Continuous Fiber Reinforced Composites for Wood Reinforcement
Reduce manufacturing costs and improve strength, durability, and performance

PRODUCT AND PROCESS DESCRIPTION
Continuous fiberglass reinforced PETG unidirectional tapes and multi-ply laminates, thermally bonded to wood substrates add strength, durability, and performance to a variety of applications.

Adhesion via thermal lamination can be achieved through primary and secondary processes including:
- Lab-scale thermoforming
- Commercial static press
- Continuous belt press
- Roll lamination

With flexible processing parameters:
- Time: < 0.5 to 8.0 minutes
- Temperature: 250–300°F (121–150°C)
- Pressure: 100–250 psi

Continuous fiberglass reinforced PETG tape from PolyOne has a Class A flame-spread rating in accordance with ASTM E84 guidance.
VALUE TO MANUFACTURERS

Improved mechanical properties
• Added stiffness and strength, improved nail retention/resistance

Reduced cost and weight
• Less material required to achieve desired performance
• Lower raw material costs; reduced scrap and shipping costs

Increased design freedom
• Thinner profiles, longer spans, better moisture resistance, paintability/printability

APPLICATIONS
Plywood, oriented strand board (OSB), and particle board used in:
• upholstered furniture frames
• shelving
• cabinetry
• desktops, tables, and chairs

RAW MATERIAL VS. REINFORCED
Documented improvement in stiffness (modulus of elasticity - MOE) and strength (modulus of rupture - MOR) to OSB, plywood and particle board.
Raw material was tested with one and two layers of unidirectional tape (UDT) reinforcement.

<table>
<thead>
<tr>
<th>RAW MATERIAL</th>
<th>MOE Wood (psi)</th>
<th>MOR Wood (psi)</th>
<th>1 Layer</th>
<th>2 Layer</th>
<th>1 Layer</th>
<th>2 Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thick (in)</td>
<td>MOE Wood (psi)</td>
<td>MOR Wood (psi)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSB 0.4375</td>
<td>18%</td>
<td>41%</td>
<td>20%</td>
<td>41%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSB 0.75</td>
<td>6%</td>
<td>21%</td>
<td>31%</td>
<td>45%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plywood 0.5</td>
<td>15%</td>
<td>—</td>
<td>49%</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plywood 0.75</td>
<td>15%</td>
<td>—</td>
<td>92%</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plywood 1.1</td>
<td>6%</td>
<td>16%</td>
<td>32%</td>
<td>54%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Particle Board 0.75</td>
<td>40%</td>
<td>66%</td>
<td>194%</td>
<td>250%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data provided by Eastman Chemical Company
PERFORMANCE IMPROVEMENT

Adding composite reinforcement can enhance fitness for use properties and performance.

* Wood control data ranges sourced from the Wood Handbook
** Based on experimental data and nominal ¼" panel thickness

Data provided by Eastman Chemical Company