



Use of Salt at Cold Temperatures

Good practice for salt use under extreme cold conditions means an agency must optimize the use of its salt.

The working temperature of salt ends at approximately 15° F pavement temperature, despite the fact that the eutectic temperature is -6° F. When pavement temperatures fall to 15° Fahrenheit or lower, untreated salt melts very little ice and takes hours to do so. During these extremely cold situations when pavement temperatures are below 15° F, untreated salt should not be used, and alternatives should be considered. This could mean using salt that has been treated with a product like magnesium chloride or calcium chloride. It could also mean pre-wetting the salt with one of these liquid chemicals as well.

It is important to note that if pavement temperatures should fall to 0 degrees Fahrenheit or lower, even these methods will be ineffective. In these situations materials that promote traction may be the only alternative to consider.

In order to manage its materials properly, agencies should consider “what is the optimum time to use treatments during extremely cold situations?”

To do this an agency should use instruments to determine the pavement temperature and, if possible, have a pavement temperature forecast. Pavement temperature forecasts can help an agency determine when its chemicals will be most useful and when is the appropriate time not to apply chemicals.

It is vital that this information is made available to the operators in the vehicles. In many situations, operators feel they must apply material when clearing roadways regardless of the pavement temperature. It is likely that in extremely cold conditions this material will be wasted because it will not go into solution and will subsequently be plowed off the roadway on the next round.

Giving an operator access to pavement temperature in the vehicle or to the information coming from a roadway weather information system will help them make good educated decisions about when to apply deicing materials.

Pounds of Ice Melted Per Pound of Salt

The numbers: It is not that salt does not work below 15 F, but that it works too slowly. If it will take more than two hours for salt to fully activate at cold temperatures, and your cycle time is two hours or less, you are just going to plow off the salt before it can help you. Instead of doing that, when the pavement gets really cold, stop spreading salt.

The Alternatives: If you are not going to use salt in these low temperature conditions, what should you do instead? If you have them available, either calcium chloride brine or magnesium chloride brine will work at these low pavement temperatures, although they have their limits too. If you do not have these other materials, then you should just plow, and where appropriate use abrasives for temporary local friction gains.

The needs: The key need is for a pavement temperature sensor, either as part of an RWIS system or mounted on a truck. Either way, you need to know the pavement temperature. Then, you have to decide to stop using salt when that temperature gets too low.

Pavement Temp. °F	One Pound of Salt (NaCl) melts	Melt Times
30	46.3 lbs of ice	5 min.
25	14.4 lbs of ice	10 min.
20	8.6 lbs of ice	20 min.
15	6.3 lbs of ice	1 hour
10	4.9 lbs of ice	Dry salt is ineffective and will blow away before it melts anything.
5	4.1 lbs of ice	
0	3.7 lbs of ice	
-6	3.2 lbs of ice	

It is not cost-efficient to apply salt (sodium chloride) at pavement temperatures less than 15° F.

When pavement temperatures fall to 15°Fahrenheit or lower, untreated salt melts very little ice and takes hours to do so.

