMAL CONDITIONS (INCLUDING ABNORMAL WEATHER CONDITIONS), AND THE BUYER ASSUMES THE RISK OF ANY SUCH USE. ALPINE STARTER OR FOLIAR APPLICATIONS ARE INTENDED TO SUPPLEMENT EXISTING SOIL FERTILITY PROGRAMS AND WILL NOT BY ITSELF PROVIDE ALL THE NUTRIENTS NORMALLY REQUIRED BY AGRICULTURAL CROPS.

## ALPINE CRN-S

Foliar feeding is one of the most efficient methods of supplying nutrients during critical growing stages. ALPINE staged foliar nutrition products can provide the nutritional requirements to the plants either alone or in combination with other ALPINE products to deliver the required balanced nutrition that is determined by soil and tissue tests. Foliar nutrition can make a good crop even better or it can supply a deficient, stressed crop the proper nutrients for a quick recovery.

ALPINE CRN-S provides the plants with a quick uptake of nitrogen as well as a controlled release of nitrogen during 3-4 weeks to provide additional nitrogen in an efficient manner corresponding to crops needs. Application timing is usually done in conjunction with the application of crop protection products which result in application cost savings and efficient use of the grower's time.

In addition ALPINE CRN-S can supply sulphur to the plant at later stages of plant growth if soil supplies have run out. This is especially critical in the case of canola where lack of sulphur prior to pod or seed formation can have a major negative impact on yield. Timely plant tissue sampling and analysis will provide the necessary information to determine if your sulphur is in balance with the nitrogen supply.

"A crop's internal nitrogen-sulphur ratio is yet another way to assess sulphur fertilizer requirements. Because N and S are required for protein formation, a shortage of either nutrient can affect the crop's ability to make good use of the other."

"For optimum results, the N:S ratio should be 7:1 for canola and 10-15:1 for most other crops. Applying nitrogen without sulphur may widen a crop's N:S ratio and actually induce a sulphur deficiency."

—Source: The Sulphur Institute, Sulphur –Do Canada's Crops Get Enough?

### FIELD PROVEN IN WESTERN CANADA

2011 FIELD DEMONSTRATION-CANOLA –KELVINGTON, SASK.		
TREATMENT	BU/AC	ADVANTAGE
ALPINE CRN-S @ 2L/ac +ALPINE Foliar @ 1L/ac	44.5	+3.5 Bu
Check	41	

2011 FIELD DEMONSTRATION-BARLEY –SWIFT CURRENT, SASK.		
TREATMENT	BU/AC	ADVANTAGE
ALPINE CRN-S @ 4L/ac	104.5	+2.9 Bu
ALPINE CRN-S @ 2L/ac	102.8	+1.2 Bu
Check	101.6	

### ADVANTAGES OF ALPINE CRN-S

- Efficient form of nitrogen
- Provides slow even release of Nitrogen
- Reduces leaching and volatilization
- Provides excellent foliar absorption
- Compatible with other liquid fertilizer
- Carrier for crop protection programs
- Supplements Sulphur requirements



ALPINE CRN-S droplets on leaf surface 3 days after application

## ALPINE N-RAGE

### GUARANTEED NUTRITIONAL ANALYSIS

lbs per litre applied

Total Nitrogen (N).....	0.584
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ).....	0.167
Soluble Potash (K <sub>2</sub> O).....	0.083

Derived from: ammonia, phosphoric acid, potassium hydroxide, urea and CRN solution

33% of the total nitrogen found in ALPINE N-Rage is Controlled Release Nitrogen

100% of the total phosphate found in ALPINE N-Rage is orthophosphate

WEIGHT: 1.26 kg/L

### PRODUCT PROPERTIES

**SPECIFIC GRAVITY:** 1.26

**pH:** 7.0-8.0

**APPEARANCE:** clear to translucent

**ODOUR:** nearly odourless

### GENERAL PRODUCT INFORMATION

ALPINE N-RAGE is manufactured by utilizing the highest quality raw materials coupled with urea triazone technology to provide a very agronomically efficient source of N-P-K. The quality of the raw materials used to formulate ALPINE N-RAGE:

- Maximizes plant nutrient absorption through the use of triazone technology
- Minimizes salt- index providing safe foliar use
- Minimizes equipment corrosion
- Is plant safe at recommended rates
- May be used with crop protection products

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

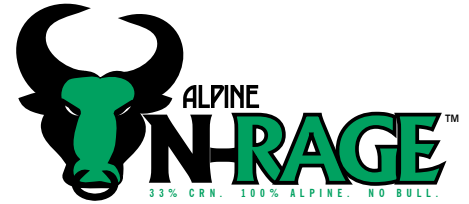
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# ALPINE N-Rage

ALPINE N-Rage is a convenient-to-use premix of ALPINE Foliar and ALPINE CRN-B. The two products have been mixed by growers to take advantage of the controlled release Nitrogen and the nutrient moving capabilities of Phosphate. By combining both products, growers receive the benefits of both products in one simple to use formulation.

### ADVANTAGES OF ALPINE N-RAGE

- Efficient form of nitrogen
- Provides slow even release of Nitrogen
- Reduces leaching and volatilization
- Provides excellent foliar absorption
- Compatible with other liquid fertilizers
- Carrier for crop protection programs



### FIELD PROVEN IN WESTERN CANADA

2011 FIELD DEMONSTRATION - WHEAT - VIKING, AB.

TREATMENT	BU/AC	ADVANTAGE
ALPINE N-Rage @ 4L/ac + .25L/ac humic acid	46.7	+6.7 Bu
Check	40	



ALPINE N-RAGE is best used as a supplement to a good nutrition program. Consult your ALPINE District Sales Manager for a specific rate according to crop condition and nutrition program.

# ALPINE K-Thio

## ALPINE K-THIO

### GUARANTEED NUTRITIONAL ANALYSIS

lbs per litre applied

Total Nitrogen (N).....	0.0
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ).....	0.0
Soluble Potash (K <sub>2</sub> O).....	0.816
Sulfur (S).....	0.555

Derived from: potassium thiosulphate

WEIGHT: 1.48 kg/L

### PRODUCT PROPERTIES

**SPECIFIC GRAVITY:** 1.46-1.49

**pH:** 7.0-8.2

**APPEARANCE:** clear

**ODOUR:** slight sulfur odour

### GENERAL PRODUCT INFORMATION

Alpine K-Thio is manufactured by utilizing the highest quality raw materials including potassium hydroxide and elemental sulfur. The quality of the raw materials used to formulate Alpine K-Thio:

- Maximizes plant nutrient solubility
- Minimizes equipment corrosion
- Allows good cold weather storage
- Compatible with other liquid fertilizers
- Plant safe at recommended rates
- Chloride free formulation

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

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ALPINE K-Thio's high quality, clear liquid solution provides growers with an excellent opportunity to increase productivity, profit and nutrient efficiency. Alpine K-Thio can be used alone or tank-mixed with other Alpine staged nutrition products to provide the nutrition solution as determined by soil and tissue tests.

### ALPINE K-THIO ADVANTAGES

- Excellent source of both plant available potassium and sulphur
- Compatible with many other liquid fertilizers

Source: Western Canada Potash Handbook.  
Published by the Western Canada Fertilizer Association.



This map shows the most likely areas where K deficient soils are likely to occur in Western Canada.

### FIELD PROVEN IN WESTERN CANADA

2011 FIELD DEMONSTRATION-LENTILS-SWIFT CURRENT, SASK.		
TREATMENT	BU/AC	ADVANTAGE
ALPINE K-Thio @ 1L/ac	36.1	+ 4.8 Bu
Check	31.3	

2011 FIELD DEMONSTRATION-OATS-KELVINGTON, SASK.		
TREATMENT	BU/AC	ADVANTAGE
ALPINE K-Thio @ 1L/ac + ALPINE Foliar @ 1L/ac + ALPINE Zinc@ 1/2 L/ac	141	+ 17 Bu
Check	124	

\*Yield increase was due to increase in bushel weight.



## ALPINE FORTIFIED

### GUARANTEED NUTRITIONAL ANALYSIS

Total Nitrogen (N).....	10%
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ).....	10%
Soluble Potash (K <sub>2</sub> O).....	10%
Boron (B) (actual).....	0.01%
Iron (Fe) (actual).....	0.01%
Manganese (Mn) (actual).....	0.05%
Zinc (Zn) (actual).....	0.05%
Molybdenum (Mo) (actual).....	0.0006%

Derived from: urea, ammonium hydroxide, phosphoric acid, potassium hydroxide, boric acid, iron HEDTA, manganese EDTA, zinc EDTA, and ammonium molybdate.

WEIGHT: 1.27 kg/L

### PRODUCT PROPERTIES

**SPECIFIC GRAVITY:** 1.25-1.29

**pH:** 6.8-7.2

**APPEARANCE:** clear brown

**ODOUR:** none

### GENERAL PRODUCT INFORMATION

ALPINE Fortified is manufactured by utilizing the highest quality raw materials and includes only available chelated micronutrients (except molybdenum) to maximize foliar absorption. The quality of the raw materials used to formulate ALPINE Fortified:

- Minimizes salt-index providing safe foliar use
- Minimizes equipment corrosion
- Is plant safe at recommended rates
- May be used with crop protection products

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

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THIS FERTILIZER CONTAINS BORON, IRON, ZINC, MANGANESE, AND MOLYBDENUM AND SHOULD BE USED ONLY AS RECOMMENDED. IT MAY PROVE HARMFUL WHEN MISUSED.

# ALPINE fortified

ALPINE Fortified foliar is a high quality, clear liquid solution which is easily absorbed by the leaf surface to provide enhanced nutrient uptake by the plant.

### ALPINE FORTIFIED ADVANTAGES

- Enhanced yield
- Reduced stunting and discoloration
- Less crop stress
- Compatible with crop protection products

### APPLICATION RATES

#### TANK MIXED WITH CROP PROTECTION PRODUCTS

Apply 2-4L/ac on cereal crops, pulse crops, canola, alfalfa, corn, soybean and dry edible beans

#### AS A NUTRITIONAL SPRAY ALONE

CEREAL CROPS: 2-4L/ac at 4-6 leaf stage and at flag leaf

CORN: 2-4L/ac at 4-6 leaf stage and then just prior to tassel

ALFALFA: 2-6L/ac within 10 days after each cutting

SOYBEAN: 2-4L/ac at 2-4 trifoliolate stage and at early bloom

DRY/EDIBLE BEAN: 2-4L/ac 2-4 trifoliolate and at early bloom

VEGETABLES: 2-4L/ac every 7-10 days

CANOLA: 2-4L/ac

ALPINE Fortified is best used as a supplement to a good nutrition program. Consult your ALPINE District Sales Manager for a specific rate according to crop condition and nutrition program.

For **MIXING INSTRUCTIONS**, please refer to page 15.



# foliar recommendations

## APPLICATION RATE

ALPINE CRN-B, ALPINE CRN-S, ALPINE N-Rage and ALPINE K-Thio can be applied at 1-4 litres per acre in most field crops.

ALPINE Foliars are best used as a supplement to a good nutrition program. Consult your ALPINE District Sales Manager for a specific rate according to crop condition and nutrition program.

**Murray and Scott Wilson**  
4,500 acres - Melville, SK

"ALPINE Liquid Phosphate has been our source of phosphate for the past 24 years. 15 years in Eastern Canada and now 9 years in Western Canada. It has given our canola plants a better root system which has led to higher yields. We also follow up with a foliar application of ALPINE and liquid Ammonium Sulphate which has also helped push yields. ALPINE has also been very convenient to use in our operation."

## MIXING INSTRUCTIONS

ALPINE Foliars can mix with many crop production products including glyphosate.

- In a small container prior to full scale mixing, proportionally mix all the components to confirm compatibility
- Thorough mixing of all blends is important
- Temperature and storage time can influence the degree of success
- Mix only the amount that will be immediately used
- Long-term storage is not suggested

## ALPINE FOLIARS TANK MIXING PROCEDURES

- Add ½ of total water to spray tank
- Start recirculation in the tank
- Add the recommended amount of ALPINE Foliar
- Add micronutrients and/or any other flowable material
- Add any soluble powder, first pre-mixing with water
- Add remaining water volume and continue recirculation prior to spraying

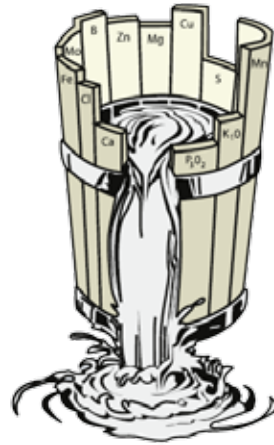
THE FOLLOWING CONDITIONS MUST BE OBSERVED IN ORDER TO APPLY ALPINE LIQUID FERTILIZER FOR FOLIAR APPLICATIONS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN DAMAGE TO THE PLANTS:

- **DO USE** ALPINE fertilizers under conditions of optimum plant growth including highest humidity, moderate temperature and adequate soil moisture.
- **DO add**, as a minimum, equal amounts of water. Do use sufficient water to provide thorough coverage.
- **DO consult** with your local ALPINE distributor to determine pesticides which are compatible with ALPINE fertilizer.
- **DO add** wettable or soluble powders, emulsifiables or flowables to water in the mix and wet, dissolve or disperse before adding ALPINE fertilizer.
- **DO consult** your local ALPINE DSM for rate and application instructions.
- **DO USE** a small jar or container prior to full scale mixing to proportionally mix all the components to confirm compatibility.
- **DO NOT** use when the crop is under stress from pests, heat or inadequate soil moisture.
- **DO NOT** apply by aircraft if surface wind is greater than five miles per hour to assure adequate crop coverage and droplet disposition.
- **DO NOT** spray to run off. **DO NOT** spray to visible droplet coalescence. **DO NOT** allow concentrated spray mist to run off fruit or leaves.
- **DO NOT** apply during the heat of the day.
- **DO NOT** mix with calcium containing products unless the calcium is fully EDTA chelated.
- **DO NOT** mix fertilizers with hard water. Mixing with hard water may cause clogging of lines due to the combining of calcium, magnesium and iron in the water with phosphate in the fertilizer.



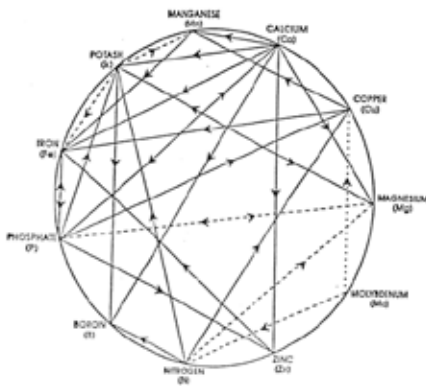
# micronutrients

Micronutrients are essential to plant life but normally our soils contain enough to provide sufficient nutrition to the plant. Most growers are well aware of Liebig's Law of the Minimum which states that any deficiency in a nutrient, no matter how small, will hold back the yield potential. As growers have evolved their crop nutrition programs, to provide the maximum micronutrients to achieve optimum yields, it is often a micronutrient deficiency that is restricting the plant from reaching its genetic potential.



Growers must take into account the interactions of nutrients with each other. Any over supply on one nutrient can cause another nutrient to become the limiting factor.

## MULDERS CHART



SOURCE: SCHUTTE AND MYERS' BOOK

### ANTAGONISM —————>

A decrease in availability to the plant of a nutrient by the action of another nutrient (see direction of arrow).

### STIMULATION - - - - ->

An increase in the need for a nutrient by the plant because of the increase in the level of another nutrient.

Chelation is derived from the Greek word "chele" meaning claw.



For these reasons many top producers are starting to realize that nutritional balance is required in any nutritional program to reach desired yield levels and to maintain adequate plant health to defend against unfavorable environmental conditions. The use of soil and tissue tests is a prerequisite to determine the proper nutritional program. Growers can then address the concerns with either

- 1) micronutrient additions in the starter nutrition program
- 2) micronutrient additions in the staged foliar program

**The key micronutrients in Western Canada that have been shown to affect crop production are:**

- Manganese: Mn+2
- Zinc: Zn+2
- Copper: Cu+, Cu+2
- Boron: BO-3

## MICRONUTRIENT RESPONSES

Crop	Mn	B	Cu	Zn	Mo	Fe
Corn	M	L	M	H	L	M
Soybeans	H	L	M	M	M	M
Wheat	H	L	H	L	L	L
Canola	M	H	H	M	L	
Alfalfa	M	H	H	L	M	M
Oats	H	L	H	L	L	M
Grass	M	L	L	L	L	H
Barley	M	L	M	M	L	H
Dry Beans	H	L	L	H	M	H
Potatoes	H	L	L	M	L	
Rye	L	L	L	L	L	
Peas	H	L	L	L	M	

Legend: H... High M... Medium L... Low

In order to have these metal nutrient ions available for plant uptake, they must be first properly chelated so that the charged ions do not become bound to the opposite charged ions, making them unavailable to the plant. The chelate surrounds the metal ion and binds to it with two non-metal ions forming

a ring. A chelate will bind the micronutrient ion in a soluble form which is then easily released and made available to the plant. The nutrient is allowed to maintain its own identity, not tie up and then can be released to the plant in the plant available form.

# ZINC

## GUARANTEED NUTRITIONAL ANALYSIS

Zinc (Zn) (chelated) (actual)..... 9.0%  
EDTA (chelating agent)

Derived from: Zinc oxide, ammonium hydroxide, EDTA

WEIGHT: 1.31 kg/L

## PRODUCT PROPERTIES

**SPECIFIC GRAVITY:** 1.32

**pH:** 6.0-8.0

**APPEARANCE:** clear

**ODOUR:** slightly ammonia

## GENERAL PRODUCT INFORMATION

ALPINE Zinc is manufactured by utilizing the highest quality raw materials to provide a very agronomically efficient source of plant available Zinc. The EDTA chelate is compatible with high orthophosphate products. ALPINE Chelated Zinc delivers:

- Maximum plant nutrient solubility - in furrow or foliar
- Minimal salt index
- No application equipment corrosion
- Compatibility with most other liquid fertilizers
- Tank mixable with most pesticides
- Low impurities
- Neutral pH

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

**THE FOLLOWING CONDITIONS MUST BE OBSERVED IN ORDER TO APPLY ALPINE ZINC FOLIAR APPLICATIONS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN DAMAGE TO THE PLANTS:**

- DO USE ALPINE Zinc under conditions of optimum plant growth including highest humidity, moderate temperature and adequate soil moisture.
- DO USE sufficient water to provide thorough coverage.
- DO consult with your local ALPINE Agronomist or Sales Manager to determine pesticides which are compatible with ALPINE Zinc.
- DO consult your local ALPINE Agronomist or Sales Manager for rate and application instructions.
- DO USE a small jar or container prior to full scale mixing to proportionally mix all the components to confirm compatibility.
- DO NOT use when the crop is under stress from pests, heat or inadequate soil moisture.
- DO NOT apply during the heat of the day.

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THIS FERTILIZER CONTAINS ZINC AND SHOULD BE USED ONLY AS RECOMMENDED. IT MAY PROVE HARMFUL WHEN MISUSED.

# ALPINE zinc

## APPLICATION RATE

Use ½ to 1 L/ac either in furrow or as a foliar spray. Optimum rate of application will vary between fields, depending on soil pH and organic matter content. Product should be used on the basis of soil and/or tissue analysis.

## MIXING INSTRUCTIONS

1. Put 1/3 water or fertilizer in the tank
2. Add correct amount of product
3. Fill tank with balance of water or fertilizer
4. Agitate adequately to mix

## ROLE OF ZINC

- Zinc is crucial in flower formation. i.e. Canola
- Zinc acts like “antifreeze” in the plant to give early and late frost protection
- Zinc controls the synthesis of many plant growth regulators
- Animals deficient in Zinc require twice as much feed to attain the same weight
- Zinc is unavailable in high pH soils
- Zinc improves germination rate and plant vigor
- Zinc is necessary for starch formation and proper root development
- Zinc is also essential for seed formation & maturity

## ZINC SOIL AVAILABILITY

- The availability of Zinc is directly related to 3 soil factors:
  - (1) the amount of Zinc supplying minerals
  - (2) the amount of available phosphate and
  - (3) soil pH (Calcium Carbonate)
- Soils with both high pH and high phosphate levels, the available Zinc is complexed to form ZnPO<sub>4</sub>
- When Zinc is precipitated in this form, it is unavailable and deficiencies can occur
- 1.1 – 3.0 ppm in soil test is medium amount

## ZINC IN THE LEAF

- Research indicates the P to Zn ratio in leaf tissue should be 100-150:1
- Whenever the P content of a plant increases, so must the Zn concentration in order that this ratio be maintained
- Sufficiency tissues test ranges in ppm
  - Canola: 25-45
  - Small grains: 20-50
  - Peas: 40-80

## DEFICIENCIES SYMPTOMS

- The most common nutrient deficiencies include interveinal chlorosis on older leaves with shortening of the intermodal area
- This shortening often leaves a short compressed plant with a rosetted appearance





## COPPER

### GUARANTEED NUTRITIONAL ANALYSIS

Copper (Cu) (chelated) (actual)..... 7.5%  
EDTA (chelating agent)

Derived from: Copper, ammonium hydroxide, EDTA

WEIGHT: 1.3 kg/L

### PRODUCT PROPERTIES

**SPECIFIC GRAVITY:** 1.3

**pH:** 8.0-9.0

**APPEARANCE:** blue

**ODOUR:** slightly ammonia

### GENERAL PRODUCT INFORMATION

ALPINE Copper is manufactured by utilizing the highest quality raw materials to provide a very agronomically efficient source of plant available Copper. The EDTA chelate is compatible with high orthophosphate products. ALPINE Chelated Copper delivers:

- Maximum plant nutrient solubility - in furrow or foliar
- Minimal salt index
- No application equipment corrosion
- Compatibility with most other liquid fertilizers
- Tank mixable with most pesticides
- Low impurities

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

**THE FOLLOWING CONDITIONS MUST BE OBSERVED IN ORDER TO APPLY ALPINE COPPER FOLIAR APPLICATIONS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN DAMAGE TO THE PLANTS:**

- DO USE ALPINE Copper under conditions of optimum plant growth including highest humidity, moderate temperature and adequate soil moisture.
- DO USE sufficient water to provide thorough coverage.
- DO consult with your local ALPINE Agronomist or Sales Manager to determine pesticides which are compatible with ALPINE Copper.
- DO consult your local ALPINE Agronomist or Sales Manager for rate and application instructions.
- DO USE a small jar or container prior to full scale mixing to proportionally mix all the components to confirm compatibility.
- DO NOT use when the crop is under stress from pests, heat or inadequate soil moisture.
- DO NOT apply during the heat of the day.

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THIS FERTILIZER CONTAINS COPPER AND SHOULD BE USED ONLY AS RECOMMENDED. IT MAY PROVE HARMFUL WHEN MISUSED.

# ALPINE copper

## APPLICATION RATE

Use 1/4 to 1/2 L/ac either in furrow or as a foliar spray. Optimum rate of application will vary between fields, depending on soil pH and organic matter content. Product should be used on the basis of soil and/or tissue analysis.

## MIXING INSTRUCTIONS

1. Put 1/3 water or fertilizer in the tank
2. Add correct amount of product
3. Fill tank with balance of water or fertilizer
4. Agitate adequately to mix

## ROLE OF COPPER

- Copper is important in plant disease prevention
  - Plant diseases i.e.: net blotch, ergot and pig tailing
- Copper affects lignin building qualities and is crucial in preventing lodging
- Copper is important as a co-enzyme
- Copper builds and converts acids to proteins
- Copper greatly affects kernel size and kernel weight
- Copper and other micro deficiencies are enhanced by too much up-front NITROGEN early in spring
- The window of opportunity to correct a Copper deficiency lasts until just before heading

## COPPER SOIL AVAILABILITY

- 0.9-1.2 ppm in soil test is medium amount

## COPPER IN THE LEAF

- 5 ppm lowest sufficient tissue test level
- Sufficiency tissue test ranges in ppm
  - Canola: 4-12
  - Small grains: 6-15
  - Peas: 10-30

## DEFICIENCIES SYMPTOMS

- Deficiency symptoms usually occur on new growth since Copper is an immobile nutrient
- Deficient plants will become chlorotic and take on a bleached appearance
- New plant growth often dies

## BORON

### GUARANTEED NUTRITIONAL ANALYSIS

Boron (B) (chelated) (actual)..... 10%  
MEA (chelating agent)

Derived from: Boric acid, MEA

WEIGHT: 1.31 kg/L

### PRODUCT PROPERTIES

**SPECIFIC GRAVITY:** 1.31

**pH:** 7.0

**APPEARANCE:** slightly amber

**ODOUR:** odourless

### GENERAL PRODUCT INFORMATION

ALPINE Boron is manufactured by utilizing the highest quality raw materials to provide a very agronomically efficient source of plant available Boron. The MEA chelate is compatible with high orthophosphate products. ALPINE Chelated Boron delivers:

- Maximum plant nutrient solubility - in furrow or foliar
- Minimal salt index
- No application equipment corrosion
- Compatibility with most other liquid fertilizers
- Tank mixable with most pesticides
- Low impurities
- Neutral pH

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

**THE FOLLOWING CONDITIONS MUST BE OBSERVED IN ORDER TO APPLY ALPINE BORON FOLIAR APPLICATIONS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN DAMAGE TO THE PLANTS:**

- DO USE ALPINE Boron under conditions of optimum plant growth including highest humidity, moderate temperature and adequate soil moisture.
- DO USE sufficient water to provide thorough coverage.
- DO consult with your local ALPINE Agronomist or Sales Manager to determine pesticides which are compatible with ALPINE Boron.
- DO consult your local ALPINE Agronomist or Sales Manager for rate and application instructions.
- DO USE a small jar or container prior to full scale mixing to proportionally mix all the components to confirm compatibility.
- DO NOT use when the crop is under stress from pests, heat or inadequate soil moisture.
- DO NOT apply during the heat of the day.

SELLER WARRANTS THAT THE ABOVE PRODUCT CONFORMS TO ITS CHEMICAL DESCRIPTION AND IS REASONABLY FIT FOR THE PURPOSE ON THE LABEL WHEN USED IN ACCORDANCE WITH DIRECTIONS UNDER NORMAL CONDITIONS OF USE (INCLUDING NORMAL WEATHER CONDITIONS). NEITHER THIS WARRANTY NOR ANY OTHER WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXPRESS OR IMPLIED, EXTENDS TO THE USE OF THIS PRODUCT WHEN USED CONTRARY TO THE LABEL INSTRUCTIONS OR UNDER ABNORMAL CONDITIONS (INCLUDING ABNORMAL WEATHER CONDITIONS), AND THE BUYER ASSUMES THE RISK OF ANY SUCH USE. ALPINE STARTER OR FOLIAR APPLICATIONS ARE INTENDED TO SUPPLEMENT EXISTING SOIL FERTILITY PROGRAMS AND WILL NOT BY ITSELF PROVIDE ALL THE NUTRIENTS NORMALLY REQUIRED BY AGRICULTURAL CROPS.

THIS FERTILIZER CONTAINS BORON AND SHOULD BE USED ONLY AS RECOMMENDED. IT MAY PROVE HARMFUL WHEN MISUSED.

# ALPINE boron

## APPLICATION RATE

Use 1/4 to 1/2 L/ac either in furrow or as a foliar spray. Optimum rate of application will vary between fields, depending on soil pH and organic matter content. Product should be used on the basis of soil and/or tissue analysis.

## MIXING INSTRUCTIONS

1. Put 1/3 water or fertilizer in the tank
2. Add correct amount of product
3. Fill tank with balance of water or fertilizer
4. Agitate adequately to mix

## ROLE OF BORON

- Vital to the growth & development of the plant, without adequate Boron, new growth ceases
- It is necessary in the pollination & seed production stages
- Boron is essential for maintaining a balance between sugars & starches
- A small amount of Boron is beneficial to plants but too much can be toxic to plants

## SUGAR MOVER

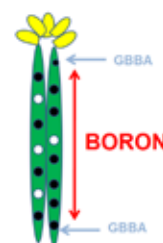
- Boron moves plant sugars up and down the plant daily
- During the night time, Boron moves plant sugars from the plant to feed the root system, which in turn feeds the soil biology
- During night, the soil biology exudes food for the roots and then Boron moves this food from the roots up into the plant during the day
- This process takes place daily

## CELL DEVELOPMENT

- Boron functions in plants in the differentiation of meristematic cells. Without Boron, cells may continue to divide, but structural components are not differentiated.
- Missing florets (seeds) in Timothy and Alfalfa heads
- Larger cereal heads and fuller Canola & legume pods

## THE “ MISSING SEED “ THING

**Explanation:** At the top and the bottom of the pod is a hormone called GBBA. This hormone must move in the pod to fertilize each and every seed in that pod. No GBBA no SEED. The nutrient that moves GBBA throughout the pod is Boron along with mainly Phosphorous, Manganese, Calcium and other nutrients. Remember BORON along with Phosphorous moves SUGARS in the plant daily, so if there is an interruption of this or a lack of nutrients - the SEED DOES NOT BECOME FERTILIZED SO THEREFORE NO SEED.



## BORON SOIL AVAILABILITY

- Soils with high pH values reduce solubility and therefore plant uptake
- Soils with low pH values increase solubility but can also lead to leaching of boron out of the root zone
- 0.6 – 1.2 ppm in soil test is medium amount

## BORON IN THE LEAF

- Sufficiency tissue test ranges in ppm
  - Canola: 15-20
  - Small grains: 8-20
  - Peas: 15-45

## DEFICIENCIES SYMPTOMS

- Plants turn pale green
- Heads poorly developed and sterile
- Deformed flowers
- Proliferation of side shoots resulting in a “witches broom” condition

# MANGANESE

## GUARANTEED NUTRITIONAL ANALYSIS

Manganese (Mn) (chelated) (actual).....6.0%  
EDTA (chelating agent)

Derived from: Manganese oxide and  
potassium hydroxide, EDTA

WEIGHT: 1.26 kg/L

## PRODUCT PROPERTIES

**SPECIFIC GRAVITY:** 1.26

**pH:** 8.0-9.0

**APPEARANCE:** slightly pink

**ODOUR:** slightly ammonia

## GENERAL PRODUCT INFORMATION

ALPINE Manganese is manufactured by utilizing the highest quality raw materials to provide a very agronomically efficient source of plant available Manganese.

The EDTA chelate is compatible with high orthophosphate products. ALPINE Chelated Manganese delivers:

- Maximum plant nutrient solubility - in furrow or foliar
- Minimal salt index
- No application equipment corrosion
- Compatibility with most other liquid fertilizers
- Tank mixable with most pesticides
- Low impurities

**FIRST AID:** Please see the MSDS sheet for more information or call (800) 265-2268.

**THE FOLLOWING CONDITIONS MUST BE OBSERVED IN ORDER TO APPLY ALPINE MANGANESE FOLIAR APPLICATIONS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN DAMAGE TO THE PLANTS:**

- DO USE ALPINE Manganese under conditions of optimum plant growth including highest humidity, moderate temperature and adequate soil moisture.
- DO USE sufficient water to provide thorough coverage.
- DO consult with your local ALPINE Agronomist or Sales Manager to determine pesticides which are compatible with ALPINE Manganese.
- DO consult your local ALPINE Agronomist or Sales Manager for rate and application instructions.
- DO USE a small jar or container prior to full scale mixing to proportionally mix all the components to confirm compatibility.
- DO NOT use when the crop is under stress from pests, heat or inadequate soil moisture.
- DO NOT apply during the heat of the day.

SELLER WARRANTS THAT THE ABOVE PRODUCT CONFORMS TO ITS CHEMICAL DESCRIPTION AND IS REASONABLY FIT FOR THE PURPOSE ON THE LABEL WHEN USED IN ACCORDANCE WITH DIRECTIONS UNDER NORMAL CONDITIONS OF USE (INCLUDING NORMAL WEATHER CONDITIONS). NEITHER THIS WARRANTY NOR ANY OTHER WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXPRESS OR IMPLIED, EXTENDS TO THE USE OF THIS PRODUCT WHEN USED CONTRARY TO THE LABEL INSTRUCTIONS OR UNDER ABNORMAL CONDITIONS (INCLUDING ABNORMAL WEATHER CONDITIONS), AND THE BUYER ASSUMES THE RISK OF ANY SUCH USE. ALPINE STARTER OR FOLIAR APPLICATIONS ARE INTENDED TO SUPPLEMENT EXISTING SOIL FERTILITY PROGRAMS AND WILL NOT BY ITSELF PROVIDE ALL THE NUTRIENTS NORMALLY REQUIRED BY AGRICULTURAL CROPS.

THIS FERTILIZER CONTAINS MANGANESE AND SHOULD BE USED ONLY AS RECOMMENDED. IT MAY PROVE HARMFUL WHEN MISUSED.



# ALPINE manganese

## APPLICATION RATE

Use ½ to 1 L/ac either in furrow or as a foliar spray. Optimum rate of application will vary between fields, depending on soil pH and organic matter content. Product should be used on the basis of soil and/or tissue analysis.

## MIXING INSTRUCTIONS

1. Put 1/3 water or fertilizer in the tank
2. Add correct amount of product
3. Fill tank with balance of water or fertilizer
4. Agitate adequately to mix

## ROLE OF MANGANESE

- Manganese assists Iron in Chlorophyll production
- Catalyst in oxidation-reduction process
- Manganese affects lignin building qualities and is critical in preventing lodging & disease
- Manganese is crucial when growing oats
- Glyphosate has been linked to Manganese deficiencies
- With glyphosate translocating within the root mass of weeds and RR crops thus leaking into the root rhizosphere, this immobilizes Manganese which is required for the growth of many plants
- Without Manganese, there is no seed production (i.e. seedless grapes, oranges have no Manganese)

## MANGANESE SOIL AVAILABILITY

- Manganese is not available when soils are cold in spring because Manganese starts out in the Mn<sup>4+</sup> state, must convert to the Mn<sup>3+</sup> state and then convert to the Mn<sup>2+</sup> state to be available to the plant. The fungus "Take-all" root rot oxidizes early Manganese availability, reducing lignification of roots, making them more susceptible to infections. This is where a GREAT SEED TREATMENT WORKS.
- Reduced lignifications also can create lodging problems
- Foliar, seed-placed or seed-treated with Manganese are ways to correct Mn deficiencies but seed-treated and seed-placed treatments are preferable. Like ALPINE'S new ASN.
- 9-12 ppm in soil test is medium amount

## MANGANESE IN THE LEAF

- Sufficiency tissue test ranges in ppm
  - Canola: 60-110
  - Small grains: 30-60
  - Peas: 40-70

## DEFICIENCIES SYMPTOMS

- Low pollen fertility and reduced 1000 kernel or bushel weight are symptoms of Manganese deficient crops.
- In cereals greenish grey spots

[www.alpineplantfoods.com](http://www.alpineplantfoods.com)



**Kevin Sparrow Farms**  
4200 acres - Fairfax, MB

"I have used ALPINE for three years now going on four; I really like the vigour of the plants in cold early springs. We are noticing fast emergence and large root development compared to the fields around us using dry phosphate. I have been using micronutrients with our ALPINE in the seed row and find that a very efficient way to apply the micronutrients I need. When we first set up the ALPINE equipment we found it very easy to install on the drill and ALPINE being a highly available product with low use rates we do not need a lot of liquid storage. The product stores well over winter and ALPINE's Early Booking Program works quite well."

Kevin seeds 4200 acres with one 42 foot Seedhawk air drill with a 1200 gallon liquid tank on board, carrying enough ALPINE to seed 350 acres per fill.

