



Fact Sheet

ANTI-ICING

What are the NDDOT vehicles spreading on the highway before a winter storm?

The North Dakota Department of Transportation (NDDOT) vehicles are applying the anti-icing products that will help melt snow and reduce ice formation on the roadway. The process is known as anti-icing. This is being done to provide safe driving conditions and reduce environmental impact.

What is anti-icing?

Anti-icing is a pro-active approach to winter road maintenance. It involves the application of anti-icing products (also known as freezing-point depressants) to the roadway before a winter storm. It forms a bond-breaker between the pavement surface and the snow and ice layer which melts snow more quickly and reduces the chance that ice will form and bond to the surface. It is similar to how cooking oil prevents food from sticking to the frying pan.



Typical anti-icing equipment.

Anti-icing reduces the amount of time required to restore the roads to a clear, dry state. NDDOT uses snow plows, tankers, automatic bridge deck sprayers, and other equipment in the anti-icing process. Effective anti-icing is dependent upon having the right amount of anti-icing liquid in the right place at the right time. Applying anti-icing liquids to the roadways is generally the most effective approach to prevent icy and snow-compacted roads.

How do you know when and where to conduct the anti-icing process?

There are many factors that go into determining if anti-icing will be effective. Some of the factors are air temperature, wind speed, precipitation type and intensity, current pavement conditions, and location. NDDOT uses these factors in an advanced weather forecasting system, as well as the experience of our maintenance crews, to determine when and where to anti-ice.

What anti-icing liquids does NDDOT use?

Direct application of liquid products include:

- Salt Brine – water mixed with salt
- Agricultural-based liquid product – sugar beet by-product added to salt brine
- Potassium Acetate – used in a liquid solution on bridge surfaces

How does NDDOT use anti-icing liquids to control snow and ice?

NDDOT applies liquid products directly to the roadway to prevent the buildup of snow and ice by lowering the freezing point of water, leaving the roads bare and wet when they would otherwise be covered by snow and ice. NDDOT primarily uses liquids in three ways:

1. **Anti-icing** is the application of liquids to the roadway before, or at the onset to, a winter storm.
2. **De-icing** is the application of liquids after snow and ice has compacted to the roadway. NDDOT's experience has been that it takes approximately three times the resources to remove compacted snow and ice when the anti-icing process is not used. The same effect is experienced when snow compacts on a driveway after driving on it several times and then trying to scrape it off.
3. **Pre-wetting** is the application of liquid to a granular salt mixture to help jump start the melting process. Sand alone cannot melt snow and ice, and dry salt must change into a liquid solution to melt snow and ice. Studies have shown up to 30% of dry salt or sand can scatter or blow off the roadway, so liquid is added to the salt mixture to prevent scattering and blowing, helping the salt mixture stay on the roadway.



Does applying an anti-icing liquid make roads slippery?

The amount of anti-icing liquid applied to the roadway is unlikely to make roads slippery. However, motorists should always remain at least 500 feet behind a vehicle applying an anti-icing liquid. If applied before a storm, the anti-icing liquid typically dries within 45 minutes, leaving a thin layer of anti-icing product on the road surface. It can go through a slurry phase after it is applied if temperature or humidity unexpectedly rises. Although this may cause the road to feel slightly slippery, it is still a much safer surface than snow and ice.

Are anti-icing products harmful?

Although salt can be corrosive to vehicles, the addition of a sugar beet by-product (which is brown in color and also used to sweeten livestock feed) reduces the corrosiveness of the salt. In fact, test results from an independent lab approved by the Pacific Northwest Snowfighters showed that the sugar beet by-product and salt brine mixture is only one-third as corrosive as salt. A simple wash after a snowstorm can also significantly reduce any corrosive effects.

What are the benefits of anti-icing compared to traditional methods?

- Anti-icing is a pro-active approach to winter road maintenance. It forms a bond-breaker between the pavement surface and the snow and ice layer which melts snow more quickly and reduces the chance that ice will form and bond to the surface. It reduces the amount of time required to restore the roads to a clear, dry state.
- Reduced use of abrasives on the road results in reduced environmental impacts.
- Snow and ice control cost savings results in benefits to NDDOT and the public.
- Improved winter roadway conditions results in safer driving conditions for motorists.
- Lower accident rates – Colorado experienced an average decrease of 14% in snow- and ice-related crashes during a 12-year study utilizing the anti-icing process on the interstate system in the Denver metro area.

For more information contact:

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