



Highway Maintenance Manual

Bureau of Highway Maintenance

Chapter 06 Winter Maintenance

December 2025

Section 20 Snow Removal Materials

Subject 05 Proper Applications and Temperature Ranges for De-Icing Agents and Abrasives

1.0 Proper Applications and Temperature Ranges for De-icing Agents and Abrasives

1. Application rates for de-icing agents are provided in [HMM 06-20-20](#) (anti-icing) and [HMM 06-20-25](#) (de-icing). The rates contained in these sections are guidelines because conditions for a given storm may require that other measures be taken. Discretion must be exercised in responding to each winter maintenance situation. Data from winter storm reports, required per [HMM 06-10-20](#), will be collected to make comparisons and evaluations of the amount of de-icing agents used for winter maintenance.
2. The appropriate material to use is dependent on the specific storm conditions and forecast. De-icing agents are not always necessary and, in some situations, may create a more hazardous situation than if no de-icing agents were used. Winds, temperatures of both the pavement and air, and drifting conditions should be considered when choosing to apply de-icing agents, since chemically wet pavements may capture drifting snow and lead to ice and snow accumulations.
3. Prewetted sodium chloride is an effective material during and after the storm when the pavement temperature is 15°F or higher. However, below 15°F, the prewetted salt becomes less effective and therefore the service provider should consider a plow only strategy or switch to a deicing agent other than sodium chloride such as magnesium chloride or calcium chloride, etc. Even though these de-icing agents will lower the melting range of sodium chloride, it should be noted that below 15°F the effectiveness of all agents is greatly reduced. Additional monitoring may be required when using these liquid agents because re-freeze may occur.
4. Prewetting of dry salt with salt brine, liquid magnesium chloride solutions, or other approved liquids should be done to reduce the loss of de-icing materials that are blown or bounce off the pavement as a result of traffic or the act of dispensing the material from a moving truck.
5. Direct Liquid Application (DLA) with salt brine, liquid calcium chloride, liquid magnesium chloride, or other approved liquids can also be used to reduce the loss of de-icing materials. This has also been shown to be highly effective in the de-icing process.
6. Anti-icing should be performed using only materials specifically designed for anti-icing applications. The materials selection process should be a joint effort between the service provider, region maintenance staff, and the bureau of highway maintenance. Salt brine applied using a spray bar with controls to provide uniform application is the preferred method of anti-icing. Dry or prewetted salt should not be used for anti-icing because of the likelihood that most of the material will not remain on the pavement to provide effective control.
7. Locally available abrasive materials, usually sand (see [HMM 06-20-15](#)), can be employed when pavement temperatures are 10°F or less or when de-icing agents are ineffective because of high winds or other storm conditions. However, it is recommended that abrasives be pre-wetted and only used in low-speed trouble spots and intersections. Abrasives should not be used on roadways where speeds in the sanded locations exceed 45 mph. Special consideration should be taken in urban areas where there are storm sewers. Abrasive products should be scrutinized for their effects on the environment. Under no circumstance shall any abrasive material that contains an environmentally sensitive substance be used on the state highway system. It is unacceptable to use rock salt as an abrasive. Prewetting abrasives may be appropriate or necessary to aide in securing or imbedding the abrasive into the ice or snowpack.
8. De-icing agents should be applied with appropriate equipment to provide the most effective benefit from the material. The material should be spread only to the width necessary to achieve the "bare/wet pavement" expectation, keeping in mind the effects of traffic and wind on the material. Chutes and spinners placed close to the roadway, specialized velocity negating spreaders, and pressurized nozzle sprayers placed close to the pavement are some of the devices available to aide in keeping the material on the pavement where it can be most effective. When spinners are used, operators

should be instructed about their use and asked to limit the speed of the spinner to prevent the material from being cast beyond the area to be treated.