Thermoset Materials

PL ET 350

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Polymer Materials

- Thermoset
- Melamine
- Urea
- Phenolic
- Polyester
- Vinyl Ester

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Polymer Materials

- Forms of Thermoset Materials - Filled
  - SMC - Sheet Molding Composite (Compound)
  - TMC - Thick-Sheet Molding Composite
  - BMC - Bulk Molding Composite
  - Granular
  - Preform (Compacted Granular)

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Melamine (Amino)

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Melamine

- Major Uses
  - Molded Dinnerware
  - Electric Shaver Housings
  - Buttons
  - Ashtrays
  - Connector Bodies

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Melamine

- Why would you want to use it?
  - High Surface Hardness
  - Good Heat Resistance
  - Good Flame Resistance
  - Resists Chipping and Breaking
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Melamine

- Processes
  - Compression/Transfer Molding
  - Injection Molding

Slide 8

Melamine (Alpha Cellulose)

<table>
<thead>
<tr>
<th>Property</th>
<th>Low</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>1.500</td>
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<tr>
<td>Price</td>
<td>0.90</td>
<td>0.94</td>
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</tr>
<tr>
<td>Flexural Modulus</td>
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<td>ksi</td>
</tr>
<tr>
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<tr>
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Melamine

- Material Suppliers
  - American Cyanamid
  - BIP
  - Bud Co.
Slide 10

Urea (Amino)

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Slide 11

Urea

- Major Uses
  - Control Housings
  - Wiring Devices
  - Control Buttons
  - Knobs

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Urea

- Why would you want to use it?
  - High Surface Hardness
  - Good Heat Resistance
  - Good Flame Resistance
  - Resists Chipping and Breaking
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Urea

- Processes
  - Compression/Transfer Molding
  - Injection Molding

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Urea (Alpha Cellulose)

<table>
<thead>
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Urea

- Material Suppliers
  - American Cyanamid
  - BIP
  - Bud Co.

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Slide 16

Phenolic

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Slide 17

- Major Uses
  - Electrical Products
  - Connectors
  - Ashtrays
  - Utensil Handles
  - Electric Motor Components
  - Knobs

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Slide 18

- Why would you want to use it?
  - Good Heat Resistance
  - Good Flame Resistance
  - Good Rigidity
  - Good Creep Resistance

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Slide 19

Phenolic

- Processes
  - Compression/Transfer Molding
  - Injection Molding

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Phenolic (Wood Flour)

<table>
<thead>
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<th>Property</th>
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<th>High</th>
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</thead>
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Phenolic

- Material Suppliers
  - Amoco Electronic
  - Rogers
  - Plenca
Slide 22

Polyester

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Slide 23

Polyester

- Major Uses
  - Boats
  - Automotive Body Panels
  - Ladders
  - Appliance Covers
  - Bathtub Enclosures
  - Bowling Balls

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Polyester

- Why would you want to use it?
  - Good Heat Resistance
  - Good Rigidity
  - Good Creep Resistance
Slide 25

Polyester

- Processes
  - Hand Lay-Up
  - Compression/Transfer Molding
  - Injection Molding

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Polyester (Glass Fiber)

<table>
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Polyester

- Material Suppliers
  - Premix
  - Glastic
  - Reichold
Slide 28

Vinylester

Slide 29

Vinylester

- Major Uses
  - Pipe
  - Electrical Equipment
  - Grating
  - Exhaust Stacks
  - Washer Drums
  - Chemical Tanks

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Vinylester

- Why would you want to use it?
  - Good Heat Resistance
  - Excellent Bonding to Fibers
  - Good Chemical Resistance
  - Good Rigidity
  - Good Creep Resistance
Slide 31

Vinylester

- Processes
  - Hand Lay-Up
  - Compression/Transfer Molding
  - Injection Molding

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Slide 32

Vinylester (15% Glass Fiber)

<table>
<thead>
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<th>High</th>
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<tr>
<td>Tg</td>
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<td>°F</td>
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Slide 33

Vinylester

- Material Suppliers
  - Premix
  - Glastic
  - Reichold

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