ICE B'GONE®

WORK SMARTER….NOT HARDER

SNOW AND ICE TECHNOLOGY (RE) DEFINED!

The combination of a low molecular weight carbohydrate and a chloride salt [US Patent #6,299,793] produces:

- Significant Freeze Point Depression!
- Lower Salt Usage!
- Corrosion Reduction!

This patented technology-

- Is the most significant breakthrough in snow and ice removal since the introduction of salt for melting.
- Can be used on **rock salt**, **brines** or with **calcium chloride**.
- Will **save** the user **money** through lower salt usage (30--35%), fewer truck trips, less equipment corrosion, less structures corrosion.
- Will make roads **safer**!
- Has been proven over the last 7 years throughout the Northeast and the Midwest.

ICE B' GONE® is a liquid product used for direct application to snow and/or ice covered surfaces, or for treating salt to be used on such surfaces.

ICE B' GONE® will make the salt work down to –10 F or more, thus eliminating the need for sand or cinders, and their attendant problems.

Corrosion is reduced to below the PNS threshold of 30%, thus providing significant savings to equipment and structures.

Salt usage is reduced by reducing bounce and scatter, and also because of the significant freeze point reduction that is caused by the addition of the carbohydrate to the salt.

Freeze point reduction means longer working time to dilution!!

USING **ICE B' GONE®** GIVES THE ABILITY TO IMPROVE SERVICE, SAVE MONEY AND BENEFIT THE ENVIRONMENT AS NO OTHER ICE MELTING PRODUCT HAS BEEN ABLE TO DO BEFORE!

This technology is covered by various US and foreign Patents which are owned by
Sears Ecological Applications Company, LLC (SEACO) and Sears Petroleum and Transport Corp. (SEARS)
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Product descriptions- Ice B' Gone ®

Ice B' Gone (I)- The original patented uses by-products of alcohol distillation, brewing and/or corn steeping in combination with chloride salts to achieve freeze point reduction, corrosion reduction, decreased salt use and lessened environmental impact.

Ice B' Gone (II)- The combining of low molecular weight carbohydrates with Magnesium Chloride and electively, corrosion reducers and/or thickeners; a manufactured product that assures reliable quality and consistency. Because of its low phosphorus count, it has very little impact on water quality. Available in two versions, for liquid and for salt pile treatment. The latter being slightly more viscous to preclude pile leaching.

IBG II is also available with acetates in place of chloride salts, as needed for specific applications. Some users also request water soluble dyes to be added to reflect application.

ADVANTAGES OF USING TREATED SALT AND SALT SOLUTIONS

- Reduction of corrosion by 60-80%
- Reduction of usage by 30-40%
- Reduction of salt cost, overall, by 10%*
- Improved service level
- Less overtime and vehicle operating cost
- Environmentally beneficial

*See "Cost Savings"

Typical Corrosion Performance:

Deicing Fluid	PNSDOT Relative Corrosion Rate
Distilled Water	0
Rock Salt (NaCl)	100
Calcium Chloride ($CaCl_2$)	121
Magnesium Chloride ($MgCl_2$)	80
ICE B'GONE® (I)	24.7
ICE B'GONE® (II)	8.1

Corrosion Rates: The Pacific Northwest Snowfighters (PNS) method of determining corrosivity employs a modified National Association of Corrosion Engineers test method (TM-01-69) where steel corrosion rates are compared with rock salt solution. The requirement is that deicers should have a corrosion rate of 70% less than that of rock salt. ICE B'GONE® I and II more than comply with this requirement.

COST SAVINGS

Using an example of 10% savings: Dry salt cost, $40/T, Treated salt cost, usually at $15 more than dry = $55 x 40% use reduction = $22. $55 - $22 = $33 versus $40 for dry; more than a 10% reduction.

Add to this the **reduction in trips**, **lessened overtime**, **reduction in corrosion of vehicles and equipment**, as well as the **greater service level** typically achieved. The **greatly improved impact** on the **environment**, **concrete and structures** makes a compelling argument for the use of IBG products! Note that the addition of IBG products lowers the working temperature of road salt from approximately 18° F to approximately -10° F, so that it is not necessary to resort to sand or cinders to keep road passable at low temperatures.

Typical Analysis:

	IBG (II)	IBG (I)
$MgCl_2$	22% - 27%	14% - 16%
Spec Gravity	1.28 – 1.32	1.28 – 1.32
PH	4.0 – 6.0	4.0 – 6.0
Solubility	> 98%	> 95%
Odor	Slight Sweet	Light Molasses
Weight/Gallon	10.5 – 10.9 lbs	10.5 – 10.9 lbs
Freeze Point	< 40°F	< 40°F

Biological Oxygen Demand (BOD) in IBG II is 0.04 to 0.14 KgO_2/KgDeicer and IBG I is .20 to .24 KgO_2/KgDeicer.

PRODUCT AVAILABILITY

Sears operated facilities and distributor facilities recognize the need for prompt delivery of product when conditions are adverse. Modern bottom loading and gauging systems assure quick accurate loading without delay. Large tank storage assures adequate supply.

A WORD ABOUT PATENTS AND TECHNOLOGY IN THE ICE MELTING INDUSTRY -

Since the middle 1990's, when agricultural additives for salt first started appearing, there have been many claims and patent issues. SEARS has been in the industry with strong technical and chemistry support since its entry in 1997. Sears has a number of issued patents as a result of this significant research effort and has made the primary discovery that Low Molecular Weight Carbohydrates, when mixed at the proper ratios with a chloride salt, have a synergistic effect on Freeze Point, as well as causing a reduction in the corrosivity of the salt.

All other refined product patents are secondary to Sears primary 1999 patent. Therefore, the user of a Sears licensed product is assured of quiet enjoyment, highest effectiveness, low cost, reduced environmental impact and the economies associated with less trips and truck time.

COMPARATIVE BENEFITS OF TREATING SALT BRINES

As the use of salt brines by DOT's around the US has grown, the issues of corrosion, refreeze, cost and relative efficiency are necessarily under scrutiny. This paper attempts to make some of the relevant comparisons.

SEACO's patented product, **Ice B' Gone®** (IBG) is an effective and safe treatment for brines and will produce measurable and significant improvements in the final product. The chart below compares lbs. of ice melted by 24% brine and a 90/10 ratio of $MgCl_2$ and a low molecular weight carbohydrate (LMWC)- the patented ingredient of IBG. Since NaCl brines have characteristics similar to $MgCl_2$, adding the LMWC to salt brines will produce results similar to those below:

ICE MELTING CAPABILITY (per gallon of deicer)

Pounds of Ice Melted

Temperature °F	24% brine*	IBG II 90/10**	IBG II 80/20**
30	31.8	61.7	112.0
25	18.0	30.7	55.7
20	11.2	18.1	32.8
15	7.2	10.6	19.2
10	4.3	6.1	11.1
5	2.6	3.5	6.3
0	1.6	2.0	3.5
Freeze Point	1.0°F	-31.9°F	-54°F

*calculated from Table B-7, SHRP H-205-2, Test Method for Ice Melting of Liquid Deicing Chemicals.
**based on actual laboratory testing

As can be readily seen from the above, the enhanced product will melt, on average, two to three times as much ice as straight brine. With its colder freeze point, it will also work longer before it dilutes out, and will require less material to be applied- thus saving truck time, cost of product, and reduced refreeze. All of this results in much greater highway safety.

ICE B'GONE® also passes the purity requirements as set by the PNS.

	ICE B'GONE®	PNS Specifications
Arsenic	< 2	5.00 ppm Max
Barium	0.60	1.00 ppm Max
Cadmium	< 0.02	0.20 ppm Max
Chromium	0.5	1.00 ppm Max
Copper	< 0.1	1.00 ppm Max
Cyanide	< 0.15	0.20 ppm Max
Lead	< 0.50	1.00 ppm Max
Mercury	< 0.01	0.05 ppm Max
Selenium	< 1	5.00 ppm Max
Zinc	< 1.0	10.00 ppm Max
Phosphates	0.20	25.00 ppm Max

Applications

ICE B'GONE® may be used for both de-icing and anti-icing, whether in the by-product or the refined form. It is common for the by product based product to be used for pile treating and for spraying salt at the "spinner." The refined base product may be used for both salt treating and for direct application; and concentrates of this product can also be used to mix with salt brines to improve the brine's performance and reduce use.

Typical application rates are 8 gallons per ton of salt for pile treating, for anti icing, rates of 20-40 gallons per lane mile are common, for de icing, higher rates are used; local conditions will dictate optimum rates.

Treated salt shows its superior qualities at lower temperatures- when regular salt stops working, treated salt is just getting started- and because it stays in place and works longer, savings in use are an additional benefit.

CAUTION!

ICE B'GONE® mixed with chloride salts and applied at temperatures above 38°F and /or in higher humidity (50+ %) conditions can become slippery as the chloride portion of the product will absorb moisture from the air. Applications at higher temps and humidities should be reduced with water by 20%+/-. Note that it is important to know humidity, air and road temperature.

British Pendulum Friction Test

Shows effect of higher humidity. Higher numbers are greater friction.

	40% Relative Humidity at 39.2 F	80% Relative Humidity at 39.2F
Dry Surface	76-78	76-78
Water and Magnesium Chloride	14 - 18	9-11
50-50 ICE B'GONE and Magnesium Chloride		
Less than 1 Minute	40-105	13-14
Time 70 Minutes	46-60	14-16
Time 92 Minutes	46-60	14-16
Time 167 Minutes	46-60	15-17