Back-End Test & Electronic Fixturing Solutions

Worlds’ broadest portfolio of polymer solutions for use in IC Chip test & fixturing applications

Applications: Burn-In, Test Sockets & Electronic Fixturing

**Standard Materials**
- Semitron® MDS 100
- Semitron® MP 370
- Duratron® T4203 PAI
- Duratron® T5030 PAI
- Ketron® 1000 PEEK
- Duratron® U1000 PEI
- Kyron® EPM-2204
- Kyron® GC-100

**Electrostatic Dissipative Materials**
- Semitron® ESd 520HR PAI (A)
- Semitron® ESd 490HR PEEK (A)
- Semitron® ESd HPV PEEK (D)
- Semitron® ESd 480 PEEK (D)
- Semitron® ESd 420V PEI (D)
- Semitron® ESd 420 PEI (D)
- Semitron® ESd 410C PEI (C)
- Semitron® ESd 300 PET (D)
- Semitron® ESd 225 POM (D)
- Semitron® ESd POM CNT (D)

A = Anti-Static
D = Static Dissipative
C = Conductive
General Trends

Driven by the miniaturization of IC devices, the Back-End Test industry is pushing material science to the brink of polymeric capability. The smaller IC device requires thinner cross sections, thinner cross sections then require stiffer materials to withstand the testing parameters. The challenge is to offer increased stiffness while maintaining the machinability of the decreasing features such as hole size and pitch.

Test Socket Trends
- Increased I/O Count
- Reduction in Hole & Pitch Size
- Thinner Cross Sections

Mitsubishi Chemical Advanced Materials’ proprietary material technologies are opening the doors to new design advancements.

Critical Properties

In order to deliver a functional test socket under the changing conditions described, the engineer must pay particular attention to the most critical properties that effect the machinability and the stability of the test socket.

Flexural Modulus
Critical for managing the robustness of the finished socket under test conditions

Tensile Elongation
Critical for controlling the accuracy of holes during machining

CLTE
Critical for providing dimensional stability over a varied temperature range during usage

Polymer Melting Point
Critical for clean thru holes during drilling

Moisture Absorption
Critical for maintaining dimensional stability
Test Socket Material Selection Grid
Polymeric Stability vs. Machinability of Fine Features

<table>
<thead>
<tr>
<th>Socket Type</th>
<th>Basic</th>
<th>Challenging</th>
<th>Demanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole Size</td>
<td>&gt;0.4 mm</td>
<td>0.2-0.35 mm</td>
<td>&lt;0.18 mm</td>
</tr>
<tr>
<td>Pitch Size</td>
<td>&gt;0.6 mm</td>
<td>0.25-0.5 mm</td>
<td>&lt;0.25 mm</td>
</tr>
</tbody>
</table>

Featured Products/Materials

**Kyron® GC-100**
- Non fiber filled ultra-stiff polymer delivering exceptional dimensional stability
- Developed to complement Semitron® MDS-100 with thicker cross sections (6mm, 9mm, & 12mm)
- Low CTE provides stability over a wide range of test conditions
- Injection molded plate provides a low-cost alternative to expensive polyimides
- Low tensile elongation allows for increased accuracy in hole placement

**Semitron® MDS 100**
- Highest flexural modulus non fiber filled product
- Extremely low CLTE translates to excellent dimensional stability
- Available in thin cross sections ranging from 1mm to 6mm thick
- Very low moisture absorption allowing for excellent dimensional stability
- Excellent machinability for fine features

The key components in next generation socket design
ESd Performance vs. Temperature

<table>
<thead>
<tr>
<th>Material</th>
<th>Conductive Range</th>
<th>Dissipative Range</th>
<th>Anti-Static Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ketron® CA30 PEEK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semitron® ESd 410C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500°F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400°F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical Properties</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>grey white grey tan mustard dark brown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tensile Modulus (psi)</td>
<td>D638</td>
<td>640,000</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Flexural Modulus (psi)</td>
<td>D790</td>
<td>625,000</td>
<td>1,420,000</td>
</tr>
<tr>
<td>Tensile Elongation (%)</td>
<td>D638</td>
<td>3.0</td>
<td>1.5</td>
</tr>
<tr>
<td>CLTE (in./in./°F X 10⁻⁵)</td>
<td>E-831 (TMA)</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Moisture Absorption 24hrs @73°F (%)</td>
<td>D570⁸⁶</td>
<td>0.11</td>
<td>0.10</td>
</tr>
<tr>
<td><strong>Thermal Prop.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tg Glass Transition (°F)</td>
<td>D3418</td>
<td>320</td>
<td>-</td>
</tr>
<tr>
<td>Heat Deflection Temperature @264psi (°F)</td>
<td>D648</td>
<td>300</td>
<td>410</td>
</tr>
<tr>
<td><strong>Electrical Properties</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dielectric Constant, 10⁶ Hz</td>
<td>D150</td>
<td>4.13</td>
<td>3.37</td>
</tr>
<tr>
<td>Dissipation Factor, 10⁶ Hz</td>
<td>D150</td>
<td>0.004</td>
<td>0.007</td>
</tr>
<tr>
<td>Surface Resistivity Ω/sq.</td>
<td>ANSI/ESd STM 11.11</td>
<td>&gt;10¹⁵</td>
<td>&gt;10¹⁵</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>D149</td>
<td>376</td>
<td>-</td>
</tr>
</tbody>
</table>

(1) Specimens: 1/8” thick x 2” diameter or square.