

TECHNOMELT®

LOW PRESSURE MOLDING SOLUTIONS

ENCAPSULATE AND PROTECT YOUR ELECTRONICS IN THREE SIMPLE STEPS



Henkel

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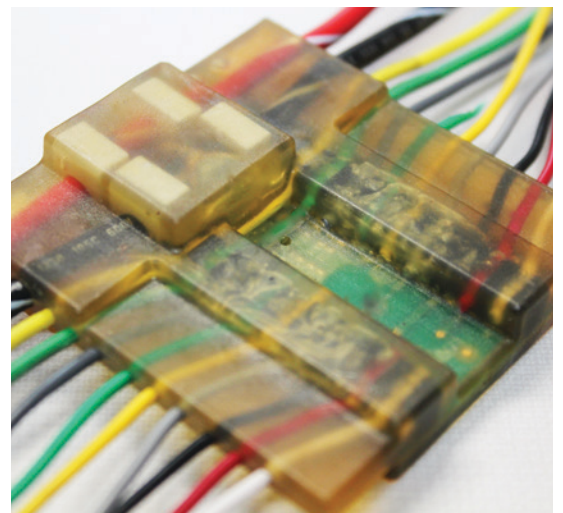
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INTRODUCTION

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.

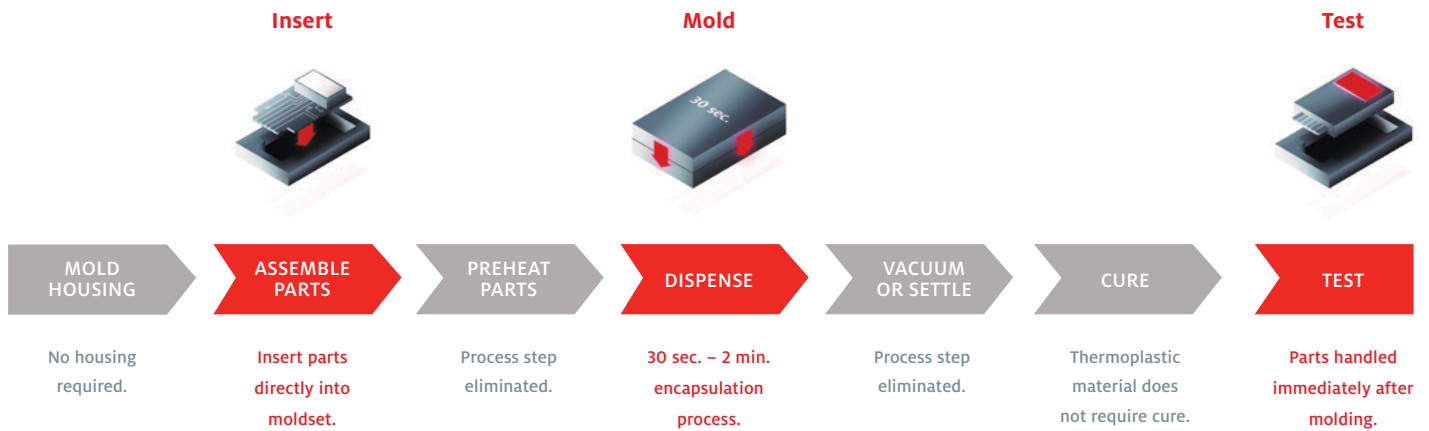
What's more, these re-workable thermoplastic materials provide impressive device protections against temperature, vibration, impact, moisture, chemicals and mechanical stress. Sustainable and cost-effective, low pressure molding with TECHNOMELT has been proven to reduce PCB protection costs by as much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



LOW PRESSURE MOLDING PROCESS

Cost reduction and streamlined processing are among 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

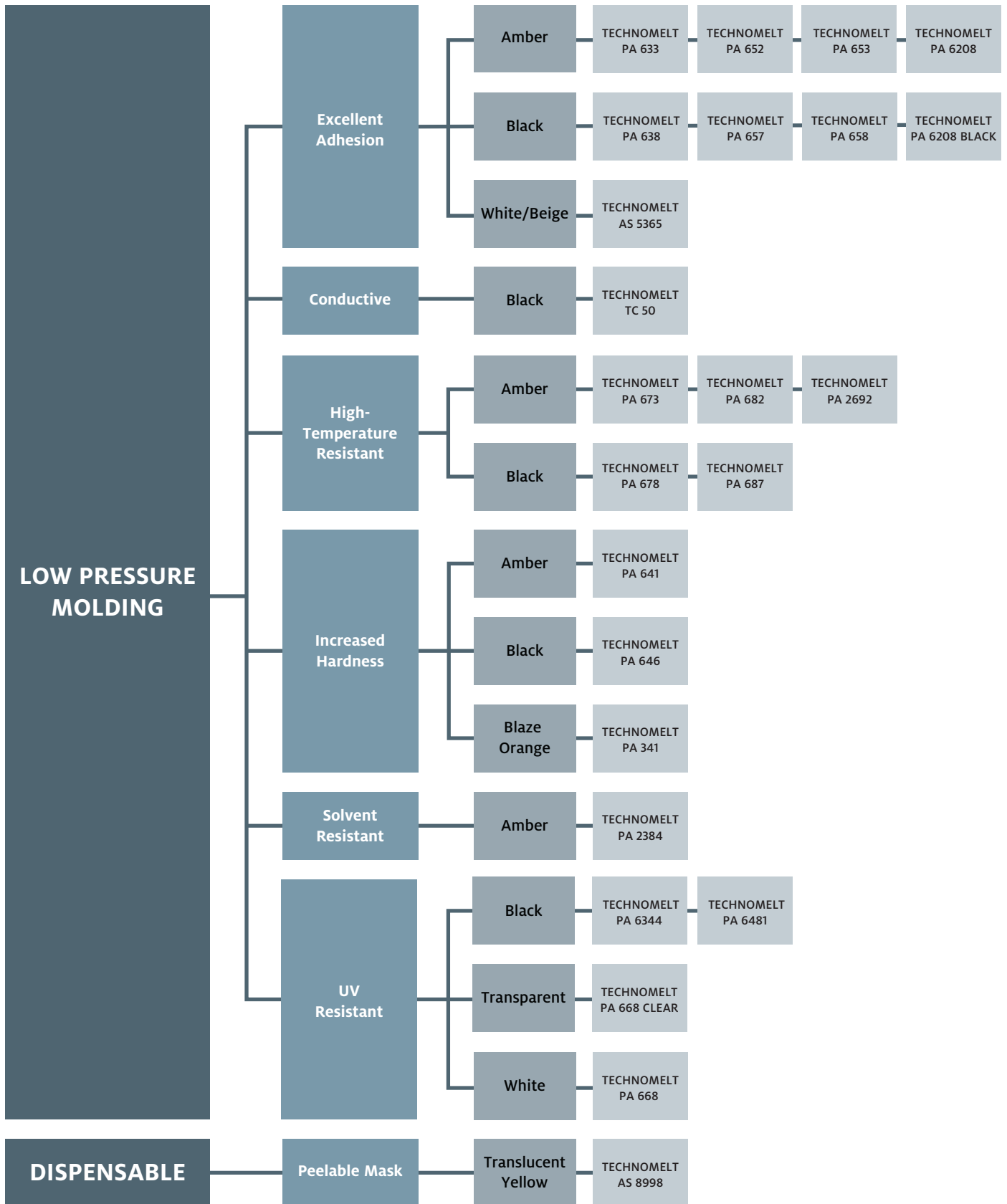


CIRCUIT BOARD PROTECTION TECHNOLOGY COMPARISON

Traditional CBP Materials	Material Challenges	TECHNOMELT Low Pressure Molding Solutions
Potting	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> One part; no mixing Reworkable Weight reduction Low waste 30 sec. – 2 min. cycle times Strain relief Green technology; no VOC
Sealing	<ul style="list-style-type: none"> Limited by housing dimensions; space constraints 48 – 72 hours cure schedule Up to 6 process steps 5 – 7 BOM part numbers in inventory 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Very limited mechanical strength 4 – 12 hours cure schedule Up to 8 process steps 3 – 4 BOM part numbers in inventory 	<ul style="list-style-type: none"> No cure Temperature, vibration, impact and chemical resistance Watertight encapsulation Good mechanical strength Translucent materials available for optical inspection

PRODUCT PORTFOLIO

PCB PROTECTION

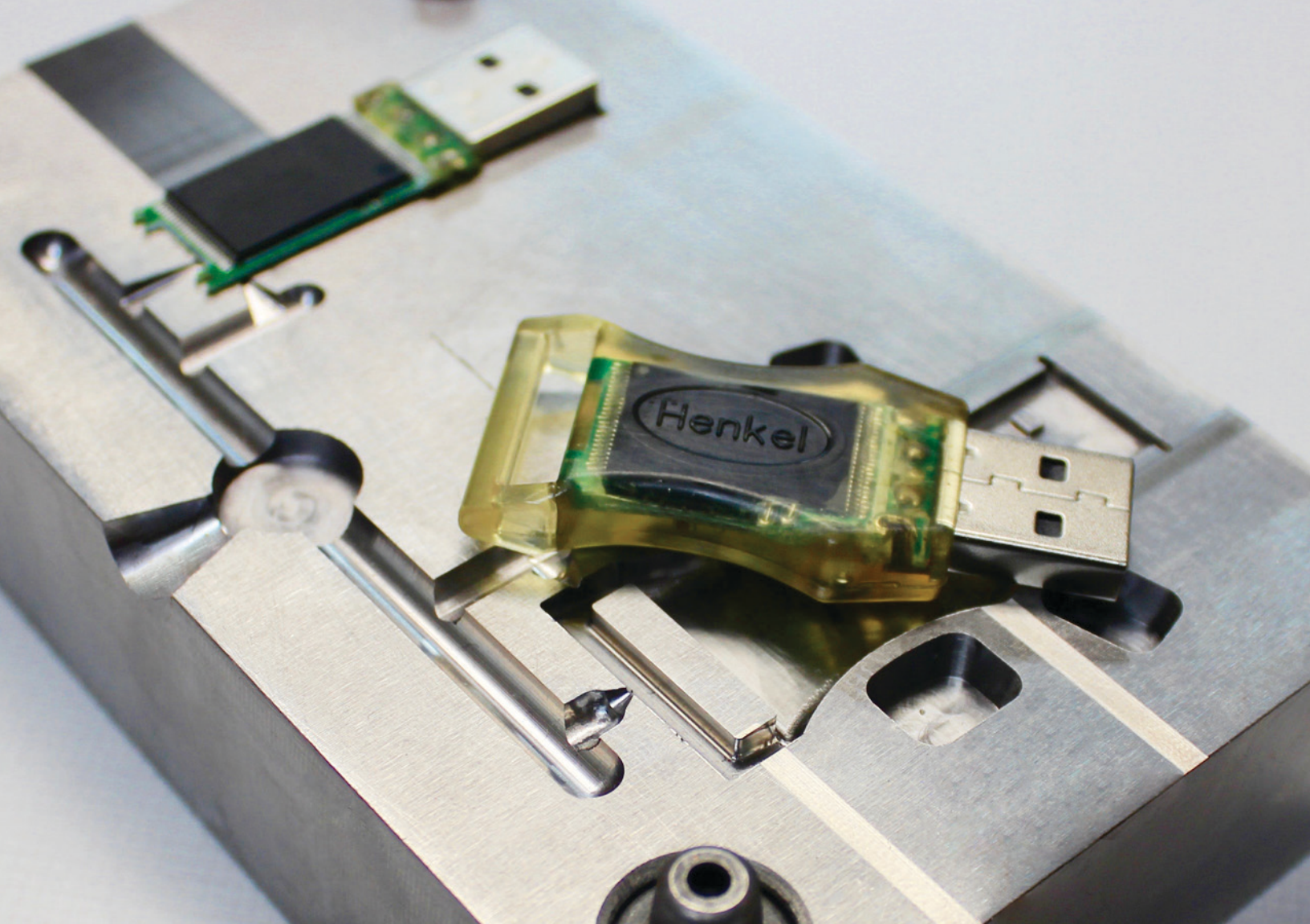


TECHNOMELT LOW PRESSURE MOLDING PRODUCTS

PRODUCT	DESCRIPTION	COLOR	PERFORMANCE TEMPERATURE	SHORE HARDNESS	APPLICATION TEMPERATURE RANGE
Excellent Adhesion					
TECHNOMELT AS 5365	Moldable polyolefin for demanding moisture and solvent resistance. Excellent adhesion to the most difficult substrates. Compatible with a secondary overmold with a harder polyamide.	White/Beige	-40°C to 100°C	78A	180°C – 200°C
TECHNOMELT PA 633	High-performance thermoplastic polyamide with moderate strength and good adhesion for in-cabin and under-hood applications.	Amber	-40°C to 125°C	90A	200°C – 240°C
TECHNOMELT PA 638		Black			
TECHNOMELT PA 652	Moldable polyamide, where excellent adhesion and cold-temperature flexibility are important, such as in an automotive exterior. Also used extensively in white goods.	Amber	-40°C to 100°C	77A	200°C – 240°C
TECHNOMELT PA 657		Black			180°C – 230°C
TECHNOMELT PA 653	Moldable polyamide with excellent adhesion to plastic substrates. It is designed for improved performance where prolonged exposure to moisture and harsh environments is expected.	Amber	-40°C to 100°C	77A	210°C – 230°C
TECHNOMELT PA 658		Black			
TECHNOMELT PA 6208	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.	Amber	-40°C to 100°C	82A	180°C – 230°C
TECHNOMELT PA 6208 BLACK		Black			
Conductive					
TECHNOMELT TC 50	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.	Black	-40°C to 140°C	60D	210°C – 240°C
High-Temperature Resistant					
TECHNOMELT PA 673	Moldable polyamide with good adhesion for high-temperature applications, such as in an automotive under-hood.	Amber	-40°C to 140°C	88A	210°C – 240°C
TECHNOMELT PA 678		Black			
TECHNOMELT PA 682	Moldable polyamide for the most demanding high-humidity applications, such as for automobile tire pressure sensors. Formulated for very low water vapor transmission.	Amber	-40°C to 140°C	88A	225°C – 235°C
TECHNOMELT PA 687		Black			225°C – 235°C
TECHNOMELT PA 2692	Designed for excellent heat resistance and good oil resistance. This material is also hard and has a very low moisture sensitivity.	Amber	-40°C to 175°C	57D	240°C – 270°C
Increased Hardness					
TECHNOMELT PA 341	High-performance thermoplastic polyamide designed to offer safety blaze orange color for easy identification of components. Typically used to encapsulate high-voltage modules.	Blaze Orange	-25°C to 125°C	92A	190°C – 210°C
TECHNOMELT PA 641	Moldable polyamide, where strength and hardness are needed, such as in memory sticks and computer connectors.	Amber	-40°C to 125°C	92A	210°C – 240°C
TECHNOMELT PA 646		Black			200°C – 240°C
Solvent Resistant					
TECHNOMELT PA 2384	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.	Amber	10°C to 175°C	67D	232°C – 260°C
UV Resistant					
TECHNOMELT PA 668	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.	White	-25°C to 105°C	90A	180°C – 230°C
TECHNOMELT PA 668 CLEAR	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.	Transparent	-25°C to 105°C	90A	180°C – 230°C
TECHNOMELT PA 6344	High-performance, UV-resistant thermoplastic polyamide that exhibits good adhesion to a variety of substrates including solder mask.	Black	-40°C to 100°C	76A	210°C – 250°C
TECHNOMELT PA 6481	High-performance, UV-resistant thermoplastic polyamide that exhibits strong mechanical properties, abrasion resistance and increased hardness. Ideal for outdoor applications.	Black	-40°C to 130°C	93A	200°C – 240°C

DISPENSABLE

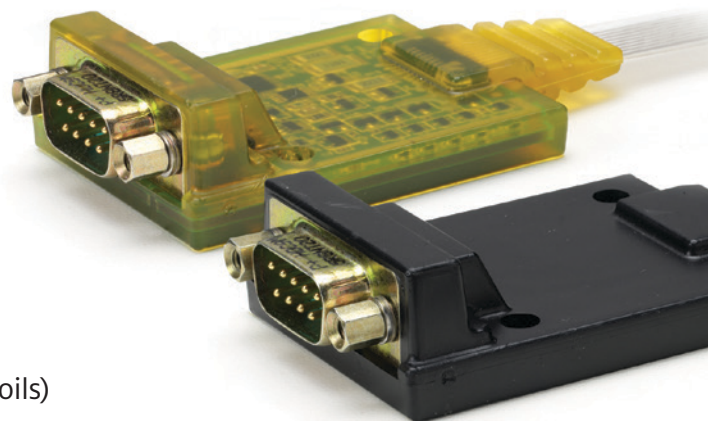
PRODUCT	DESCRIPTION	COLOR	SLUMP RESISTANCE	SHORE HARDNESS	VISCOSITY AT 163°C
Peelable Mask					
TECHNOMELT AS 8998	Peelable hot melt adhesive used to mask off areas that need protection before conformal coating is applied. Formulated to have excellent slump resistance.	Translucent Yellow	Up to 100°C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



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

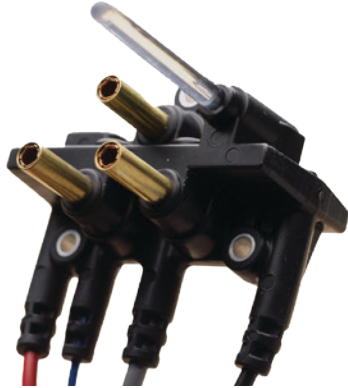




INDUSTRIAL SENSORS AND COMPONENTS MARKET

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
- Connectors
- Micro inverters

INCREASED HARDNESS

TECHNOMELT PA 646

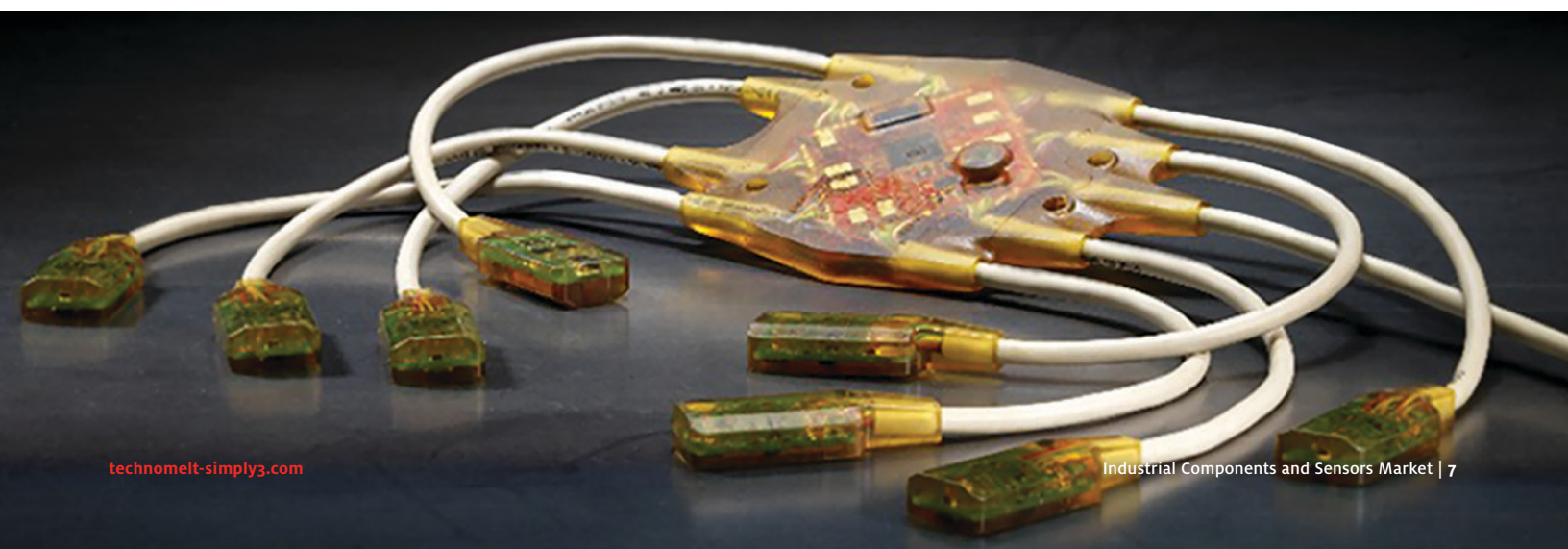


BENEFITS

- 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

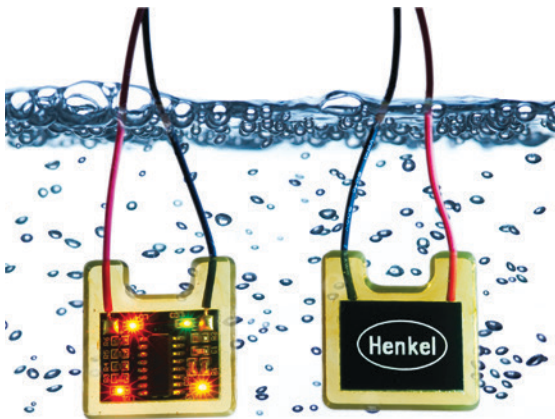
- Increased thermal stability for the harshest environments
- Excellent resistance to automotive fluids
- Very low moisture sensitivity
- High hardness

APPLICATIONS

- Automotive sensors
- Engine control units
- Temperature sensors

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
- Smart meter systems
- Solar units

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

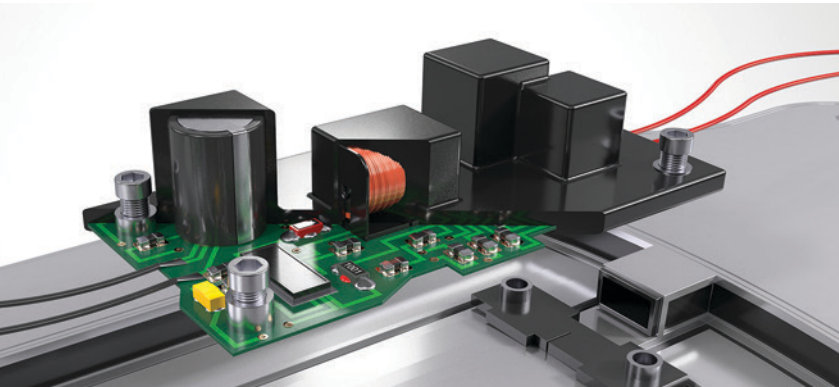
- Sensors with LEDs
- Lighting display boards
- Consumer LED units
- LCD screens

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 $> 0.5 \text{ W/m}\cdot\text{K}$ 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

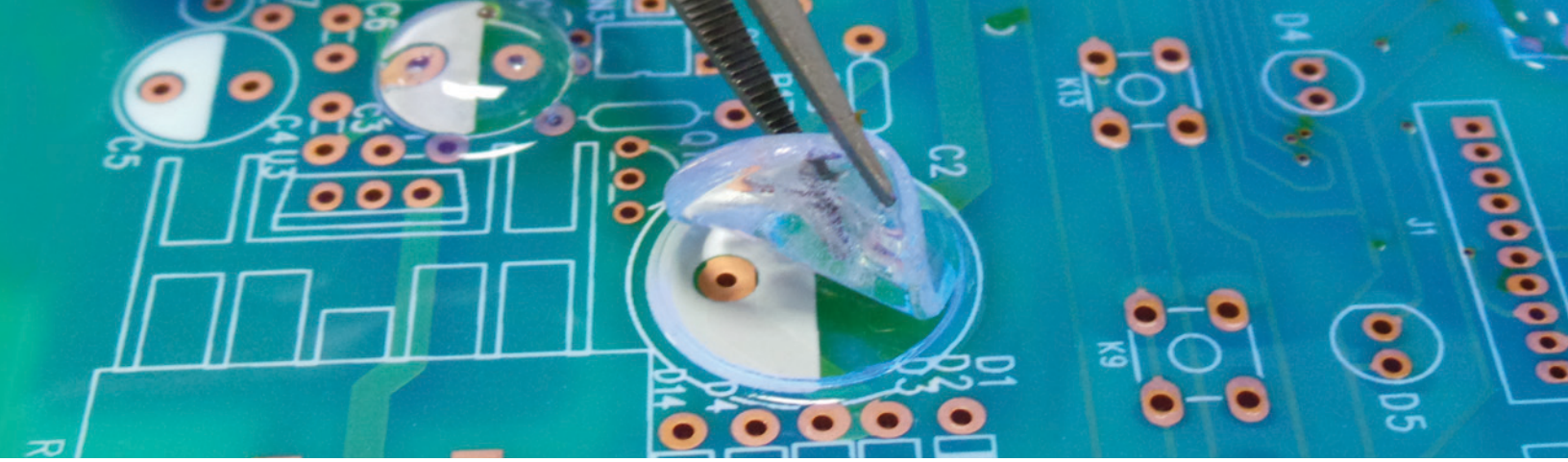


- Durable material to survive harsh outdoor environments
- Minimizes air gaps
- Minimizes interfacial resistance between the low pressure molding material and substrate, promoting heat transfer

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



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