



Why are there different temperature effectiveness ratings with Ice Melter brands?

- Temperature rating is based on blend ingredients. Calcium Chloride and to a lesser degree Magnesium Chloride, have special properties (please see below) that improve effectiveness of blends at low temperatures. Because these ingredients are more expensive than salt, these blends are premium and rated to below -30°C . For blends rated -15°C to -18°C , salt is often a major component.
- Coatings applied to blends can improve performance. When Calcium Chloride brine is applied to a blend, a micro-coating covers each granule in the mix. This is a technique used by highways departments to improve the performance of road salt prior to application. Our product uses Calcium Chloride in the same way, but also as a dye carrier in the preparation of all of our Ice Melters.

What are the common types of Ice Melter ingredients?

- **Salt:** Provides “best bang for the buck” as an Ice Melter. It is low cost, effective and readily available. The Sodium ion in salt is also more harmful to plants than most other ingredients, but negative affects are nominal when the Ice Melter is used in moderation. If any Ice Melter is over-applied, or if melt water runs off of a walkway and concentrates in an area, grass and vegetation can be damaged.
- **Calcium Chloride:** Provides the best combination of speed and duration in ice melting. Calcium Chloride reacts exothermically with ice and snow (generates heat as it forms a brine) making Calcium Chloride the most powerful Ice Melter. This creates a synergistic affect with other ingredients (e.g. salt, Potassium Chloride) to make them perform better at colder temperatures. When proportionately small amounts (less than 20%) of Calcium Chloride are blended with salts, re-freezing is largely avoided due to the drying effect of the salt. Calcium Chloride has similar properties to Magnesium Chloride, except that Calcium Chloride is much more effective because purity is 77% versus 47% for Magnesium Chloride. Calcium Chloride is safe to use: is used extensively in the environment by highways departments for de-icing and dust control (gravel roads); is used as fertilizer in agriculture, and as a food additive – a safe and proven ingredient.
- **Potassium Chloride:** Is an important plant nutrient when applied in moderation. However, it is an expensive ingredient that does not work well in temperatures colder than -10°C ($+14^{\circ}\text{F}$).
- **Traction Grit:** Is Limestone granules sized larger than sand to reduce tracking-in and to blend well with other Ice Melter ingredients. Traction Grit does not melt ice, but has the benefits of immediate, long-lasting and very visible traction.
- **Urea:** Is Nitrogen fertilizer (helpful to plants in moderation), and Urea is less corrosive to metals than chlorides. However, Urea is very expensive and not effective at temperatures colder than -8°C ($+18^{\circ}\text{F}$).
- **Magnesium Chloride Hexahydrate:** Melts ice at low temperatures, but the maximum purity of granular Magnesium Chloride is only 47% (53% is water). Therefore, after an initial melt, Magnesium Chloride

stops working – more frequent application is required. In addition, because Magnesium Chloride is hygroscopic, it attracts and holds water droplets. This can lead to re-freezing as the Magnesium Chloride brine on the walkway is diluted. Lastly, evidence suggests that Magnesium Chloride reacts chemically against concrete.

- **Calcium Magnesium Acetate (CMA):** Is a chemical formulation of dolomitic lime and acetic acid that is used as a corrosion inhibitor and Ice Melter. The manufacturer states that CMA does not melt ice and snow, but rather changes it to an oatmeal texture. It has also been suggested that 20% to 75% CMA content in a blend is required to reduce corrosion effectively. Because CMA is *vastly more expensive* than all of the ingredients discussed here, if this amount of CMA were in a blend, the per bag price would be enormously expensive.
- **Potassium Acetate:** Similar non-corrosive and corrosion inhibition properties to CMA, but in a liquid form that is applied uniformly over an entire blend of Ice Melter.

What type of Ice Melter should be used on new concrete?

- Concrete specialists recommend that no Ice Melter should be used on concrete that is less than one year old.
- During winter months, some concrete can be damaged by normal “freeze/thaw cycles”. Concrete is porous in nature and absorbs water from ice melting; the water then freezes and expands to cause surface scaling. Research and laboratory tests have shown that scaling or spalling is primarily a physical action from hydraulic and osmotic pressures, and not caused by chemical reactions from Ice Melters. With the exception of Ammonium Nitrate and Ammonium Sulfate (fertilizers no longer sold as Ice Melters), Ice Melters do not cause scaling with chemical reactions or crystal pressures.
- Air-entrainment of concrete (a technique developed in the 1930s for cold climates) protects concrete by creating billions of closely spaced air voids in the concrete that act as relief valves to absorb hydraulic and osmotic pressures of freezing water within concrete. Regardless of brand, Ice Melters create more water and increase saturation of concrete. During freezing, water builds pressure that can cause scaling if air entrainment voids are not present to relieve this pressure. The effects of freeze/thaw cycles may be reduced by using only moderate amounts of Ice Melter, by removing the resulting slush and water to accelerate drying, or by using a concrete sealer. The risk of concrete damage must be weighed against the risk of slippery conditions.
- Websites that explain Ice Melters and Concrete are: www.cement.org, www.cement.ca and www.pavement.com.

How do Ice Melters affect vegetation?

- Any Ice Melter can harm plants if it is concentrated in the soil. This can result from heavy use of Ice Melter or if melt water collects and runs into the soil in a concentrated area. The “burn” affect on plants (e.g. grass) can result from any active ingredient in Ice Melters (e.g. Sodium Chloride, Potassium Chloride, Urea, Magnesium Chloride or Calcium Chloride), in the same way that that grass is “burned” by the over application of fertilizer. The osmotic nature of the soil changes making it more difficult for plants to absorb soil water (and dissolved nutrients) required for growth.
- Sodium Chloride (Salt), the most prevalent Ice Melter ingredient, is considered the most detrimental to vegetation. However, careful use of salt in an Ice Melter blend provides excellent safety in slippery conditions, with minimal risk to vegetation. Secondary ingredients of Potassium Chloride (an important Potassium fertilizer used domestically and in agriculture), and Calcium Chloride (also a fertilizer on some crops), tend to lower risk to vegetation slightly.

What is the recommended application rate for Ice Melter?

- Apply 50-100 g per m² (1/4-1/2 cup per yard²). It is best to remove excess snow before applying Ice Melter, then remove loose slush and ice after Ice Melter has penetrated the surface. Re-apply to stubborn areas.

