GEOMELT® Patented Products
Environmentally Sensitive Alternative

- Winter
  Ice Melt

- Summer
  Dust Control
  Non Chloride
Deicer Parameters
Standard Analysis

- PNS Testing
- Quality Control
- Solids Content
- Corrosiveness
- Biodegradation
- Friction
- Heavy metals
- Chloride content
- Freeze Point
- Effect of Dilution

Watch for Patented product lookalike violators

Watch for over stated marketing claims

Request Documentation-100% ingredient disclosure
Benefits of GEOMELT®

- Natural renewable resource
- Natural corrosion inhibitors
- Biodegradable
- Synergistic with inorganic salts
- Biologically stable
- Reduce Chloride load to environment
Quality Control
Quality Control Program

- Raw Material
  - Each source is qualified

- Product Blending
  - Each blending site is qualified

- Product QC/QA
  - Each lot sampled and retained for one year in GEOMELT® USA laboratory
Quality Control Transportation

- Transporters must be certified.
  - proper permits and documentation
  - approved and practiced QC/QA program
GEOMELT® Liquid Products

- GEOMELT® = Sugar Beet enhancer
- GEOMELT® 65 & 55% solids
- GEOMELT® S = NaCl brine
- GEOMELT® M = MgCl₂ brine
- GEOMELT® C = CaCl₂ brine
- GEOMELT® K = Potassium Acetate
Rock Salt Usage

- Airport Parking  87,500 tons
- Bridges         130,000 tons
- Landscape & Industrial  300,000 tons
- *Highways Canada     4,500,000 tons
- *Highways US DOT      18,000,000 tons
- * City/County streets excluded.
<table>
<thead>
<tr>
<th>Product</th>
<th>lb. chloride/mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid NaCl</td>
<td>400#/LnMile = 240</td>
</tr>
<tr>
<td>NaCl brine</td>
<td>20 gal/LnMile = 28</td>
</tr>
<tr>
<td>MgCl₂ solution</td>
<td>“”</td>
</tr>
<tr>
<td>GEOMELT® S</td>
<td>“”</td>
</tr>
<tr>
<td>GEOMELT® M</td>
<td>“”</td>
</tr>
<tr>
<td>GEOMELT® C</td>
<td>“”</td>
</tr>
</tbody>
</table>
Corrosion - PNS

The graph shows the relative corrosion rate for various substances and conditions, including different types of salts (NaCl, CaCl2, MgCl2) and melt samples (GEOMELT, GEOMELT S, GEOMELT M, GEOMELT C). The y-axis represents the relative corrosion rate, while the x-axis lists the different substances and conditions.
## Comparative Freezing Point Data

<table>
<thead>
<tr>
<th>Deicing Fluid</th>
<th>% Active</th>
<th>Freezing Point (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Chloride</td>
<td>23</td>
<td>-5</td>
</tr>
<tr>
<td>Calcium chloride</td>
<td>28</td>
<td>-60</td>
</tr>
<tr>
<td>Magnesium chloride</td>
<td>22</td>
<td>-27</td>
</tr>
<tr>
<td>GEOMELT®</td>
<td>55</td>
<td>-30</td>
</tr>
<tr>
<td>GEOMELT® S</td>
<td>40</td>
<td>-30</td>
</tr>
<tr>
<td>Potassium Acetate</td>
<td>60</td>
<td>-60</td>
</tr>
</tbody>
</table>

Freeze point not the same as “Ice Melt Capacity.”
Performance Evaluation - Phase Diagram

GEOMELT® S Anti-icing/Deicing Fluid
Phase Diagram

PEGOMELT® anti-icing/deicing products freezing points are based on Analytical Labs, Boise, ID data. The data are useful for comparing anti-icing/deicing performance in a laboratory setting. Actual field observations may differ. This information is presented in good faith but is not warranted as to accuracy of results. Also, freedom from patent infringement is not warranted. This information is offered solely for your investigation, verification, and consideration.

GEOMELT® anti-icing/deicing products are produced under U.S. Patents #6,080,330, #6,416,684, and #6,641,753.

GEOMELT USA Approved 05/01/09
Friction Testing

**Coefficient of Friction**

- **Dry pavement** 1.15
- **Water** 0.75
- **GEOMELT®** 0.66
- **GEOMELT® S** 0.70
- **GEOMELT® M** 0.55
- **GEOMELT® C** 0.69
- **Typical liquid deicers** 0.50
GEOMELT®
Application Techniques

- Salt Pile Treatment - GEOSALT®
- Pre-Wetting
- Liquid Anti-icing
- Liquid Deicing
GEOMELT® 55
Salt Pile Treatment

- Apply to Salt Pile:
  - 5 - 6 gallon per ton of salt
  - spray directly onto pile
  - blend with front end loader
- Apply at Conveyor, Pugmill
- Treated Product Quality Control Important
  - store product on cement or asphalt
  - Store product in storage facility
  - Must at least cover product with tarp
Treated Salt Storage
GEOMELT® 55
Salt Pile Treatment

■ BENEFITS

- Accelerated melting
- Increased ice melt capacity - higher solids
- Reduce bounce and scatter loss
- Use 30% less rock salt – reduce operating cost
- Increase employee efficiency
- Increase equipment efficiency
- Truck / employee can cover 30% more area
- Prevents freezing, crusting – salt free flowing
- Reduced equipment corrosion
- No added chlorides
GEOMELT® S
Enhanced Salt Brine

- GEOMELT® used to enhance salt brine.
- Cuts corrosion by 80%.
- Lowers freezing point to -34 °C (-30 °F)
- Increased ice melt capacity.
- Reduces application rate, increasing employee and equipment efficiency.
- Cuts chloride release into environment.
GEOMELT® Pre - Wetting

Apply at 6-10 gals/ton (21-42 liters/m ton)
Use GEOMELT®55 as is – no chlorides
Or blend GEOMELT®55 with brine(s)
Reduce application rate 30%
Reduce bounce and scatter loss
Improve equipment/employee efficiencies
Why Pretreat?

% Salt Retrieved
from 24 ft. pavement

78% Prewet Salt
46% Dry Salt

9% 12% 9% 12% 4% 30%

Outside 1/3  Center 1/3  Outside 1/3

Source: Michigan Highway Department
Liquid application equipment
GEOMELT® Liquid Anti-icing

- Apply at 20-30 gals / Ln mile (47-71 ltrs / kilometer)
- Apply before storm event to prevent snow and ice bond to pavement
- Reduced application rates 30% - 60% compared to non enhanced brines
- GEOMELT® residual will last 4 – 6 days frost protection – bridges
- Improve employee and equipment efficiencies – cover 30% more territory
- Reduce equipment and infrastructure corrosion
- Reduce chloride load to environment
Latest nozzle designs
After storm event plow and apply 50-60 gals / Ln mile (190-225 ltrs / kilometer)

Allow GEOMELT® S to penetrate – breaking bond to pavement

GEOMELT® enhanced products require less volume to break bond than non-enhanced products reducing corrosion potential and reduce negative environmental impact
Salt Stock Pile Preservation Treatment

- Apply at 5-6 gals/ton (21-25 liters/metric ton)
- Apply at 55% solids no need to dilute with Brines
- Prevents freezing, crusting – salt free flowing
- Prevents hardening over summer
- Will not waste rock salt due to hardening
Benefits of GEOMELT®

- Natural renewable resource
- Natural corrosion inhibitors
- Biodegradable
- Synergistic with inorganic salts
- Biologically stable
- Reduce Chloride load to environment

- danfreeman@snisolutions.com