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Architectural Concrete Solutions

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## DEICERS AND BOMANITE SYSTEMS

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This guide is to provide some basic information about the use of deicing chemicals on Bomanite concrete systems. It is meant to assist in the selection of an appropriate treatment regimen and is not intended to be used as an application guideline for the prevention of ice or snow. In no way does the Bomanite Corporation promote the use of deicing chemicals on concrete nor promote the use of any particular deicing chemical type or brand. Certain deicing chemicals have proven to be better for concrete than other based off third party testing and technical documentation; this guide reflects some of this information. Be sure to thoroughly qualify a deicing program prior to implementation.

While studies are largely inconclusive about how and why deicing chemicals promote scaling of concrete surfaces, it is generally accepted through practical observation that chloride based deicing chemicals such as calcium, sodium and magnesium are detrimental to un-treated architectural concrete surfaces. It may be related to the aggregate type used in the concrete itself or it may be related to the age of the concrete with new concrete being more susceptible to the deterioration than cured concrete. Additionally the time of exposure combined with repeated wetting and drying cycles may contribute to the scaling of the concrete surface.

It is also generally accepted that acetate based deicers such as magnesium acetate are less detrimental to architectural concrete surfaces. While of less "strength" than the chloride deicers, acetate based products are commonly used by facilities such as airports that require a relatively ice free surface while having an interest in protecting their long term investment from deicer damage. The application of acetate deicers may vary somewhat due to their lessened effect on the freezing temperature of water but have found to be viable alternates to the chloride based products.

### **Improving Resistance to Deicing Chemicals**

We do know as fact that the quality of the concrete exposed to deicing chemicals plays a very important role in the resistance of the concrete to scaling caused by deicing chemicals or other environmental factors.

1. A water to cement ratio of .42 or lower (42% water by weight to the cement content of the concrete) promotes a harder, more densely structured concrete surface. Higher water to cement ratios increases the void space in the concrete and weakens the concrete surface. Additionally applying water to the surface of the concrete during the finishing process is another practice that weakens the surface and has a negative effect on surface water to cement content. Admixtures that reduce the amount of water required in the concrete yet keep the concrete fluid and workable or evaporation retarders that slow the surface set are an alternate to using more water in the mix or on the surface.
2. Bomanite Imprinted or Architectural Concrete commonly uses a dry powder product called Bomanite Color Hardener to color the surface of the concrete while improving the concrete's resistance to abrasion and freeze thaw damage. Bomanite Color Hardener is a cement based product that is applied to the surface of plastic concrete lowering the surface water to cement ratio and increasing the density of the concrete surface. This improved density provides improved freeze thaw and scaling resistance as proven out by over 50 years of installations in all climates.

3. Bomanite Concrete is treated with film forming sealer that provides a barrier designed to resist surface applied contaminants. This thin barrier allows moisture in the concrete to escape as vapor while resisting water or water carried contaminants introduced to the top of the concrete surface. This sealer may be one of several in the Bomanite line dependant upon the desired look or environment it is being applied in but all act in this protective manner. Their long term performance is dependant upon their occasional reapplication which should be done as per recommendation by or application of a Bomanite contractor.
4. In some cases the Bomanite system selected is not an Imprinted system or does not allow for the use of Color Hardener as the coloring and surface hardening product. As an example specific systems such as AggreTex or SandScape have the surface removed as part of the finishing process. This removal of the surface greatly improves the resistance to abrasion and freeze thaw damage but will allow more surface introduced contaminants to penetrate the concrete. For these systems the use of Bomanite Conshield is an alternate to Color Hardener. Conshield is a silicate based liquid applied to the concrete surface prior to sealing that reacts and creates crystals in the pores of the concrete which harden the surface and improve the surface density. This improvement in density improves the resistance to surface introduced contaminants.
5. Using sand rather than salt to provide traction and help break up hardened snow is a safe alternate to deicing chemicals. The drawback is that sand is abrasive to the concrete surface and does not melt ice which may promote the use of tools to chip ice from the concrete surface. This practice should be avoided as it can be even more damaging than deicing chemicals. It is recommended that at the very least sand is used on concrete 6 months or less in age so as to allow the concrete to cure more fully prior to being exposed to deicing chemicals.

### **Conclusion**

Architectural Concrete is generally more costly to install than plain broom or swept concrete due to higher labor costs and additional product consumption. The durability of architectural concrete should be no less than that of plain concrete but the expectation of an aesthetically pleasing product would generally promote the idea that it should be maintained and cared for in a more judicious manner than plain concrete. The assessment and selection of a deicing regimen should take both installed cost and long term aesthetics into consideration.

More importantly the selection of a qualified contractor that properly installs the architectural concrete at the correct water to cement ratios will directly affect the concrete's resistance to deicing chemicals. Bomanite contractors are factory trained, certified and have ongoing training programs that educate them on the correct installation of architectural concrete. These contractors will take the following additional steps when installing Bomanite systems to further improve the concrete's resistance to deicing chemicals:

1. Use Color Hardener in all situations possible
2. Seal the surface of the concrete
3. Promote the use of Conshield as a pre-treatment prior to sealing on all surfaces where Color Hardener was not utilized

It is the end users responsibility to fully asses any products applied to the surface of their Bomanite concrete. Consult your Bomanite Franchise Partner for more information on the ongoing care and maintenance of your specific Bomanite system.