LOW PRESSURE MOLDING SOLUTIONS

ENCAPSULATE AND PROTECT YOUR ELECTRONICS IN THREE SIMPLE STEPS
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INTRODUCTION

LOW PRESSURE MOLDING

Henkel’s TECHNOMELT® low pressure molding materials are a single-material solution that delivers a simple, streamlined and low-cost alternative to multi-step, multi-material PCB protection methods. A three-step process where parts are inserted into the moldset, molded and tested, low pressure molding eliminates messy two-part material mixing routines, device preparation (masking), long cure times and material waste.

What’s more, these re-workable thermoplastic materials provide impressive device protections against temperature, vibration, impact, moisture, chemicals and mechanical stress. Sustainable and cost-effective, low pressure molding with TECHNOMELT has been proven to reduce PCB protection costs by as much as 30% compared to potting, conformal coating and sealing methods.
LOW PRESSURE MOLDING PROCESS

Cost reduction and streamlined processing are among the TECHNOMELT® product’s most significant benefits. Compared to conventional potting techniques which require multiple steps, TECHNOMELT simplifies encapsulation into only three: insert, mold and test. Simplicity and processing speed equate to lower costs.

SIMPLIFY THE TRADITIONAL POTTING PROCESS

MOLD INSERT MOLD HOUSING ASSEMBLE PARTS PREHEAT PARTS DISPENSE VACUUM OR SETTLE CURE TEST

No housing required. Insert parts directly into moldset. Process step eliminated. 30 sec. – 2 min. encapsulation process. Process step eliminated. Thermoplastic material does not require cure. Parts handled immediately after molding.

CIRCUIT BOARD PROTECTION TECHNOLOGY COMPARISON

<table>
<thead>
<tr>
<th>Traditional CBP Materials</th>
<th>Material Challenges</th>
<th>TECHNOMELT Low Pressure Molding Solutions</th>
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</thead>
<tbody>
<tr>
<td>Potting</td>
<td>Two-part systems; mixing required</td>
<td>One part; no mixing</td>
</tr>
<tr>
<td></td>
<td>Non-reworkable</td>
<td>Reworkable</td>
</tr>
<tr>
<td></td>
<td>Large equipment investment and footprint</td>
<td>Weight reduction</td>
</tr>
<tr>
<td></td>
<td>24 – 72 hours cure schedule</td>
<td>Low waste</td>
</tr>
<tr>
<td></td>
<td>Up to 8 process steps</td>
<td>30 sec. – 2 min. cycle times</td>
</tr>
<tr>
<td></td>
<td>5 – 7 BOM part numbers in inventory</td>
<td>Strain relief</td>
</tr>
<tr>
<td></td>
<td>Strain relief</td>
<td>Green technology; no VOC</td>
</tr>
<tr>
<td></td>
<td>Thermoplastic material does not require cure</td>
<td>Parts handled immediately after molding.</td>
</tr>
<tr>
<td>Sealing</td>
<td>Limited by housing dimensions; space constraints</td>
<td>No housing; fewer part numbers</td>
</tr>
<tr>
<td></td>
<td>48 – 72 hours cure schedule</td>
<td>Only 3 process steps</td>
</tr>
<tr>
<td></td>
<td>Up to 6 process steps</td>
<td>Improved aesthetic appearance; skylining</td>
</tr>
<tr>
<td></td>
<td>5 – 7 BOM part numbers in inventory</td>
<td>Only 1 BOM part number required</td>
</tr>
<tr>
<td></td>
<td>Improved aesthetic appearance; skylining</td>
<td>In-line and high-volume processing</td>
</tr>
<tr>
<td>Conformal Coating</td>
<td>Very limited mechanical strength</td>
<td>No cure</td>
</tr>
<tr>
<td></td>
<td>4 – 12 hours cure schedule</td>
<td>Temperature, vibration, impact and chemical resistance</td>
</tr>
<tr>
<td></td>
<td>Up to 8 process steps</td>
<td>Watertight encapsulation</td>
</tr>
<tr>
<td></td>
<td>3 – 4 BOM part numbers in inventory</td>
<td>Good mechanical strength</td>
</tr>
<tr>
<td></td>
<td>No cure</td>
<td>Translucent materials available for optical inspection</td>
</tr>
</tbody>
</table>
PRODUCT PORTFOLIO

PCB PROTECTION

LOW PRESSURE MOLDING

Excellent Adhesion

Amber

TECHNOMELT PA 633
TECHNOMELT PA 652

TECHNOMELT PA 653
TECHNOMELT PA 6208 N

Black

TECHNOMELT PA 638
TECHNOMELT PA 657

TECHNOMELT PA 658
TECHNOMELT PA 6208 N BLACK

Amber

TECHNOMELT PA 673
TECHNOMELT PA 682

TECHNOMELT PA 678
TECHNOMELT PA 687

Black

Solvent Resistant

TECHNOMELT PA 641

TECHNOMELT PA 646

Increased Hardness

Amber

TECHNOMELT PA 641

TECHNOMELT PA 646

Black

Solvent Resistant

Amber

TECHNOMELT PA 2584

TECHNOMELT PA 6344

Black

TECHNOMELT PA 6344

TECHNOMELT PA 6481

UV Resistant

Transparent

TECHNOMELT PA 668 CLEAR

TESCHNOMELT AS 8998

Dispensable

Peelable Mask

Translucent Yellow

Amber

TECHNOMELT PA 673
TECHNOMELT PA 682

TECHNOMELT PA 678
TECHNOMELT PA 687

Black

TECHNOMELT PA 2584

TECHNOMELT PA 6344

TECHNOMELT PA 6481

Transparent

TECHNOMELT PA 668 CLEAR

TECHNOMELT AS 8998
## TECHNOMELT® LOW PRESSURE MOLDING PRODUCTS

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>DESCRIPTION</th>
<th>COLOR</th>
<th>PERFORMANCE TEMPERATURE</th>
<th>SHORE HARDNESS</th>
<th>APPLICATION TEMPERATURE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excellent Adhesion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT PA 633</td>
<td>High-performance thermoplastic polyamide with moderate strength and good adhesion for in-cabin and under-hood applications.</td>
<td>Amber</td>
<td>-40°C to 125°C</td>
<td>90A</td>
<td>200°C – 240°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 638</td>
<td></td>
<td>Black</td>
<td>-40°C to 125°C</td>
<td>90A</td>
<td>200°C – 240°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 652</td>
<td>Moldable polyamide, where excellent adhesion and cold-temperature flexibility are important, such as in an automotive exterior. Also used extensively in white goods.</td>
<td>Amber</td>
<td>-40°C to 100°C</td>
<td>77A</td>
<td>180°C – 230°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 657</td>
<td></td>
<td>Black</td>
<td>-40°C to 100°C</td>
<td>77A</td>
<td>180°C – 230°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 658</td>
<td>Moldable polyamide with excellent adhesion to plastic substrates. It is designed for improved performance where prolonged exposure to moisture and harsh environments is expected.</td>
<td>Amber</td>
<td>-40°C to 100°C</td>
<td>77A</td>
<td>180°C – 230°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 6208 N BLACK</td>
<td>Moldable polyamide with excellent adhesion to tough substrates. Great flexibility offers incredible strain relief on cables and wires. Ideal for encapsulation of heat-producing components in appliances and consumer electronics.</td>
<td>Amber</td>
<td>-40°C to 100°C</td>
<td>82A</td>
<td>180°C – 230°C</td>
</tr>
<tr>
<td><strong>High-Temperature Resistant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT PA 673</td>
<td>Moldable polyamide with good adhesion for high-temperature applications, such as in an automotive under-hood.</td>
<td>Amber</td>
<td>-40°C to 140°C</td>
<td>88A</td>
<td>210°C – 240°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 678</td>
<td></td>
<td>Black</td>
<td>-40°C to 140°C</td>
<td>88A</td>
<td>210°C – 240°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 682</td>
<td>Moldable polyamide for the most demanding high-humidity applications, such as for automobile tire pressure sensors. Formulated for very low water vapor transmission.</td>
<td>Amber</td>
<td>-40°C to 140°C</td>
<td>88A</td>
<td>225°C – 235°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 687</td>
<td></td>
<td>Black</td>
<td>-40°C to 140°C</td>
<td>88A</td>
<td>225°C – 235°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 2692</td>
<td>Designed for excellent heat resistance and good oil resistance. This material is also hard and has a very low moisture sensitivity.</td>
<td>Amber</td>
<td>-40°C to 175°C</td>
<td>57D</td>
<td>240°C – 270°C</td>
</tr>
<tr>
<td><strong>Increased Hardness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT PA 641</td>
<td>Moldable polyamide, where strength and hardness are needed, such as in memory sticks and computer connectors.</td>
<td>Amber</td>
<td>-40°C to 125°C</td>
<td>92A</td>
<td>210°C – 240°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 646</td>
<td></td>
<td>Black</td>
<td>-40°C to 125°C</td>
<td>92A</td>
<td>210°C – 240°C</td>
</tr>
<tr>
<td><strong>Solvent Resistant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT PA 2384</td>
<td>Thermoplastic polyamide that exhibits good adhesion, excellent heat resistance and excellent resistance against gasoline containing 20% alcohol, as well as many other solvents or chemicals.</td>
<td>Amber</td>
<td>10°C to 175°C</td>
<td>67D</td>
<td>232°C – 260°C</td>
</tr>
<tr>
<td><strong>UV Resistant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT PA 688 CLEAR</td>
<td>Thermoplastic polyamide designed for overmolding sensitive electronic devices. The material is clear in color and is UV stabilized to retain a high level of clarity after exposure to UV and heat. Makes it ideal for LED and lighting applications.</td>
<td>Transparent</td>
<td>-25°C to 105°C</td>
<td>90A</td>
<td>180°C – 230°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 6344</td>
<td>High-performance, UV-resistant thermoplastic polyamide that exhibits good adhesion to a variety of substrates including solder mask.</td>
<td>Black</td>
<td>-40°C to 100°C</td>
<td>76A</td>
<td>200°C – 250°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 6481</td>
<td>High-performance, UV-resistant thermoplastic polyamide that exhibits strong mechanical properties, abrasion resistance and increased hardness. Ideal for outdoor applications.</td>
<td>Black</td>
<td>-40°C to 130°C</td>
<td>93A</td>
<td>200°C – 240°C</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>DESCRIPTION</th>
<th>COLOR</th>
<th>SLUMP RESISTANCE</th>
<th>SHORE HARDNESS</th>
<th>VISCOSITY AT 163°C</th>
</tr>
</thead>
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<tr>
<td><strong>Peelable Mask</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT AS 8998</td>
<td>Peelable hot melt adhesive used to mask off areas that need protection before conformal coating is applied. Formulated to have excellent slump resistance.</td>
<td>Translucent Yellow</td>
<td>Up to 100°C</td>
<td>10A</td>
<td>2,900 to 4,000 cP</td>
</tr>
</tbody>
</table>
A SUSTAINABLE SOLUTION

• Solvent-free
• No safety labels
• 80% of raw materials are based on renewables (vegetable oils)
• No harmful fumes from molding process
• UL-listed material options
• Long shelf life (2+ years)
• RoHS and REACH compliant
INDUSTRIAL SENSORS AND COMPONENTS MARKET

EXCELLENT ADHESION

TECHNOMELT® PA 6208 N BLACK

**BENEFITS**
- Low viscosity
- High adhesion strength to challenging surfaces
- High dielectric strength
- Improved flexibility at low temperatures

**APPLICATIONS**
- Door sensors
- Security tokens
- Monitoring systems
- Connectors
- Micro inverters

INCREASED HARDNESS

TECHNOMELT PA 646

**BENEFITS**
- Provides good balance of low- and high-temperature performance
- Particularly suited for applications where high strength and hardness are desired
- Good adhesion to a variety of substrates
- Excellent moisture and environmental resistance

**APPLICATIONS**
- Switches
- Electronic controllers
- Power regulators
- Optical encoders
- Moisture sensors
- Electric motors
AUTOMOTIVE MARKET

HIGH-TEMPERATURE RESISTANT
TECHNOMELT PA 2692

BENEFITS
• Increased thermal stability for the harshest environments
• Excellent resistance to automotive fluids
• Very low moisture sensitivity
• High hardness

APPLICATIONS
• Automotive sensors
• Engine control units

SOLVENT RESISTANT
TECHNOMELT PA 2384

BENEFITS
• Chemical- and solvent-resistant material
• Polar solvent and hydrocarbon resistant
• High hardness
• High operating temperature
• Improved performance when exposed to industry-standard chemical media

APPLICATIONS
• Medical sensors
• Security sensors
• Outdoor batteries
LED/LIGHTING MARKET

UV RESISTANT
TECHNOMELT® PA 6344

BENEFITS
• UV and thermal resistance
• Adheres well to a variety of substrates including plastic, glass and metals
• Good flexibility and mechanical strength
• Low durometer

APPLICATIONS
• LED nodes
• Industrial sensors
• Automotive lighting

CLEAR
TECHNOMELT PA 668 CLEAR

BENEFITS
• UV and thermally stabilized
• Does not discolor over time
• Superior molding and clarity
• Good mechanical properties
• Ideal for indoor and outdoor LED lighting temperature

APPLICATIONS
• Sensors with LEDs
• Lighting display boards
• Consumer LED units
• LCD screens
PEELABLE MASK

TECHNOMELT AS 8998

TECHNOMELT AS 8998 is an advanced and efficient approach to temporary masking techniques for selective conformal coating processes.

An alternative to manual taping methods, TECHNOMELT AS 8998 is a hot melt adhesive that can be precisely applied to keep-out areas via automated dispensing systems, reducing process time and labor costs.

PRODUCT BENEFITS

- No cure
- Ultra-fast processing and solidification time
- Easily peelable
- Slump-resistant for improved dispense control
- Halogen-free and RoHS compliant
- No outgassing during coating process
- Compatible with commonly used conformal coatings
- Sustainable self-packaging
- No residue – confirmed through SIR testing IPC-TM-650 2.6.3.7
- Replaces Kapton tape, UV-cure masking materials and latex-based masking materials

SIMPLIFY THE STANDARD MASKING AND CONFORMAL COATING PROCESS

MASK
Automated or handgun dispense. Significantly reduces masking time.

CURE MASK
Does not require cure. Process step eliminated.

APPLY COAT
Compatible with commonly used conformal coatings. No degradation.

CURE COAT
100°C softening point.

DE-MASK
Easily peelable. No residues.