



# Slip and Fall Elimination Snow and Ice Removal Guidebook

We're experts at helping our customers keep their workers safe and their costs down.

Use the following example as the basis for your own program to help prevent slips and falls in parking lots and on walkways during winter months.

 AccidentFund  
[AccidentFund.com/walksafe/](http://AccidentFund.com/walksafe/)

 UnitedHeartland  
[UnitedHeartland.com/walksafe/](http://UnitedHeartland.com/walksafe/)

 CompWest  
[CompWestInsurance.com/walksafe/](http://CompWestInsurance.com/walksafe/)

 ThirdCoast  
Underwriters  
[3CU.com/walksafe/](http://3CU.com/walksafe/)

 AF Group

All policies are underwritten by a licensed insurer subsidiary. For more information, visit [afgroup.com](http://afgroup.com). © AF Group.



## Program Guidelines

### Purpose

- To prevent injuries from slips and falls on ice and snow.
- To effectively remove snow and ice from all walkways prior to employees going to and leaving work.

### Company Responsibilities

**Written Program:** Put the company snow removal program in writing and update it periodically. The program should be posted or made available to all employees.

**Resources:** Provide the necessary financial, personnel and management resources to lead and support an effective snow and ice removal program.

**Person(s) Responsible:** Assign a person in charge of ice and snow removal and assign at least two backup people for vacations and illnesses. Each person should be fully capable to fill in for those absent. Set up a way to notify backups on short notice.

**Snow and Ice Removal Personnel:** Assign or contract with people who are physically capable and knowledgeable about removing snow and ice. There should be enough people assigned to do an effective job. Assign backup personnel to account for vacations and illnesses.

**Provide the following:** snow blowers, plows, shovels, scrapers, salt (or alternative), sand and all equipment necessary for employees to effectively control snow and

ice; carts, dollies or other material-handling equipment for transporting salt and heavy materials; salt-spreading devices for distributing salt; signs and barriers to warn employees and to block areas unsafe for passage.

**Contractors:** If contractors are used, hire competent contractors who are reliable, experienced and knowledgeable. Clearly communicate your expectations to them. Obtain certificates of workers' compensation and general liability insurance.

**Inspections:** Regularly conduct inspections to monitor the effectiveness of contractors and employees responsible. Results of the inspections should be promptly reported to those people with the authority to make improvements.

**Notifications and Weather Reports:** Develop a communication system to keep track of the weather and to notify those responsible for snow and ice removal.

**Use the following:** warning devices, such as flashing yellow lights or signs, in the parking lots to notify employees of unsafe conditions; signs at the exits to warn employees of conditions outside; correspondence to communicate with employees.

**Barriers:** Use barriers to prevent employees from walking in areas that have not been cleared.

**Wet Floors:** Provide rugs, non-skid surfaces, and warning signs at walkways, steps and ramps indoors where water is tracked in. These areas should be monitored regularly and kept as clean as possible. Additional rugs must be used where necessary. Rugs must be cleaned regularly.





## Effective Snow and Ice Removal

**Frequency:** The bulk of snow and ice removal should take place prior to employees coming and going to work during shift changes. Do not wait until the last minute. Removal must continue throughout the day if snow and ice continue to accumulate.

**Snow Pile Drainage:** Pile snow and ice in an area where thaw run-off will drain to a safe location. This will prevent the thaw run-off from becoming an additional hazard when it freezes again.

**Plow After Hours:** Take advantage of hours when the parking lot is empty of cars to remove snow, ice, slush and frozen run-off. Good contractors are available during these after-hours periods.

**Coordinate Plowing and Parking:** When possible, direct people to park in lots that have already been plowed. This allows unplowed areas to be free for snow removal.

**Provide Walkways in Parking Lots:** Clear paths in the parking lot for walking. Parking lots are difficult to keep completely free of ice and snow due to their size. Keeping a walking path clear provides at least part of the way to the building and reduces the opportunity and risk of falling.

**Thawing Periods:** This is a period of time often neglected for snow removal. Thawing snow and ice freezes again at night to create a hazard in the morning. Take advantage of thawing periods and remove all melting snow and ice.

**Salt and Sand:** Use salt, sand and alternative materials on areas that have been cleared of ice and snow. This practice slows down further accumulations. Sand provides some traction on ice.



# Snow and Ice Removal Checklist



Company: \_\_\_\_\_

Location/Building: \_\_\_\_\_

Inspected By: \_\_\_\_\_

Date: \_\_\_\_\_

Exterior		
	YES/NO	COMMENTS
Review the terms of Snow Removal Contract with the provider. Is snow removal completed prior to the start/end of a shift? Did they spread ice-melt compound/sand?		
Is there adequate, proper ice-melt compound for sidewalks, stairs, entrances, parking lots, etc., located at doorways, along with a back-up supply available?		
Is there adequate sand located at doorways?		
Is there adequate snow removal equipment including, but not limited to, shovels, snow blowers and ice chippers? Are they adequately dispersed where needed and readily accessible?		
Do snow piles obstruct vision for employees and vehicular traffic?		
Is there adequate lighting at doorways, parking lots, around dumpsters, etc. where employees generally walk and work?		
Is there a build-up of icicles falling from the roof, overhangs, rain spouts and other overhead fixtures that may create a hazard for employees and others?		
Are emergency access areas/supplies free of snow/ice accumulation such as fire hydrants, fire lanes and emergency exits?		
Do melting snow and ice run-off lead to a drain?		
Are downspouts discarding melted snow/ice water onto a walkway or sidewalk that can re-freeze?		
Are there areas to address concerning re-freezing of snow and ice?		
Do you notice any area where employees are walking (short cuts) that isn't considered a normal entrance/exit in or out of the building?		
Are general walking surfaces in good condition before/after winter and free of damaged concrete/black top, trip hazards, pot holes, etc.? (You may only be able to temporarily cold patch in the winter.)		
Are curb and handicap ramps in good condition, free of snow/ice accumulation?		
Are curbs (if needed), handicap ramps and other surface transition areas highlighted in yellow for easier visibility?		

<b>Interior</b>		
	<b>YES/NO</b>	<b>COMMENTS</b>
Is there adequate, proper ice-melt compound for sidewalks, stairs, entrances, parking lots, etc., located at doorways, along with a back-up supply available?		
Do all interior door entrances have adequate lighting?		
Are there floor matting and floor runners at all entrances?		
Is there a back-up runner/rug should one get too soiled, wet or damaged?		
If there is recessed flooring at entrances, is it in good condition?		
Is there "Wet Floor" signage available should there be an accumulation of melted snow and ice indoors?		
<b>Employee Safety</b>		
	<b>YES/NO</b>	<b>COMMENTS</b>
Are employees wearing slip-resistant footwear whenever conditions are wet, icy or snowy? Do you recommend employees wear winter shoes to work and change into dry work shoes once inside the building?		
Do you suggest that employees put an emergency kit in the trunk of their car — especially those who travel for company business? Items to include: flashlight, warm clothes, warm boots, hat, mittens, candles, water, snacks, shovel, jumper cables, ice-melt compound and sand.		
Do you recommend that employees take shorter, choppy steps with toes pointed slightly outward when walking on wet, icy or snow-covered surfaces?		
Do you recommend that employees wear sunglasses when going outdoors on a bright snow-covered days to cut down on glare?		
Do you have a system in place where employees can inform management and maintenance of a slippery area that needs attention?		

# Snow Removal Log



Date	Building/ Location	Time and Employee Initials	Parking Lots	Sidewalks	Exterior Entrances	Steps or Stairway	Comments

Please note that this information may not represent all conditions at your location.

# Sample Incident Report



**Ask how and why until the fundamental cause is found.**

Date of Incident: \_\_\_\_\_ Time \_\_\_\_\_  a.m.  p.m. Location \_\_\_\_\_

Status of person involved:  Visitor  Employee  Other (please describe) \_\_\_\_\_

Name and address of person involved: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Treatment:  None  First Aid  Medical

If medical, where was the person treated: \_\_\_\_\_

Description of incident by person involved. Be specific: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name and address of witness: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Description of incident by witness. Be specific: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Describe nature and extent of apparent injury: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Emergency treatment given (person providing treatment to complete): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was physician called or consulted?  Yes  No Time \_\_\_\_\_  a.m.  p.m.

Name, city and state of physician \_\_\_\_\_

**ATTENTION EMPLOYEE: If medical attention is sought at another time, you must notify your supervisor and/or human resources that you have seen a physician.**

Photos taken of slip/fall area?  Yes  No Time \_\_\_\_\_  a.m.  p.m.

Specify weather conditions at the time of the accident: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Conditions of walking/working surface (e.g., covered in snow/ice, recently plowed, etc.) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_







## Using Ice-Melt Compounds

There are many ways to deal with snow and ice, from plowing and shoveling to scraping and using ice-melting compounds. This document addresses the advantages and disadvantages to the different ice-melting options available.

Keep in mind that the science behind these products is such that simply throwing more ice-melt compound on the ice won't help it melt faster — and will just be a waste of resources. The compound will not dissolve or melt and will simply be dragged into buildings and cars or affect landscaping. Here are some key points to keep in mind:

- Ice-melt compounds are only effective down to specific temperature limits that vary by compound. Know these temperatures, referred to as eutectic temps, and monitor them to ensure effective use of your ice-melt compound. Remember, adding additional ice-melt compound to areas already well-treated will be wasting compound.
- Periodically inspect areas where ice-melt compound has been spread — has the melting action of the compound been reduced as the solution concentration has changed? Should more compound be spread to increase the solution concentration?
- The higher the air temperature, the more effective the melting action of the ice-melt compound. Knowing the outdoor air temperature and the lowest temperature

for effective use of your ice-melt compound should guide you when ice-melt should be applied to walking surfaces and up to what point it will no longer be effective.

- The temperature of the air, pavement, and the type of ice-melt compound used will affect the rate at which the ice melts.

There are many different ice-melt compounds available from traditional rock salt (sodium chloride) to ice-melt pellets (calcium chloride). Each compound has unique properties and costs that should be factored in when determining what ice-melt compound is best for your use.

Both sodium chloride and calcium chloride can be acquired in bulk quantities at relatively low cost. The disadvantage of these compounds is they tend to be corrosive to concrete or steel and can be harmful to vegetation. However, other less-corrosive or toxic compounds tend to be more expensive or may be more difficult to treat needed areas.

### Knowing What to Use

It's important that your organization assess your needs for application of ice-melt compounds. Consider the areas to be covered, access to traffic and sunlight, which improve the effectiveness of ice-melt compounds, methods for treating needed areas and cost. The chart below offers some guidance on materials to consider, as well as pros and cons for each compound.



Type	Uses	Advantages	Disadvantages	Notes
Sodium Chloride (Rock Salt) — NaCl	<ul style="list-style-type: none"> <li>• Plain</li> <li>• Wet with CaCl<sub>2</sub></li> <li>• Wet with NaCl brine</li> </ul>	<ul style="list-style-type: none"> <li>• Low purchase price</li> </ul>	<ul style="list-style-type: none"> <li>• Can be corrosive to concrete, structural steel in bridges and cars</li> <li>• Potentially harmful to roadside vegetation</li> <li>• Can contaminate surface water and drinking water supplies</li> </ul>	<ul style="list-style-type: none"> <li>• Workhorse of de-icing chemicals</li> <li>• Works to 15°F</li> </ul>
Sodium Chloride (Salt), Brine — NaCl	<ul style="list-style-type: none"> <li>• Pre-wetting other chemicals</li> <li>• Anti-icing</li> </ul>	<ul style="list-style-type: none"> <li>• Low purchase price</li> <li>• Little to no residue on pavement</li> <li>• Doesn't draw moisture and leave road wet and slick</li> </ul>	<ul style="list-style-type: none"> <li>• Can be corrosive to concrete, structural steel in bridges and cars</li> <li>• Potentially harmful to roadside vegetation</li> </ul>	<ul style="list-style-type: none"> <li>• Used primarily as pre-wetting and/or anti-icing agent</li> <li>• Works to 15°F</li> </ul>
Calcium Manganese Acetate (CMA) — Ca(O <sub>2</sub> CCH <sub>3</sub> ) <sub>2</sub> Mg(O <sub>2</sub> CCH <sub>3</sub> ) <sub>2</sub>	<ul style="list-style-type: none"> <li>• CMA liquid mixed with salt or sand</li> <li>• Liquid alone</li> </ul>	<ul style="list-style-type: none"> <li>• Less corrosive than salt</li> <li>• Reduces corrosion on steel bridges</li> </ul>	<ul style="list-style-type: none"> <li>• Use twice as much CMA as salt</li> <li>• High concentrations can reduce oxygen levels in streams and lakes</li> <li>• Pavement appears wet</li> </ul>	<ul style="list-style-type: none"> <li>• Best thing going from an environmental standpoint</li> <li>• Works to 15°F</li> </ul>
Magnesium Chloride — MgCl <sub>2</sub>	<ul style="list-style-type: none"> <li>• Sprayed directly on road</li> <li>• Mixed with sand or other de-icers</li> </ul>	<ul style="list-style-type: none"> <li>• Attracts moisture from the air, which hastens dissolving and melting</li> <li>• Does not require post distribution clean-up</li> <li>• Doesn't appear to contribute to air pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Keeps pavement wet if it attracts too much moisture from the air</li> <li>• Cost</li> <li>• Corrosive to metal</li> </ul>	<ul style="list-style-type: none"> <li>• Liquid used as an anti-icing agent when air temperatures exceed 10°F</li> <li>• Can be applied to busy streets and intersections before light snow storms to melt snow as it hits the pavement</li> <li>• Works to -13°F</li> <li>• Costs approximately two times more than salt</li> </ul>

Type	Uses	Advantages	Disadvantages	Notes
Calcium Chloride — $\text{CaCl}_2$	<ul style="list-style-type: none"> <li>Mixed with salt</li> <li>Used to pre-wet salt</li> <li>Straight/alone or in solution</li> </ul>	<ul style="list-style-type: none"> <li>Releases heat when it dissolves</li> <li>Reduces the amount of salt used by 10-15%</li> <li>Attracts moisture so it helps snow melt</li> <li>Less harmful than salt to vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Cost</li> <li>Keeps pavement wet</li> <li>Corrosive to metal</li> <li>Leaves residue harmful to carpet</li> </ul>	<ul style="list-style-type: none"> <li>Can be used to pre-wet salt</li> <li>Sprayed in approximately 32% solution for winter use</li> <li>Must be covered and kept in a dry place</li> <li>Works to <math>-25^\circ\text{F}</math></li> <li>Costs approximately three times more than salt</li> </ul>
Potassium Acetate — $\text{KO}_2\text{CCH}_3$	<ul style="list-style-type: none"> <li>Used as a pre-wetting agent for solids like sand, salt, urea, sand or CMA</li> </ul>	<ul style="list-style-type: none"> <li>Requires fewer applications</li> <li>Performs very well</li> <li>Safer than salt for structural steel and reinforcing steel</li> <li>Noncorrosive and biodegradable</li> </ul>	<ul style="list-style-type: none"> <li>Cost</li> <li>Could cause slickness on pavement</li> <li>Lowers oxygen levels in bodies of water</li> </ul>	<ul style="list-style-type: none"> <li>Liquid works best as a de-icer if applied in narrow bands</li> <li>May be used alone if needed</li> <li>Works to <math>-75^\circ\text{F}</math></li> <li>Costs approximately eight times more than salt</li> </ul>
Carbohydrate-based solution (corn- or beet-based)	<ul style="list-style-type: none"> <li>Liquid typically mixed with <math>\text{MgCl}_2</math> and other salts</li> </ul>	<ul style="list-style-type: none"> <li>Cost</li> <li>No adverse effects on roads and infrastructures</li> <li>Corrosion inhibitor</li> </ul>	<ul style="list-style-type: none"> <li>Some products may have an odor</li> </ul>	<ul style="list-style-type: none"> <li>Liquid is thick</li> <li>Biologically and environmentally safe</li> <li>Contains agricultural by-products</li> </ul>
Sand	<ul style="list-style-type: none"> <li>Provides traction</li> </ul>	<ul style="list-style-type: none"> <li>Cost</li> </ul>	<ul style="list-style-type: none"> <li>Clean-up cost of sediment in storm drains</li> </ul>	<ul style="list-style-type: none"> <li>Some products are available that have a mix of other de-icing materials and sand</li> </ul>

\*Chart adapted with permission from: Technology News, August 1995, Iowa Transportation Center, Iowa State University; Safer De-icing Chemicals - Home Steading, Mother Earth News, December 2003; and the University of Minnesota Extension Service Yard & Garden Brief: Effects of De-icers on Trees and Shrubs.



## Science Behind Ice-Melt

Ice-melting compounds lower the freezing point of water. These products attract moisture to themselves to form a liquid brine solution which can generate heat and melt the ice. The amount of ice that is melted by a given quantity of ice-melt compound will decrease as the temperature of the mixture is lowered. As the ice melts, the compound solution's concentration is reduced and the freezing point of the water starts to increase until such time that more ice-melt compound is spread on the ice and water.

The lowest melting point of the water and ice-melt compound solution is termed the "eutectic" temperature. At this limiting eutectic temperature, solutions of the ice-melt compound aren't effective and the melting action on the ice will cease.

The quantity of ice melt compound needed to lower the freezing point of ice to the eutectic temperature is called the "eutectic concentration." At this lowest temperature, the rate at which ice melts is very slow. When this melting action slows, adding more compound has no impact on lowering the eutectic temperature, thus the ice melts no faster.

### Want to know more?

We're committed to providing unrivaled loss control services and free, useful safety resources. Visit our website to access on-demand training modules, sample safety programs, tip sheets, posters and more!