Ethylene Oxide Derivatives

Chemicals Committee Meeting at APIC 2012
Kuala Lumpur, 18 May 2012

John Hodgkinson, Tecnon OrbiChem
<table>
<thead>
<tr>
<th>Name</th>
<th>End-Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEG/DEG/TEG - Glycols</td>
<td>Various Uses, mainly in Polyester Fibre, Film &amp; Resin</td>
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<tr>
<td>Ethoxylated Surfactants</td>
<td>Fatty Alcohol, Fatty Acid, Alkyl-/Nonyl- Phenols</td>
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<tr>
<td>Ethanolamines</td>
<td>Ethyleneamines, Detergents, Personal Care Products, Gas Treatment, Metal Working, Cement Grinding</td>
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<tr>
<td>Ethylene Glycol Ethers</td>
<td>Solvent formulations for paints, inks, cleaning fluids</td>
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<tr>
<td>Polyols</td>
<td>Polyurethane Polymers</td>
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<tr>
<td>Polyethylene Glycols (PEGs)</td>
<td>Medical Uses, Coatings, Solvents</td>
</tr>
<tr>
<td>Polyalkylene Glycols (PAGs)</td>
<td>Lubricants, Metal Working, Industrial Oils</td>
</tr>
<tr>
<td>Hydroxyethyl Cellulose</td>
<td>Gelling/Thickening Agent in paints and inks</td>
</tr>
<tr>
<td>Choline Chloride</td>
<td>Animal Feed Supplement</td>
</tr>
<tr>
<td>Ethylene Carbonate</td>
<td>Cross-linking Agent for Super-Absorber Polymers</td>
</tr>
</tbody>
</table>

Source: Tecnon OrbiChem
Glycols 65%
Polyols 3%
PEGs 1%
Glycol Ethers 5%
Ethoxylates 16%
Ethanolamines 7%
Others 3%

1990 Total
7.5 Million Tons

Glycols 76%
Polyols 2%
PEGs 1%
Glycol Ethers 3%
Ethanolamines 7%
Others 1%

2011 Total
21.6 Million Tons

Source: Tecnon OrbiChem
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EO USE IN NON-GLYCOL EO DERIVATIVES - 1990

1990 Total
2.6 Million Tons

2011 Total
5.2 Million Tons

Source: Tecnon OrbiChem
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EO USE IN NON-GLYCOL EO DERIVATIVES - USA

Source: Tecnon OrbiChem
APIC 2012
EO USE IN NON-GLYCOL EO DERIVATIVES - EUROPE

Source: Tecnon OrbiChem
APIC 2012
EO USE IN NON-GLYCOL EO DERIVATIVES - JAPAN

Source: Tecnon OrbiChem
Source: Tecnon OrbiChem
APIC 2012
EO USE IN NON GLYCOL EO DERIVATIVES - ASIA EXCLUDING CHINA & JAPAN

1,000 Metric Tons

Source: Tecnon OrbiChem
APIC 2012
ASIAN ETHOXYLATES CAPACITIES 2012

Total 1.3 Million Tons

Source: Tecnon OrbiChem
APIC 2012
ASIAN ETHANOLAMINES CAPACITIES 2012

Total 0.8 Million Tons

Source: Tecnon OrbiChem
APIC 2012
ETHOXYLATEDS PRODUCERS NEED - ‘SOAPERS’

Source: Tecnon OrbiChem
APIC 2012

ASIAN MEG vs. US & WE & EO PRICES 1990-2012

$/ton

Source: Tecnon OrbiChem
APIC 2012

ASIAN MEG vs. US & WE & EO PRICES 2010-2012

Source: Tecnon OrbiChem
APIC 2012
ASIA MEG vs. US & WE EO PRICES 1990-2012

Source: Tecnon OrbiChem
APIC 2012
ASIA MEG vs. US & WE EO PRICES 2010-2012

$/ton

United States EO net
Europe EO net
Asia Spot
MEG as EO exw

Source: Tecnon OrbiChem
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