MOLSIV® ADSORBENT Type 3A

Description

MOLSIV® ADSORBENT Type 3A, the potassium form of the Type A Crystal structure, is an alkali metal alumino-silicate. Type 3A will adsorb molecules with critical diameters up to 3 angstroms.

Applications

Type 3A is the preferred Molecular Sieve adsorbent for the commercial dehydration of unsaturated hydrocarbon streams such as cracked gas, propylene, butadiene, and acetylene. It is also used for drying polar liquids such as ethanol.

The small pore size of Type 3A prevents coadsorption of hydrocarbons by excluding all other molecules while adsorbing water.

Chemical Formula

$K\cdot[(AlO_2)_{1.6}(SiO_2)_{1.2}] \cdot xH_2O$

Regeneration

MOLSIV® ADSORBENT Type 3A can be regenerated for re-use by heating with simultaneous purge, or by evacuation. The degree of regeneration (water removal) is dependent on the temperature and humidity of the purge gas.

Shipping Information

MOLSIV® ADSORBENT Type 3A is available as powder, 1/16-in. and 1/8-in. pellets. It is shipped in non-returnable steel containers.

<table>
<thead>
<tr>
<th>Container Size</th>
<th>Net Weight in lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pellets</td>
</tr>
<tr>
<td>1 gal.</td>
<td>5</td>
</tr>
<tr>
<td>10 gals.</td>
<td>50</td>
</tr>
<tr>
<td>22 gals.</td>
<td>–</td>
</tr>
<tr>
<td>55 gals.</td>
<td>300</td>
</tr>
</tbody>
</table>

Typical Properties

<table>
<thead>
<tr>
<th></th>
<th>1/16&quot; Pellets</th>
<th>1/8&quot; Pellets</th>
<th>Powder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Pore Diameter</td>
<td>3 Angstroms</td>
<td>3 Angstroms</td>
<td>3 Angstroms</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>40 lb/ft³</td>
<td>40 lb/ft³</td>
<td>2.03 g/cc</td>
</tr>
<tr>
<td>Hydrated Wet Density</td>
<td>–</td>
<td>–</td>
<td>1.57 g/cc</td>
</tr>
<tr>
<td>Activated Dry Density</td>
<td>–</td>
<td>–</td>
<td>&lt;10 microns*</td>
</tr>
<tr>
<td>Particle Diameter</td>
<td>0.0575 in.</td>
<td>0.115 in.</td>
<td>–</td>
</tr>
<tr>
<td>to 0.0775 in.</td>
<td>to 0.135 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crush Strength</td>
<td>5.0 lbs</td>
<td>12.0 lbs</td>
<td>–</td>
</tr>
<tr>
<td>Crystal Structure</td>
<td>–</td>
<td>–</td>
<td>Cubic</td>
</tr>
<tr>
<td>Heat of Adsorption (max.)</td>
<td>1800 btu/lb H₂O</td>
<td>1800 btu/lb H₂O</td>
<td>1800 btu/lb H₂O</td>
</tr>
<tr>
<td>Equilibrium H₂O Capacity**</td>
<td>20% wt</td>
<td>20% wt</td>
<td>23% wt</td>
</tr>
<tr>
<td>Water Content (as shipped)</td>
<td>&lt;1.5% wt</td>
<td>&lt;1.5% wt</td>
<td>&lt;2.5% wt</td>
</tr>
<tr>
<td>Molecules Adsorbed</td>
<td></td>
<td>Molecules with an effective diameter &lt; 3 angstroms, e.g., water</td>
<td></td>
</tr>
<tr>
<td>Molecules Excluded</td>
<td></td>
<td>Molecules with an effective diameter &gt; 3 angstroms, e.g., ethane</td>
<td></td>
</tr>
</tbody>
</table>

*Agglomerate particle size. Average crystal size is 1.0 to 4.0 microns.
**Lbs H₂O/100 lbs activated adsorbent at 17.5 mm Hg, 25°C.
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