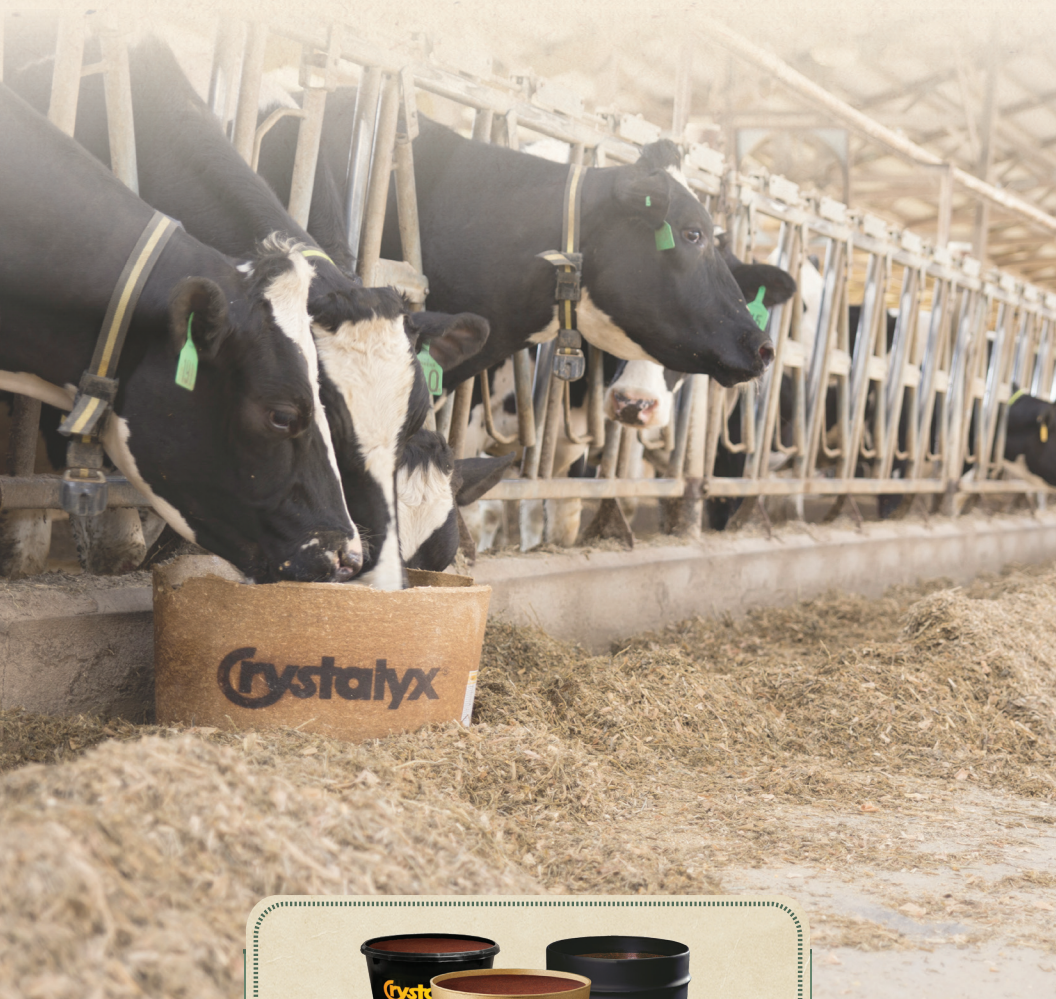


IT'S ALL IN THE DELIVERY™



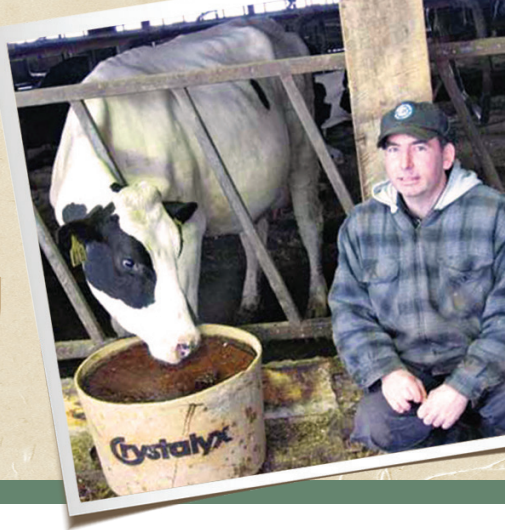
## DAIRY SUPPLEMENT GUIDE





“ There has been a 90% reduction in ketosis and less visits from the vet. ”

- Ken Wilson of Hammond, NY



## DELIVERING RESULTS AND PEACE OF MIND

CRYSTALYX® is the original low moisture self-fed supplement with a wide range of dairy specific formulas. The main benefit is saving time and money while providing you the peace of mind knowing your cattle are getting the nutrients they need 24/7.

- Research Proven Results
- Around the Clock Availability
- Predictable Intake
- Weatherproof
- Reduced Metabolic Disorders
- Improved Early Lactation Performance
- Reduced Risk of Sub-Acute Ruminant Acidosis
- TMR Safety Net®

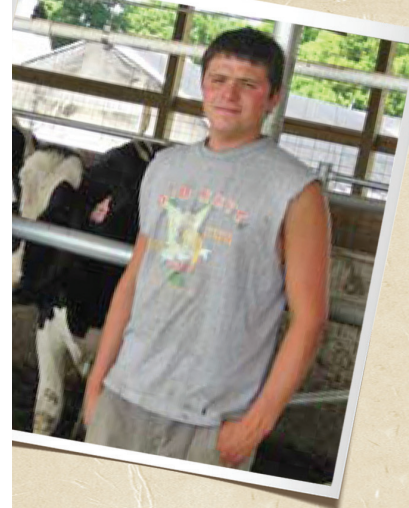


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 For products available in Canada please call us at 1-888-258-7422

Want more information? Need to find a dealer?  
Contact us at 1.888.258.7422 or visit [Crystalyx.com](http://Crystalyx.com)



“ Cows start stronger and get going faster. CRYSTALYX® gives the heifers an extra chance to get the minerals and vitamins they need. ”

- Ben and Michael Hughs of Pickett, WI

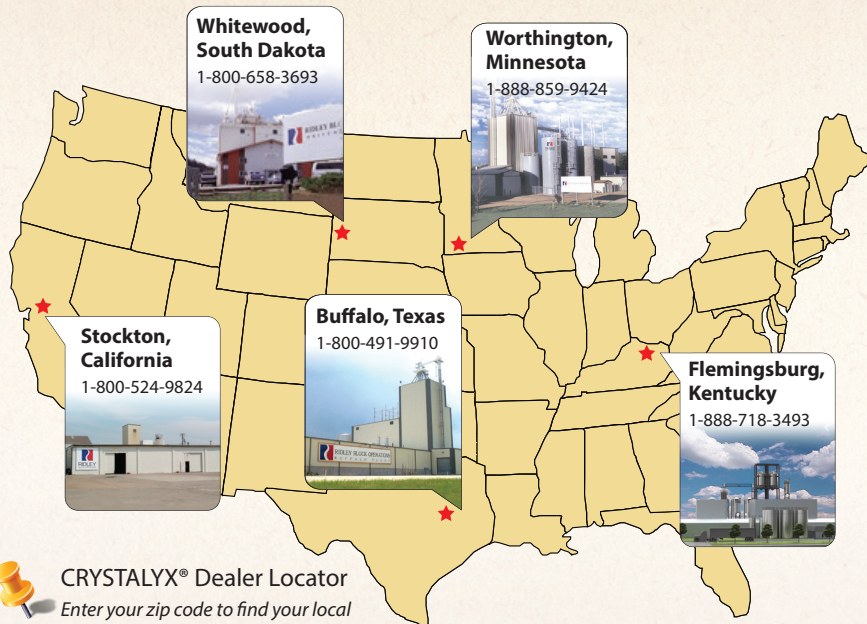


## QUALITY ASSURANCE

CRYSTALYX® supplements are manufactured at state-of-the-art plants strategically located throughout the United States. These facilities are a reflection of more than 30 years of experience in formulating and producing high quality, low moisture block supplements. Our level of commitment to quality and food

safety is unmatched in the industry, making CRYSTALYX® a leader among livestock supplements.

Strategically located production facilities across the country allow for reliable, consistent distribution of CRYSTALYX® products.



 **CRYSTALYX® Dealer Locator**  
Enter your zip code to find your local dealer at [Crystalyx.com](http://Crystalyx.com)



## WEATHERABILITY TO MATCH ANY ENVIRONMENT

The BioBarrel® is a patented, biodegradable and environmentally responsible single trip container (STC®) made of ground straw, wood fiber and a soy flour solution. As cattle consume CRYSTALYX®, the sidewalls of the BioBarrel® degrade. The addition of

WeatherAll® Protection to the CRYSTALYX® BioBarrel®, now allows for a more evenly matched degradation rate with CRYSTALYX® consumption, even under wet conditions. Eliminate labor and costs associated with collecting and returning steel barrels or disposing of plastic containers. It's effective, simple, and can make everyday hassles and frustrations disappear, just like the BioBarrel®.



### Features Like No Other: Evolution of the BioBarrel®

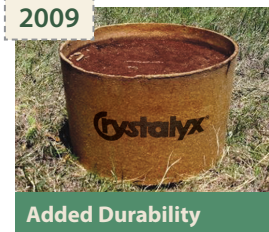
2006



**Degradability**

Introduction of the BioBarrel® as a non-returnable, "single trip", container. Our patented, one of a kind technology used ground straw coated with a soy flour solution for binding.

2009



**Added Durability**

Incorporation of a propriety blend of straw and wood fibers provided MORE durability and strength to withstand Mother Nature's elements.

2014



**Improved Weatherability**

Addition of WeatherAll® Protection technology for enhanced weatherability. Helps align BioBarrel® degradation rate under wet conditions.



4

“ I don't have to return the barrel or worry about banging them up with a skid steer. When they're gone, they're gone and I just put another one out. ”

- Troy Tomlinson of Arkansaw, WI



5



## IT'S ALL IN THE DELIVERY™

### PRECISION DAIRY MANAGEMENT AND NUTRITION TECHNOLOGIES

Dairy cattle management systems continue to incorporate new technologies such as sensors that automatically collect individual animal activity data and the use of robotic milking and feeding systems. These precision dairy tools reduce labor needs and management time while improving productivity and profitability. Real time data on individual cow eating patterns, milking frequency, milk production and health parameters such as rumination and body temperature are now available to the dairy manager.

### INDIVIDUAL COW REQUIREMENTS VERSUS GROUP DELIVERY

Dairy cattle nutrition has advanced from balancing for net energy, crude protein, fat and fiber levels to using modeling technologies that formulate for metabolizable energy, metabolizable protein, effective fiber, specific amino acids and fatty acids levels. However, the ration is delivered to groups of cattle using



AVERAGE dry matter intake of the group for diet formulation.

The compromise of using a group average dry matter intake has considerable implications for consistent delivery of key trace minerals and vitamins. In addition, the form of the trace mineral is important. Alltech® BIOPLEX® minerals are included in several of the CRYSTALYX® supplements for their high biological activity, reduced concerns about negative mineral interactions and reduced environmental impact as compared to feeding higher levels of inorganic trace minerals.

Multiple studies have shown that cattle will visit CRYSTALYX® supplements at a higher frequency than free choice mineral. Studies have shown that a very high percentage of dairy cattle in a group will visit the CRYSTALYX® supplement. See page 11 for cow movement research done at the University of Kentucky.

## RESULTS BY THE BARREL®



### CRYSTALYX® TMR SAFETY NET®

Today's high producing dairy animals have a tremendous demand for nutrients. The key to maximizing performance is to strike a balance between underfeeding and overfeeding key nutrients during all production phases. Over fortifying the ration is expensive while underfeeding can increase the risk for decreased milk production, health and reproductive problems.

Is there a need for a self-fed supplement with today's modern ration balancing programs, housing systems and TMR feeding equipment? Regardless of how rations and custom dry feed supplements are formulated, there are several constraints we must acknowledge when considering if we deliver the desired amount of each nutrient to every animal, every day.

1. Diet formulation is based on average dry matter intake (DMI). The more variation within a group the less useful the average becomes.
2. There is a limited number of dry feed supplements we can manage on-farm.
3. There is a limited amount of time for mixing feed.
4. There is a limit to how many groups we can have on-farm.
5. The TMR wagon may not mix a small group (20 head) diet very well.
6. Daily variation in nutrient intake due to sorting, mechanical problems, physiological state of the cow and environmental stress are unpredictable.

CRYSTALYX® Dairy Supplements deliver essential nutrients in an easy to use, labor saving package that is available 24 hours a day, 7 days a week. CRYSTALYX® Dairy Supplements are a safe and effective method of creating a "safety net" for your nutrition program.





# DRY COWS AND TRANSITION COWS

## Transition Stress™ FORMULA

CRYSTALYX® TRANSITION STRESS™ FORMULA offers the convenient delivery of chelated/organic trace mineral and the addition of yeast culture allows for increased dry matter intake. TRANSITION STRESS™ FORMULA can be fed before and after calving.



Crude Fat, min .....	3.0%
Crude Fiber, max .....	2.0%
Acid Detergent Fiber, max .....	2.5%
Calcium, min .....	1.5%
Calcium, max .....	2.0%
Phosphorus, min .....	0.5%
Salt .....	None Added
Magnesium, min .....	2.5%
Cobalt, min .....	40 ppm
Copper, min .....	625 ppm
Iodine, min .....	80 ppm
Manganese, min .....	2,500 ppm
Selenium, min .....	17.6 ppm
Zinc, min .....	2,500 ppm
Vitamin A, min .....	200,000 IU/lb
Vitamin D <sub>3</sub> , min .....	40,000 IU/lb
Vitamin E, min .....	1,400 IU/lb
Vitamin B <sub>12</sub> , min .....	0.5 mg/lb

## Close-Up™ FORMULA

Prevention of metabolic disorders is the goal of a transition program. Hypocalcemia, or Milk Fever, is a condition associated with low serum calcium around the time of calving. However, calcium level of the diet is not a risk factor but high dietary potassium in the dry cow diet does play a major role. The nutritional strategies to prevent the disorder are reduction of dietary potassium or the addition of anionic salts to the diet before calving to stimulate the mobilization of calcium from body reserves. Anionic salts are not very palatable and CRYSTALYX® CLOSE-UP™ FORMULA provides uniform intake of chelated/organic trace minerals and anionic salts.



Crude Protein, min .....	15.0%
(Including not more than 10.0% equivalent crude protein from non-protein nitrogen)	
Crude Fat, min .....	3.0%
Crude Fiber, max .....	2.0%
Acid Detergent Fiber, max .....	2.5%
Calcium, min .....	5.5%
Calcium, max .....	6.5%
Salt .....	None Added
Magnesium, min .....	2.5%
Cobalt, min .....	40 ppm
Copper, min .....	625 ppm
Iodine, min .....	50 ppm
Manganese, min .....	2,500 ppm
Selenium, min .....	11.8 ppm
Zinc, min .....	2,500 ppm
Vitamin A, min .....	200,000 IU/lb
Vitamin D <sub>3</sub> , min .....	40,000 IU/lb
Vitamin E, min .....	1,400 IU/lb

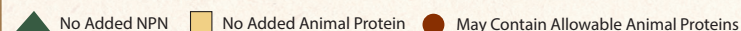
SEL-PLEX® and BIOPLEX® are registered trademarks of Alltech®.

## Dry Cow™ Formula

CRYSTALYX® DRY COW FORMULA™ is an easy-to-use, self-fed supplement that provides key mineral and vitamin fortification uniformly across the dairy herd. It is designed to be used at the beginning of the dry cow periods up to calving, or when other CRYSTALYX® dairy products can provide specific nutrient delivery in the close-up or fresh pens. DRY COW FORMULA™ provides a homogeneous and nutrient-dense blend of key concentrated micro ingredients that can be consumed with every lick. These nutrients help prevent metabolic disorders, assist in maintaining healthy rumen function and promote forage digestion. DRY COW FORMULA™ can help meet production goals by optimizing immune function, timely reproduction, stimulation of dry matter intake and providing a problem-free lactation period.



Crude Protein, min .....	15.0%
(Including not more than 10.0% equivalent crude protein from non-protein nitrogen)	
Crude Fat, min .....	3.0%
Crude Fiber, max .....	2.0%
Acid Detergent Fiber, max .....	2.5%
Calcium, min .....	1.5%
Calcium, max .....	2.0%
Phosphorus, min .....	1.0%
Salt .....	None Added
Magnesium, min .....	2.5%
Cobalt, min .....	40 ppm
Copper, min .....	625 ppm
Iodine, min .....	50 ppm
Manganese, min .....	2,500 ppm
Selenium, min .....	11.8 ppm
Zinc, min .....	2,500 ppm
Vitamin A, min .....	200,000 IU/lb
Vitamin D <sub>3</sub> , min .....	40,000 IU/lb
Vitamin E, min .....	1,400 IU/lb



## CHROMIUM SUPPLEMENTATION



- TRANSITION STRESS FORMULA™ CHROME
- CLOSE-UP™ CHROME
- DRY COW™ CHROME

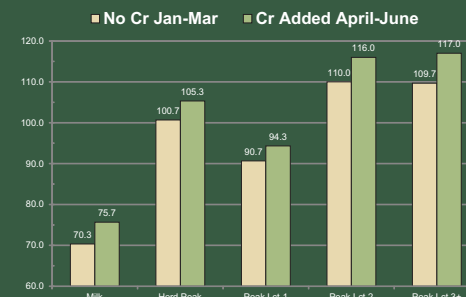
CRYSTALYX® with Chromium has the potential to benefit dairy operations with improved early lactation performance, reduced negative energy balance, and higher peak milk production.

### SUPPLEMENTAL CHROMIUM BENEFITS:

- Improved Early Lactation Performance
- Reduced Negative Energy Balance
- Higher Peak Milk Production

## HEARTLAND DAIRY CHROMIUM RESPONSE MILK AND PEAK BY LACTATION

Group 1807 Calvings



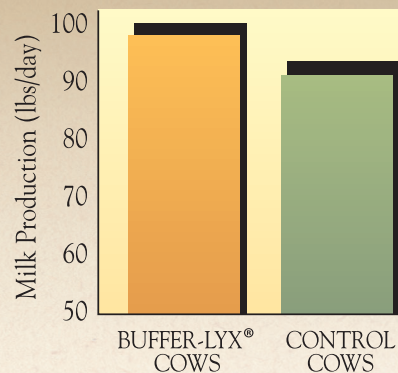
\*Please check with your local CRYSTALYX® dealer for availability of the Chromium formulas.



## MORE MILK WITH Buffer-lyx®

F.A.R.M.E INSTITUTE, HOMER, NY

A 2003 summer research farm trial shows the effect of CRYSTALYX® BUFFER-LYX® on milk production of lactating cows. BUFFER-LYX® cows produced 6.2 lbs. or 6% more milk, per-cow, per-day. This study supports findings from a previous on-farm trial that indicated 11% more milk, per-cow, per-day.



## THE Buffer-lyx® ADVANTAGE

Research conducted in 2015 at the University of Kentucky determined cow movement could be modified in a free stall housing system using strategic placement of CRYSTALYX® supplements. Cow movement was monitored using real time tracking tags and confirmed by visual observation. Visits to a control site with an empty container were compared to visits to a target location with CRYSTALYX® BUFFER-LYX®.

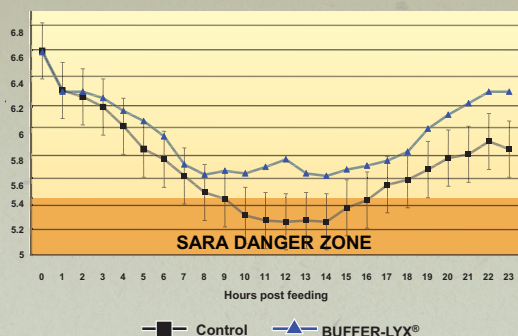
### BUFFER-LYX® Advantage

Time per day near supplement (3 meters)	7.32 more minutes per day
Visits per day	2.02 more visits per day

### ROBOTIC MILKING APPLICATION: STRATEGIC PLACEMENT OF CRYSTALYX® IN A ROBOTIC MILKING FREE STALL

- Improved Cow Flow
- Increased Milk Per Box Time
- Fewer Fetch Cows
- Faster Milk Out

## HOURLY MEAN RUMINAL pH WITH SARA CHALLENGE (Day 9 of Study)



Cows that are fed a diet that will lead to SARA will initially respond much the same as they would in the initial stages of ruminal fermentation. Once the major portion of the diet is consumed however, cows that were offered CRYSTALYX® BUFFER-LYX® appeared to handle the increased acid load much better because BUFFER-LYX® minimized the time cows spend below a pH of 5.5. In fact, when compared to cows that did not receive BUFFER-LYX®, they moved to a higher pH more quickly. The pH of cows that were fed a diet conducive to SARA and not offered BUFFER-LYX® stayed below 5.5 for a considerably longer time. When diets or feeding conditions that can lead to acidosis occur, supplementing with BUFFER-LYX® appears to help cows recover from SARA and keep fermentation within a more desirable range.

## RESEARCH SHOWS Buffer-lyx® HELPS CONTROL SUBACUTE RUMINAL ACIDOSIS (SARA)

Subacute Ruminal Acidosis (SARA) is likely the most economically important disorder of dairy cattle in the United States. SARA occurs when the pH in the rumen is too low for an extended period of time. Environmental and management challenges will increase the risk of SARA. Heat stress is a common contributing factor for SARA due to changes in eating patterns and the increased risk of slug feeding. Delays in feed delivery and mixing errors are examples of management challenges that can increase the risk of SARA.

Rumen pH will vary during the day. Ideally the pH should be in the range of 5.9 to 6.4 depending when the cow last consumed a meal. The symptoms of SARA are rarely noticed for an individual cow. When a cow's ruminal pH is too low due to SARA she responds by eating a little less feed and her milk production is reduced slightly. Cows do not recover from SARA quickly and the next time a SARA event



occurs the severity is greater and duration of the low rumen pH is longer causing additional production losses due to this compounding effect.

Dr. Gary Oetzel, DVM, MS of the University of Wisconsin-Madison, School of Veterinary Medicine has been researching ruminal acidosis in dairy cattle for many years. His group developed a SARA research model that has been used extensively in research. Dr. Oetzel conducted a trial at the U.S. Dairy Forage Research Center near Prairie Du Sac, WI using CRYSTALYX® BUFFER-LYX®. Half the cows received BUFFER-LYX® self-fed supplement in addition to the TMR and the other half did not. Each cow was on the study for 12 days. Intakes were monitored and rumen pH was measured throughout the study.

The results showed the BUFFER-LYX® treated cow's rumen pH did not drop as low as the control cows and the pH returned to normal levels sooner. There was a tendency for less dry matter intake loss

during the challenge and higher dry matter intake of the TMR.

### SUMMER HEAT STRESS RELIEF

Heat stress is a known risk factor for SARA. A common observation is cows will handle 1 or 2 heat stress events and then feed intake and milk production crashes on the 3rd or 4th event. A 2009 field trial in southeastern Minnesota is a good example of the benefit of BUFFER-LYX® in controlling SARA. 2009 was not a hot summer. There were 4 brief periods where the temperature was above 75 degrees Fahrenheit. A high group pen of 220 cows had access to BUFFER-LYX® and a control pen 200 cows had access for free choice sodium bicarbonate. When there was heat stress, the BUFFER-LYX® pen maintained milk product and recovered more quickly. The production loss in the control pen was greater with each heat stress period and by the end of the trial that pen had lost 8 lbs. of milk production.



## LACTATING COWS

### Buffer-lyx®

CRYSTALYX® BUFFER-LYX® is a patented technology for high producing lactating cows to increase milk production and dry matter intake. Additional buffer and alkalinizing ingredients help optimize rumen fermentation and reduce the risk of subacute ruminal acidosis (SARA).



### Dairy-lyx®

CRYSTALYX® DAIRY-LYX® is a supplement to stimulate appetite, enhance fiber digestion and provide a TMR Safety Net® for lactating cows. DAIRY-LYX® is an excellent choice for grazing dairies as a grazing management tool in addition to nutrient delivery.



Crude Fat, min	3.0%
Crude Fiber, max	2.0%
Calcium, min	2.5%
Calcium, max	3.5%
Salt	None Added
Magnesium, min	2.5%
Potassium, min	3.0%
Copper, min	100 ppm
Iodine, min	50 ppm
Selenium, min	11.8 ppm
Zinc, min	400 ppm
Vitamin A, min	50,000 IU/lb
Vitamin D3, min	5,000 IU/lb
Vitamin E, min	50 IU/lb



Crude Protein, min	18.0%
(Including not more than 6.0% equivalent crude protein as non-protein nitrogen)	
Crude Fat, min	3.0%
Crude Fiber, max	2.0%
Acid Detergent Fiber, max	2.5%
Calcium, min	2.0%
Calcium, max	2.5%
Magnesium, min	2.5%
Potassium, min	2.0%
Cobalt, min	40 ppm
Copper, min	300 ppm
Iodine, min	50 ppm
Manganese, min	1,500 ppm
Selenium, min	8.8 ppm
Zinc, min	1,500 ppm
Vitamin A, min	60,000 IU/lb
Vitamin D3, min	35,000 IU/lb
Vitamin E, min	200 IU/lb
Vitamin B12, min	0.5 mg/lb



No Added NPN



No Added Animal Protein



May Contain Allowable Animal Proteins

Bovatec® is a registered trademark of Zoetis.

## CALVES AND HEIFERS

### Brigade®

CRYSTALYX® BRIGADE® contains all natural plant proteins, electrolytes, highly bioavailable trace minerals and high levels of Vitamin E. BRIGADE® is ideal for calves to reduce the weaning stress and maintain growth and health.



Crude Protein, min	14.0%
Crude Fat, min	4.0%
Crude Fiber, max	3.0%
Calcium, min	2.0%
Calcium, max	2.5%
Phosphorus, min	2.0%
Salt, min	1.5%
Salt, max	2.0%
Magnesium, min	0.5%
Potassium, min	2.0%
Cobalt, min	15 ppm
Copper, min	500 ppm
Iodine, min	25 ppm
Manganese, min	2,000 ppm
Selenium, min	8.8 ppm
Zinc, min	1,500 ppm
Vitamin A, min	80,000 IU/lb
Vitamin D3, min	16,000 IU/lb
Vitamin E, min	800 IU/lb
Vitamin B12, min	0.5 mg/lb



Contains SEL-PLEX® and BIOPLEX® organic trace minerals.

### Replacement Heifer™ Formula

CRYSTALYX® REPLACEMENT HEIFER™ FORMULA is formulated for growing heifers on pasture or being fed in confinement to prove supplemental protein, trace minerals and vitamins.



Crude Protein, min	30.0%
(Including not more than 18.0% equivalent crude protein as non-protein nitrogen)	
Crude Fat, min	4.0%
Crude Fiber, max	4.0%
Acid Detergent Fiber, max	2.5%
Calcium, min	3.5%
Calcium, max	4.5%
Phosphorus, min	2.0%
Salt	None Added
Magnesium, min	2.0%
Potassium, min	1.7%
Cobalt, min	3.3 ppm
Copper, min	330 ppm
Iodine, min	17 ppm
Manganese, min	1,330 ppm
Selenium, min	6 ppm
Zinc, min	1,000 ppm
Vitamin A, min	100,000 IU/lb
Vitamin D3, min	20,000 IU/lb
Vitamin E, min	100 IU/lb

### IONO-LYX® B300

CRYSTALYX® IONO-LYX® B300 is a medicated self-fed supplement with the ionophore Bovatec® for increased rate of weight gain.



Lasalosid (active ingredient)	300 g/ton
Crude Protein, min	28.0%
(Including not more than 12.0% equivalent crude protein as non-protein nitrogen)	
Crude Fat, min	4.0%
Crude Fiber, max	2.5%
Calcium, min	2.0%
Calcium, max	2.5%
Phosphorus, min	2.0%
Salt	None Added
Magnesium, min	2.0%
Potassium, min	2.5%
Sulfur, min	0.9%
Cobalt, min	3.3 ppm
Copper, min	330 ppm
Iodine, min	17 ppm
Manganese, min	1,330 ppm
Selenium, min	5 ppm
Zinc, min	1,000 ppm
Vitamin A, min	80,000 IU/lb
Vitamin D3, min	8,000 IU/lb
Vitamin E, min	100 IU/lb





# FLY CONTROL

## HOW MANY IS TOO MANY?



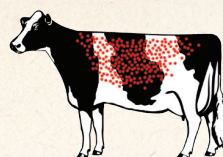
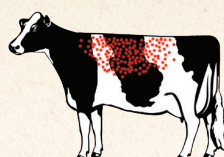
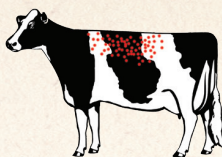
- 1,000 – 4,000 flies per cow are common at peak times.
- University data says 200 flies per beef cow is the economic threshold.

EXCELLENT

GOOD

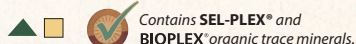
AVERAGE TO BELOW

UNACCEPTABLE



### IGR MAX™

Mineral supplement to help prevent adult horn fly emergence from manure of treated cattle. Contains S-Methoprene as the insect Growth Regulator ALTOSID® for continuous feeding to cattle through the horn fly season.



S-Methoprene (active ingredient)	0.01%
Crude Fat, min	3.0%
Crude Fiber, max	3.0%
Calcium, min	5.0%
Calcium, max	6.0%
Phosphorus, min	5.0%
Salt	None Added
Magnesium, min	5.0%
Potassium, min	1.5%
Cobalt, min	30 ppm
Copper, min	1,000 ppm
Iodine, min	50 ppm
Manganese, min	4,000 ppm
Selenium, min	13.2 ppm
Zinc, min	3,000 ppm
Vitamin A, min	200,000 IU/lb
Vitamin D3, min	20,000 IU/lb
Vitamin E, min	200 IU/lb

### IGR PRO™

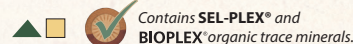
All-natural plant protein supplement to help prevent adult horn fly emergence from manure of treated cattle. Contains S-Methoprene Insect Growth Regulator ALTOSID® for continuous feeding to cattle through the horn fly season.



S-Methoprene (active ingredient)	0.005%
Crude Protein, min	18.0%
Crude Fat, min	3.0%
Crude Fiber, max	3.0%
Calcium, min	1.0%
Calcium, max	1.5%
Phosphorus, min	1.0%
Salt	None Added
Magnesium, min	1.0%
Cobalt, min	10 ppm
Copper, min	330 ppm
Iodine, min	17 ppm
Manganese, min	1,330 ppm
Selenium, min	6.0 ppm
Zinc, min	1,000 ppm
Vitamin A, min	80,000 IU/lb
Vitamin D3, min	8,000 IU/lb
Vitamin E, min	100 IU/lb

### ROL YX® MAX

Mineral supplement containing Rabon® Oral Larvicide. Supplemental mineral and fly protection for beef and dairy cattle and horses on pasture.



Rabon® (active ingredient)	0.68%
Crude Fat, min	3.0%
Crude Fiber, max	3.0%
Acid Detergent Fiber, max	2.0%
Calcium, min	5.0%
Calcium, max	6.0%
Phosphorus, min	5.0%
Salt	None Added
Magnesium, min	5.0%
Cobalt, min	30 ppm
Copper, min	1,000 ppm
Iodine, min	50 ppm
Manganese, min	4,000 ppm
Selenium, min	13.2 ppm
Zinc, min	3,000 ppm
Vitamin A, min	200,000 IU/lb
Vitamin D3, min	20,000 IU/lb
Vitamin E, min	200 IU/lb

### ROL YX® PRO-MAG

A protein and magnesium supplement containing Rabon® Oral Larvicide. Supplemental nutrition and fly control for beef and dairy cattle and horses on pasture.



Rabon® (active ingredient)	0.44%
Crude Protein, min	18.0%
Crude Fat, min	3.0%
Crude Fiber, max	3.0%
Calcium, min	1.0%
Calcium, max	1.5%
Phosphorus, min	1.0%
Salt	None Added
Magnesium, min	4.0%
Cobalt, min	15 ppm
Copper, min	500 ppm
Iodine, min	25 ppm
Manganese, min	2,000 ppm
Selenium, min	8.8 ppm
Zinc, min	1,500 ppm
Vitamin A, min	80,000 IU/lb
Vitamin D3, min	8,000 IU/lb
Vitamin E, min	100 IU/lb

Rabon® is a registered trademark of Bayer Animal Health. Altosid® is a registered trademark of Wellmark International.

No Added NPN
 No Added Animal Protein



Available at:



CRYSTALYX® Brand Supplements  
Mankato, MN 56001

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