Phosphates for Processed Cheese Applications

Innophos®
**Phosphates for Today’s Dairy Industry**

Innophos is a leading global producer of specialty phosphate products, offering performance driven ingredients for the dairy industry. With over a century of experience, Innophos produces complex phosphates to the highest standards of quality and consistency demanded by customers worldwide. Our phosphate technologies provide texture, mineral fortification and protein stabilization to a wide variety of dairy products. Our team of experts is ready to assist you with product development.

We’re dedicated to healthy innovation, while keeping an eye on your bottom line.

### Innophos Products

#### Spreadable

<table>
<thead>
<tr>
<th>Product</th>
<th>Creaming/Ion Exchange Effects</th>
<th>pH at 1%</th>
<th>pH Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textur-Melt® WM90</td>
<td>xx/xx</td>
<td>9.0</td>
<td>+0.1/+0.3</td>
</tr>
<tr>
<td>Textur-Melt® NW84</td>
<td>0/xx</td>
<td>8.7</td>
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<tr>
<td>Textur-Melt® MM66</td>
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<td>-0.2/-0.4</td>
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<td>Textur-Melt® MM75</td>
<td>xx/xx</td>
<td>7.6</td>
<td>-0.1/-0.3</td>
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</tbody>
</table>

#### Block

<table>
<thead>
<tr>
<th>Product</th>
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<th>pH Shift</th>
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</thead>
<tbody>
<tr>
<td>Textur-Melt® LM70</td>
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<tr>
<td>Textur-Melt® SS90</td>
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<td>+0.1/+0.2</td>
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<tr>
<td>Textur-Melt® SW90</td>
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<td>9.0</td>
<td>+0.1/+0.3</td>
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<tr>
<td>Textur-Melt® NS71</td>
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<td>-0.1/-0.2</td>
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<tr>
<td>Textur-Melt® NS42</td>
<td>0/xxx</td>
<td>4.3</td>
<td>-0.4/-0.6</td>
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</tbody>
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#### Sliced for Toasts and Blocks

<table>
<thead>
<tr>
<th>Product</th>
<th>Creaming/Ion Exchange Effects</th>
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<th>pH Shift</th>
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<tbody>
<tr>
<td>Textur-Melt® NW81</td>
<td>0/x</td>
<td>8.1</td>
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<tr>
<td>Textur-Melt® NM69</td>
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<td>6.9</td>
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<tr>
<td>Textur-Melt® MW12</td>
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<td>Textur-Melt® MM80</td>
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</tbody>
</table>

#### Correction

<table>
<thead>
<tr>
<th>Product</th>
<th>Creaming/Ion Exchange Effects</th>
<th>pH at 1%</th>
<th>pH Shift</th>
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</thead>
<tbody>
<tr>
<td>Textur-Melt® NN12</td>
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</table>

#### Low Sodium

<table>
<thead>
<tr>
<th>Product</th>
<th>Creaming/Ion Exchange Effects</th>
<th>pH at 1%</th>
<th>pH Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textur-Melt® LS50</td>
<td>0/x</td>
<td>9.1</td>
<td>+0.2/+0.4</td>
</tr>
</tbody>
</table>

*x = Creaming Effect/y = Ion Exchange Effect (No effect = N, Weak = W, Medium = M, Strong = S) (Two digit value)*

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**Key Benefits of Phosphates in Dairy Applications**

- **Protein Stabilization**

- **Antioxidation**
  - Pyrophosphates are very effective in Iron and Copper chelation. They are essential for flavor, oil, color and stability over time.

- **Buffering**
  - pH optimization is essential in milk products. Orthophosphates serve as buffers to maintain required pH.

- **Emulsification**
  - Phosphates open up proteins, permitting emulsification.

- **Sequestration**
  - Polyphosphates obtain antimicrobial actions by chelation of Calcium and Magnesium ions, required by microorganisms to survive.

- **Mineral Enrichment**
  - Calcium, Potassium and Magnesium phosphate ranges are suitable for fortification.

- **Gelation**
  - Pyrophosphates are used to aid gelation in dairy desserts.
Offering the right phosphates for processed cheese

Through a typical method of making process cheese where heat and shear are involved, phosphates contribute a number of important functionalities to all process cheese applications:

- Regulating pH for optimum body and texture
- Enhancing the solubility of casein (casein peptization) in water, a phenomenon known as ion exchange capability
- Effect in decreasing cross-linking of caseins, which is also known as the creaming effect
- Beneficial improvement in bone mineralization and bone strength

<table>
<thead>
<tr>
<th></th>
<th>Buffer agent</th>
<th>Sequestering ion exchange</th>
<th>Emulsifying creaming reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthophosphates</td>
<td>❌❌</td>
<td></td>
<td>0</td>
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<tr>
<td>Pyrophosphates</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Polyphosphates</td>
<td></td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>

The longer the chain, the lower the buffering capability and the higher the ion exchange capability.

Textur-Melt® Blends Functionality in Process Cheese

- **Creaming Effect**
  - Strong
  - Medium
  - Low
  - No Effect

- **Ion Exchange Capability**
  - No Effect
  - Low
  - Medium
  - Strong
The Innophos Difference

Innophos offers a complete range of phosphates for your dairy applications. From protein stabilization to mineral enrichments, phosphates play an important role in the dairy industry.

Reduce Sodium - Keep the Taste

TEXTUR-MELT® LS-50

This low sodium specialty phosphate blend contains a balanced mixture of potassium and sodium phosphates to achieve good physical properties and flavor in reduced sodium American cheese, processed cheese food and other dairy products.

Features and Benefits

- 50% Less sodium than standard phosphates
- Excellent emulsifying properties
- Good flavor profile

Innophos has the right ingredients for your dairy applications

Innophos offers a complete range of phosphates for your dairy applications. From protein stabilization to mineral enrichments, phosphates play an important role in the dairy industry.

Ingredients for Life™

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