LOW PRESSURE MOLDING SOLUTIONS
ENCAPSULATE AND PROTECT YOUR ELECTRONICS IN THREE SIMPLE STEPS
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 TECHNOMELT’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 HOUSING
ASSEMBLE PARTS
PREHEAT PARTS
DISPENSE
VACUUM OR SETTLE
CURE
TEST

No housing required.
Insert parts directly into moldset.
Process step eliminated.
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>
</tr>
</thead>
</table>
| **Potting**               | • Two-part systems; mixing required  
                          • Non-reworkable  
                          • Large equipment investment and footprint  
                          • 24 – 72 hours cure schedule  
                          • Up to 8 process steps  
                          • 5 – 7 BOM part numbers in inventory | • One part; no mixing  
                          • Reworkable  
                          • Weight reduction  
                          • Low waste  
                          • 30 sec. – 2 min. cycle times  
                          • Strain relief  
                          • Green technology; no VOC |
| **Sealing**               | • Limited by housing dimensions; space constraints  
                          • 48 – 72 hours cure schedule  
                          • Up to 6 process steps  
                          • 5 – 7 BOM part numbers in inventory | • No housing; fewer part numbers  
                          • Only 3 process steps  
                          • Improved aesthetic appearance; skylining  
                          • Only 1 BOM part number required  
                          • In-line and high-volume processing |
| **Conformal Coating**     | • Very limited mechanical strength  
                          • 4 – 12 hours cure schedule  
                          • Up to 8 process steps  
                          • 3 – 4 BOM part numbers in inventory | • No cure  
                          • Temperature, vibration, impact and chemical resistance  
                          • Watertight encapsulation  
                          • Good mechanical strength  
                          • Translucent materials available for optical inspection |
## TECHNOMELT LOW PRESSURE MOLDING PRODUCTS

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>DESCRIPTION</th>
<th>COLOR</th>
<th>PERFORMANCE TEMPERATURE RANGE</th>
<th>SHORE HARDNESS</th>
<th>APPLICATION TEMPERATURE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excellent Adhesion</strong></td>
<td>Moldable polyolefin for demanding moisture and solvent resistance. Excellent adhesion to the most difficult substrates. Compatible with a secondary overmold with a harder polyamide.</td>
<td>White/Beige</td>
<td>-40°C to 100°C</td>
<td>78A</td>
<td>180°C – 200°C</td>
</tr>
<tr>
<td>TECHNOMELT AS 5365</td>
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<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></td>
<td></td>
<td></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>200°C – 240°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 657</td>
<td></td>
<td>Black</td>
<td></td>
<td></td>
<td>180°C – 230°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 653</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>210°C – 230°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 658</td>
<td></td>
<td>Black</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT PA 6208</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>TECHNOMELT PA 6208 BLACK</td>
<td></td>
<td>Black</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT TC 50</td>
<td>High-performance, filled thermoplastic polyamide formulated as a protective encapsulant for heat-generating devices requiring thermal management. This material allows encapsulation of fragile components without damage. Thermal conductivity is 0.65 W/m.K.</td>
<td>Black</td>
<td>-40°C to 140°C</td>
<td>60D</td>
<td>210°C – 240°C</td>
</tr>
<tr>
<td><strong>High-Temperature Resistant</strong></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 673</td>
<td></td>
<td>Black</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT PA 678</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 682</td>
<td></td>
<td>Black</td>
<td></td>
<td></td>
<td>225°C – 235°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 687</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>TECHNOMELT PA 2692</td>
<td></td>
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</tr>
<tr>
<td><strong>Increased Hardness</strong></td>
<td>High-performance thermoplastic polyamide designed to offer safety blaze orange color for easy identification of components. Typically used to encapsulate high-voltage modules.</td>
<td>Blaze Orange</td>
<td>-25°C to 125°C</td>
<td>92A</td>
<td>190°C – 210°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 341</td>
<td></td>
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<td></td>
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</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></td>
<td></td>
<td>200°C – 240°C</td>
</tr>
<tr>
<td><strong>Solvent Resistant</strong></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>TECHNOMELT PA 2384</td>
<td></td>
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</tr>
<tr>
<td><strong>UV Resistant</strong></td>
<td>Thermoplastic polyamide that exhibits a crisp, bright white color with excellent UV and thermal stability and is ideal for outdoor use as well as LED applications. Good adhesion to a range of substrates.</td>
<td>White</td>
<td>-25°C to 105°C</td>
<td>90A</td>
<td>180°C – 230°C</td>
</tr>
<tr>
<td>TECHNOMELT PA 669</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TECHNOMELT PA 668 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. This 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>210°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>
</tbody>
</table>

### DISPENSABLE

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>DESCRIPTION</th>
<th>COLOR</th>
<th>SLUMP RESISTANCE</th>
<th>SHORE HARDNESS</th>
<th>VISCOSITY AT 183°C</th>
</tr>
</thead>
<tbody>
<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>

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TECHNOMELT Low Pressure Molding Products | 5
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 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

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

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THERMALLY CONDUCTIVE

TECHNOMELT TC 50

TECHNOMELT TC 50, Henkel’s thermally conductive TECHNOMELT material innovation, combines the low-pressure, protective benefits of all TECHNOMELT materials with thermally conductive functional capabilities.

As an alternative to conventional potting techniques, TECHNOMELT TC 50 offers improved process and performance benefits along with thermal conductivity > 0.5 W/m·K for the dissipation of heat through the encapsulating material.

BENEFITS

- Heat dissipation through TECHNOMELT low pressure molding material
- Substantially decreases component temperature
- Stable filler dispersion that eliminates settling for continued low pressure molding
- Low-abrasive filler

KEY APPLICATION AREAS

AUTOMOTIVE ELECTRONIC POWER SYSTEMS
- Excellent heat spreading to avoid hot spots
- Automotive fluid resistance
- Temperature-resistant material for use in engine compartments

CAMERA MODULES
- Protects multiple components in one system
- Compatible with sensitive MEMS devices

POWER SUPPLIES
- Simplified process reduces filling and sealing steps
- High dielectric strength

SOLAR INVERTERS
- Durable material to survive harsh outdoor environments
- Minimizes air gaps
- Minimizes interfacial resistance between the low pressure molding material and substrate, promoting heat transfer

LED DRIVERS
- Provides increased thermal transfer as power increases
- UV, thermally and color stabilized
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.

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