Polymer Modification (Hydrophobic)
INTRODUCTION

Thermoplastic polymers such as Polyamides (Nylon), Polymide, and Polylefins find use in a variety of applications, ranging from fibers to films or membranes, to engineering plastics. These polymers generally have good properties, which make them suitable for these applications. However, several characteristics such as flexibility, low temperature properties, and elasticity can be improved through modification with ELASTAMINE® Polyetheramines. ELASTAMINE® Polyetheramines are a new and unique product range of specialty amines.

FEATURES

- Flexible polyether backbone
- Mono-, di-, or tri- functionality amines
- Low viscosity, essentially colorless, low vapor pressure
- High alcohol to amine conversion
- ELASTAMINE® Polyetheramines chosen for such application are made hydrophobic with (PPG, PTMEG) backbone.
- ELASTAMINE® Polyetheramines can be highly reactive as a result of the presence of unhindered amine end groups. Benefits are shorter polymer production cycles, improved color and mechanical properties.

APPLICATIONS

(A) Use In Polyamide Plastics And Fibers

ELASTAMINE® Polyetheramines with PPG/PTMEG backbone can be used to improve mechanical properties of polyamide. One of the typical applications in which ELASTAMINE® Polyetheramines react with diacid, lactam to increase flexibility and elasticity of Polyamide for improving the low temperature properties and Impact strength due to the incorporation of PPG/PTMEG blocks.

![Graph showing strain and stress comparison between modified and unmodified PA6](image)

Addition of 30% ELASTAMINE® Polyetheramine greatly increases elasticity

Benefits

- Increased elasticity and flexibility, also at low temperatures
- Improved Impact strength
- Improved hydrolysis resistance
- Improved compatibility with other elastomers.
- Improved processability
(B) Polyimide Plastics And Films

There are various applications and inventions available where ELASTAMINE® Polyetheramines are used alone or in combination with aromatic ether diamine or other diamines in copolymerization with dianhydride to improve the flexibility and processability of Polyimide due to the presence of polyether backbone.

Benefits

- Increased elasticity and flexibility

### PRODUCT RANGE

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Backbone</th>
<th>Approx molecular weight</th>
<th>Colour, Pt-Co</th>
<th>Water, wt%</th>
<th>Viscosity, cSt</th>
<th>AHEW (Amine Hydrogen Equivalent Weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP-409</td>
<td>PPG-based diamines</td>
<td>400</td>
<td>25 max</td>
<td>0.25 max</td>
<td>22 (25°C)</td>
<td>110</td>
</tr>
<tr>
<td>RP-2009</td>
<td>PPG-based diamines</td>
<td>2,000</td>
<td>30 max</td>
<td>0.25 max</td>
<td>248 (25°C)</td>
<td>500</td>
</tr>
<tr>
<td>RT-1000</td>
<td>PTMEG (mostly) / PPG-based diamines</td>
<td>1,000</td>
<td>40 max</td>
<td>0.40 max</td>
<td>121 (40°C)</td>
<td>260</td>
</tr>
<tr>
<td>HT-1700</td>
<td>PTMEG-based diamines / triamines</td>
<td>1,700</td>
<td>20 max</td>
<td>0.25 max</td>
<td>936 (38°C)</td>
<td>380</td>
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<tr>
<td>RP3-500</td>
<td>PPG-based triamines</td>
<td>5,000</td>
<td>75 max</td>
<td>0.25 max</td>
<td>819 (25°C)</td>
<td>950</td>
</tr>
</tbody>
</table>

* Properties are for reference only. Please approach Huntsman Corporation for actual specifications.
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