TECHNOMELT

Low Pressure Molding Overview

ISKRATEL Tech Day

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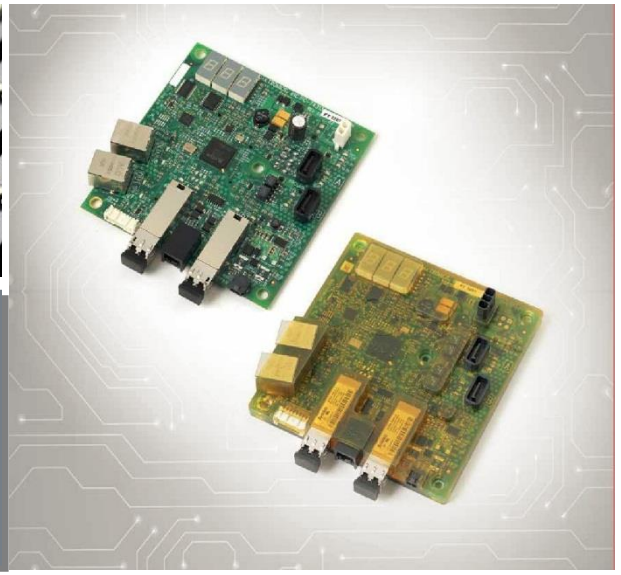
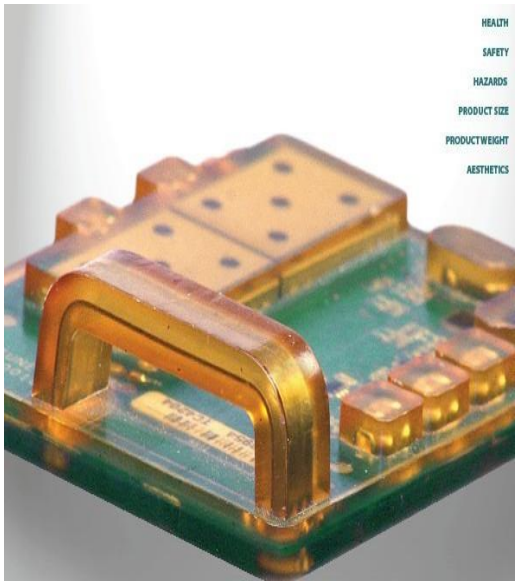
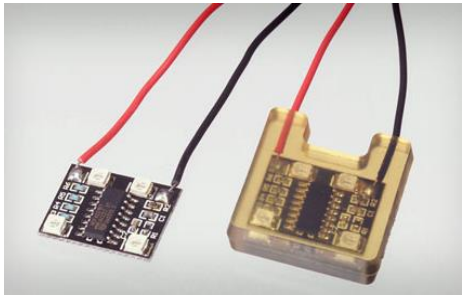
Henkel Electronics

30 September 2014







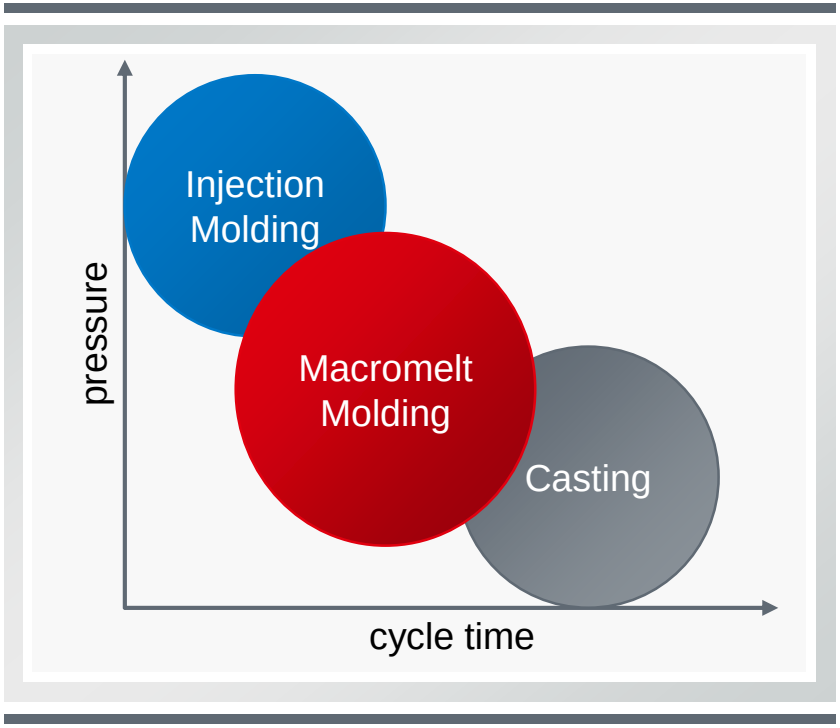
Henkel Excellence is our Passion

Agenda
Technomelt – Low Pressure Molding

- Definition
- Applications
- Process
- Products overview
- Material properties
- Material – innovation
- Equipment & mold tools

What is Technomelt Molding?

- Technomelt Molding = Low Pressure, Adhesive, Injection Molding
- An environmentally-friendly process positioned between casting and injection molding technologies
- A process to over or partially mold component pre-inserted in a mold set, like PCBs, sensors, switches, batteries, connectors, etc.
- To protect them from environmental issues like moisture, temperature, chemicals, etc.



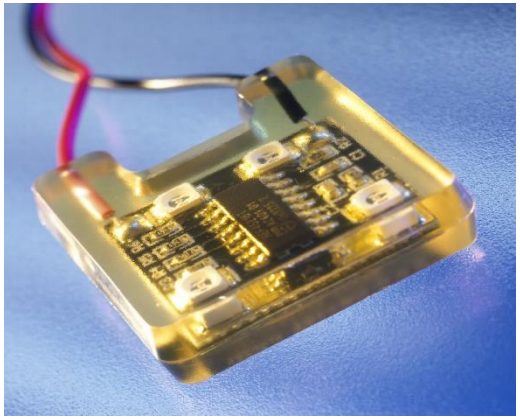
A Sustainable Solution

- ✓ High performance polyamide hotmelts
- ✓ Solvent free, no safety labels
- ✓ 80% of raw materials are based on renewables (vegetable oils)
- ✓ No harmful fumes from the molding process
- ✓ Long shelf life (2+ years)
- ✓ RoHS and REACH complaint

Low Pressure Molding Technology

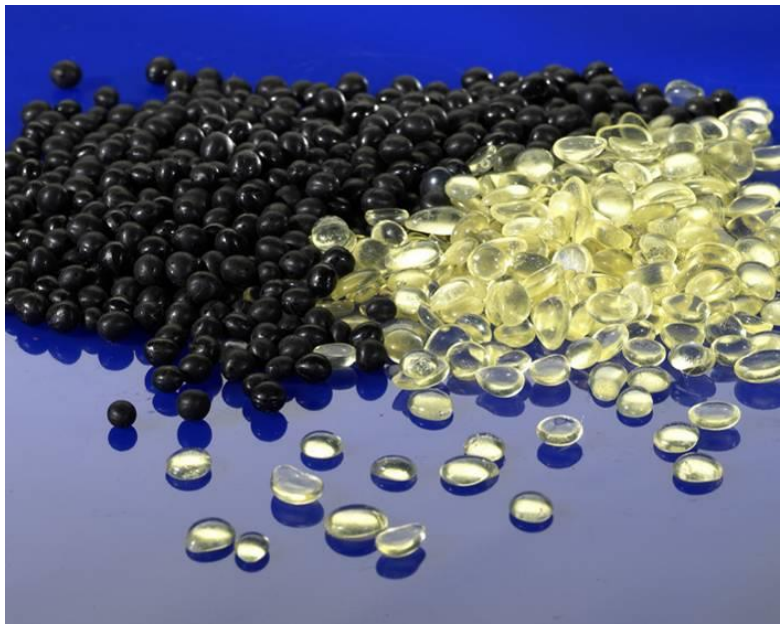
Provides Protection

- Electrical Insulation
- Contact
- Strain Relief
- Vibration
- Corrosion
- Waterproof
- Environmental Influences



Colors

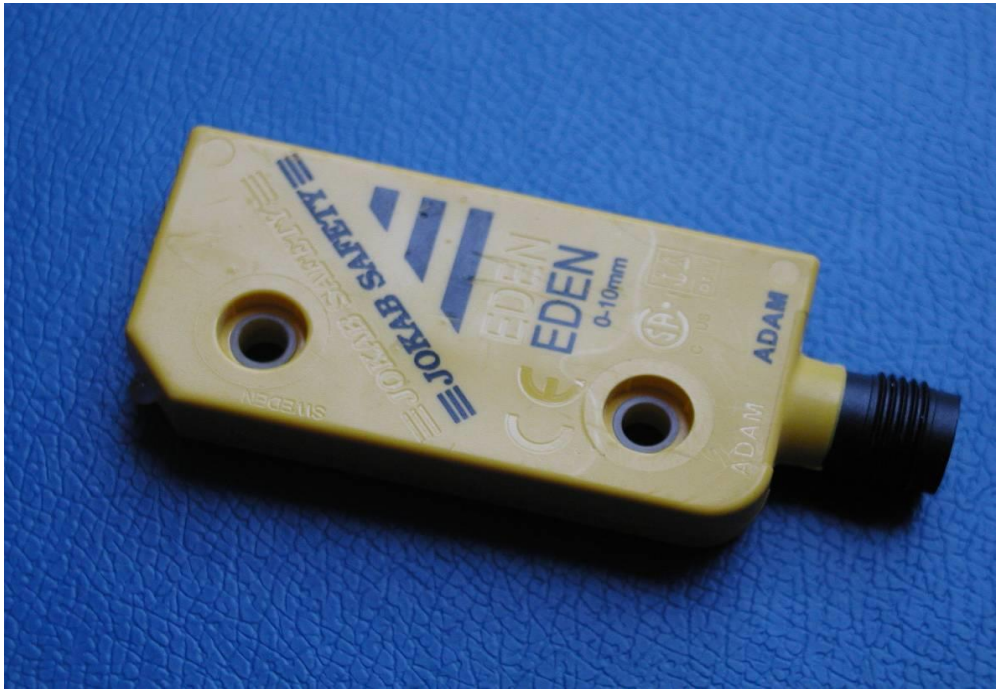
- Henkel’s standard colors are amber or black



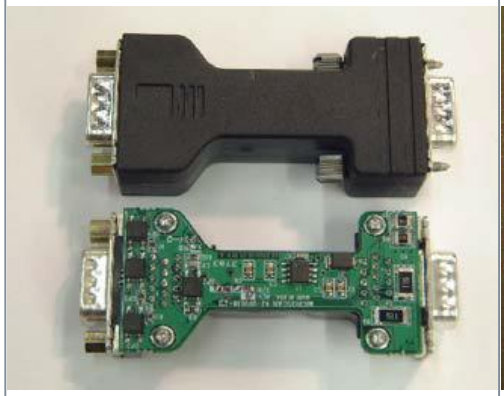
- Via colored master batches you can achieve almost every color you need

Printing

- It’s possible to print a marking directly onto the molded assembly



LPM typical Applications



Encapsulating, sealing & protecting Electronic assembly

Sealing connectors and providing strain relief

Switches, automotive electronic and medical sensors

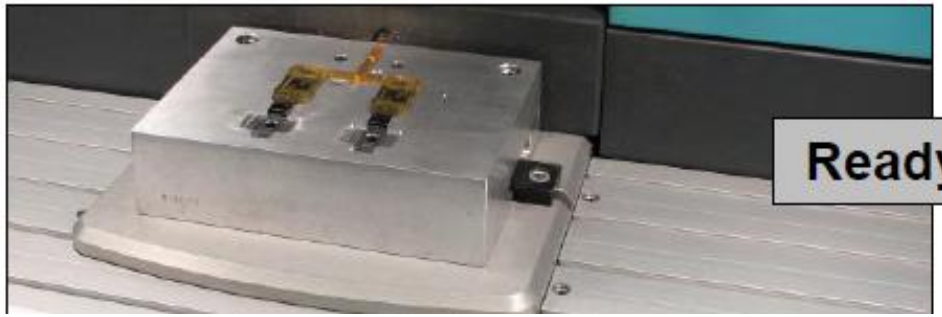
Battery sealing

Low Pressure Molding

Process

Insert electronics

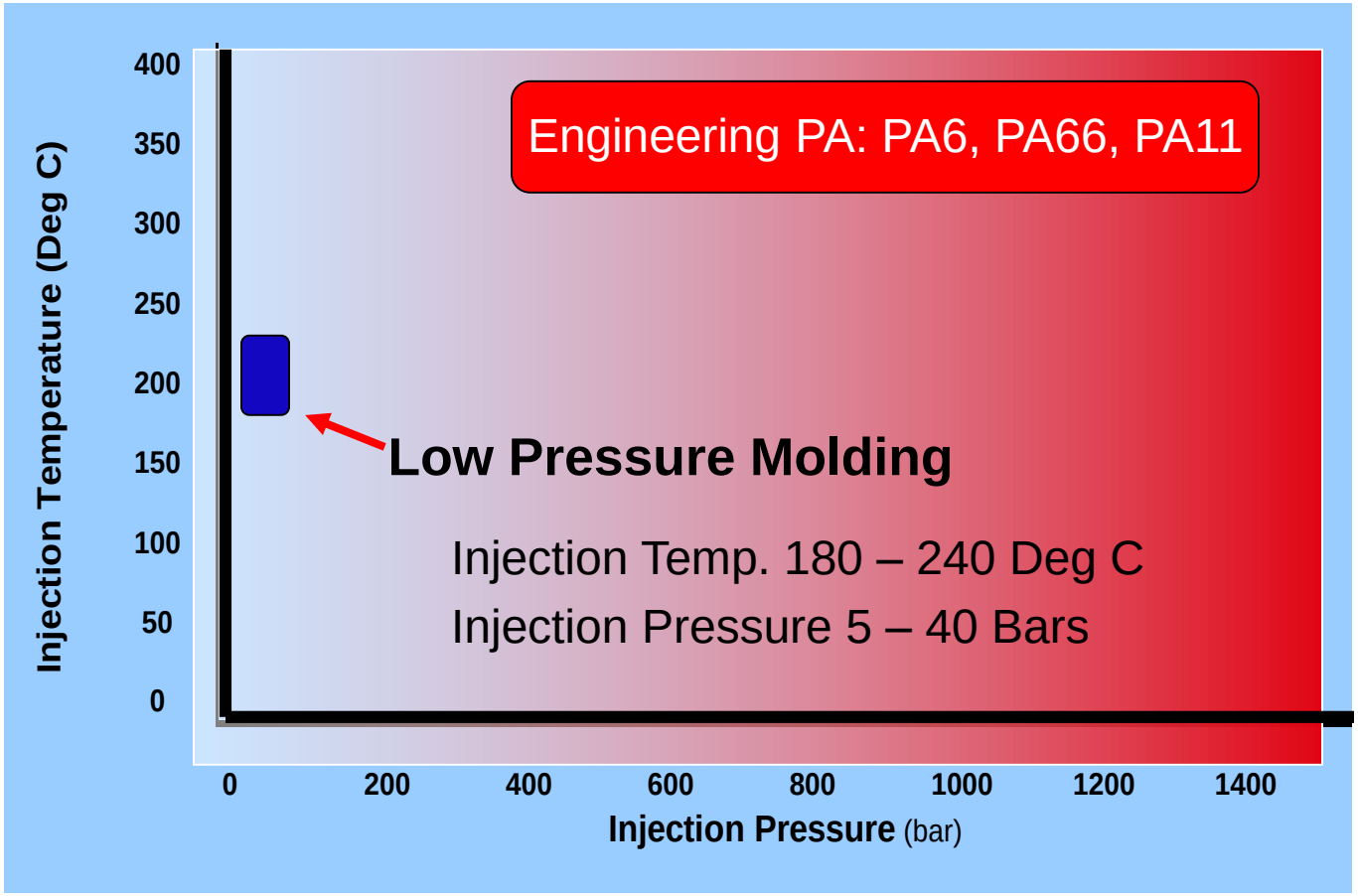
Over-mold 30 - 45 sec



Ready to handle & test

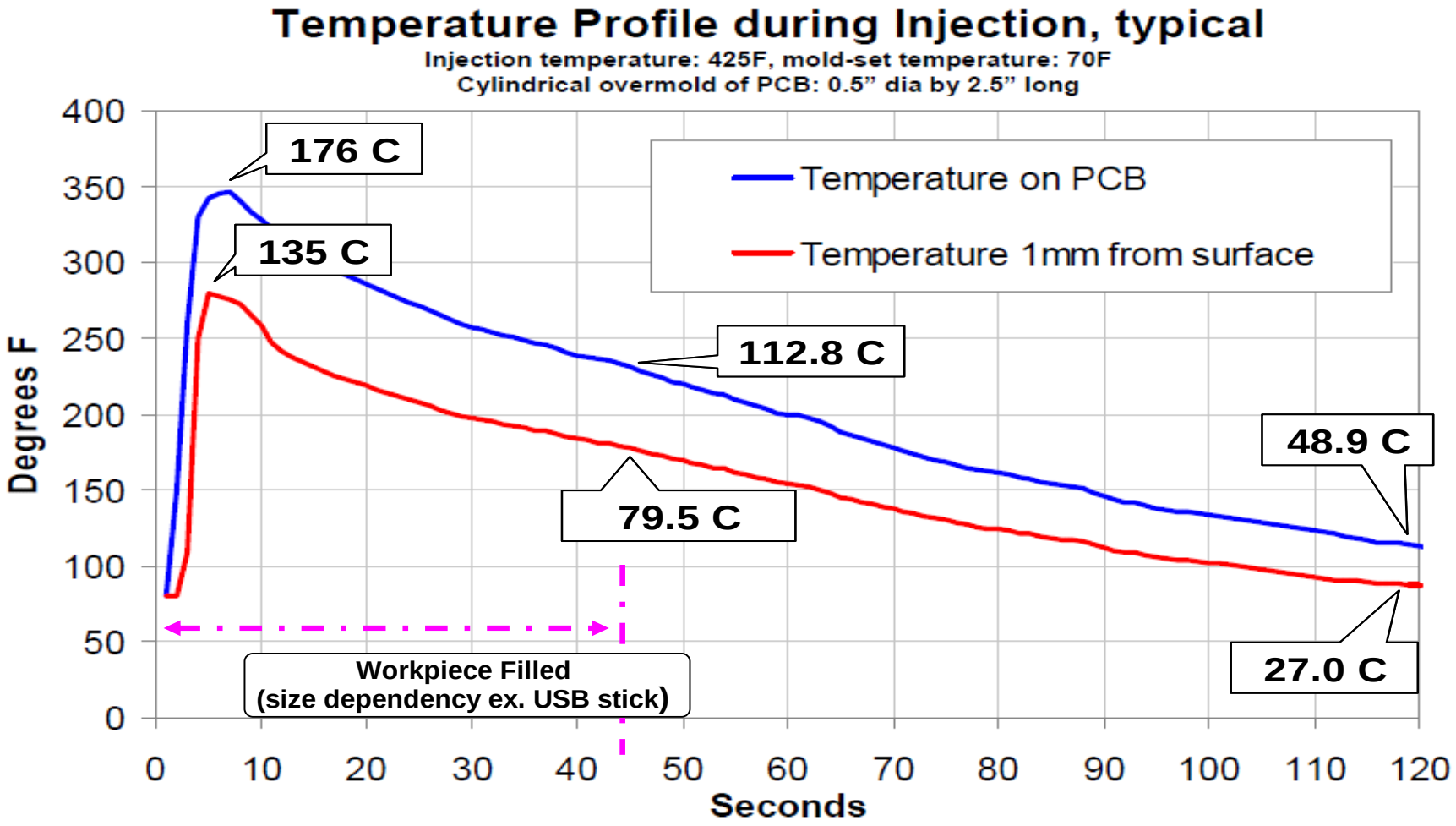
Process Conditions

Pressure & Temperature



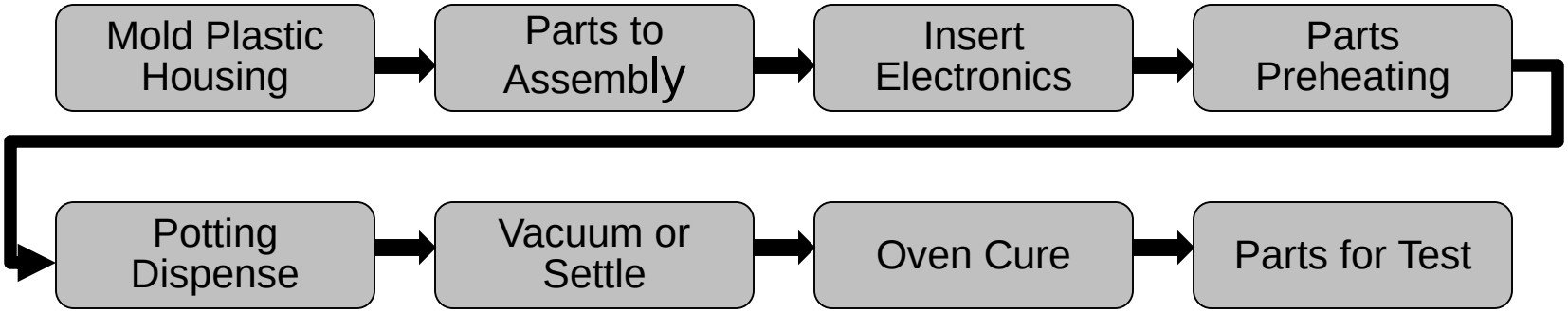
Process Conditions

Temperature & Injection Time

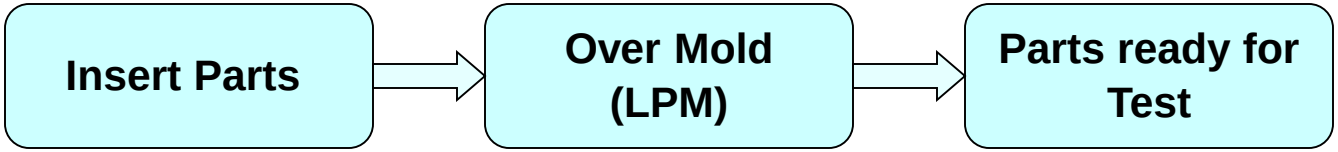


Process Overview & Comparisons

Traditional Potting Process Flow



Low Pressure Molding Process



Low Pressure Molding
Pros & Cons

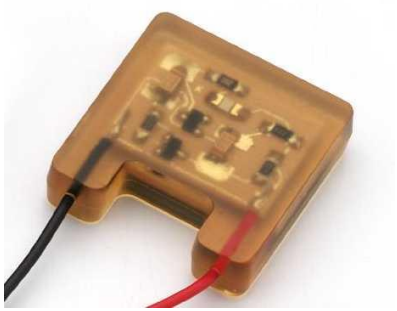
- **Cost Savings**
  - Molds can be made of aluminum instead of steel
  - Less adhesive needed compared to traditional casting
  - Saves energy by eliminating the heat curing process
- **Time Savings**
  - Fast cycle times (10 to 50 seconds); no extra time for curing
  - Simple and clean process with low machine maintenance needs
- **Production Space Savings**
  - No space needed for case storage and curing

- Relatively low adhesion on metals (this also means good release properties)
- Relatively low creep resistance leads to deformation under static load.
- Self support of a housing, threads not possible. (possible with an insert)
- Not stable vs. very high temperature (>150°C) and vs. chemical fluids (at high temperature – long time)

Technomelt Products

Low Pressure Molding for CBP

- **Low Pressure Molding**
  - **Polyamide**
    - **High Temperature Resistance**
      - Amber
        - TECHNOMELT PA 673
      - Black
        - TECHNOMELT PA 678
          - TECHNOMELT PA 676
    - **Adhesion to Plastics**
      - Amber
        - TECHNOMELT PA 652
          - TECHNOMELT PA 653
            - TECHNOMELT PA 6208
      - Black
        - TECHNOMELT PA 657
          - TECHNOMELT PA 658
            - TECHNOMELT PA 6208 BLACK
    - **Increased Hardness**
      - Blaze Orange
        - TECHNOMELT PA 341
      - Amber
        - TECHNOMELT PA 641
      - Black
        - TECHNOMELT PA 646
      - UV Resistance
        - TECHNOMELT PA 648
  - **Polyolefin**
    - **Excellent Adhesion to Metals, Plastics, Tough Surfaces**
      - Beige
        - TECHNOMELT AS 5375



Material Properties
Technomelt Molding

- Temperature resistance, short term exposure <= 185°C
- Flexibility, Elongation at rupture <= 800 %
- Cold flexibility >= -50 °C
- Good chemical resistance related to automotive applications, short term exposure.
- Good chemical resistance regarding unpolar liquids like oil, long term exposure.
- Poor chemical resistance to alcohols, petrol only short term exposure.
- Water absorption 0,2 to 2,0 %, 24 h at 22°C
- Flame retardant properties UL-listing, mainly UL 94 V-0

Henkel Innovations

White Polyamide

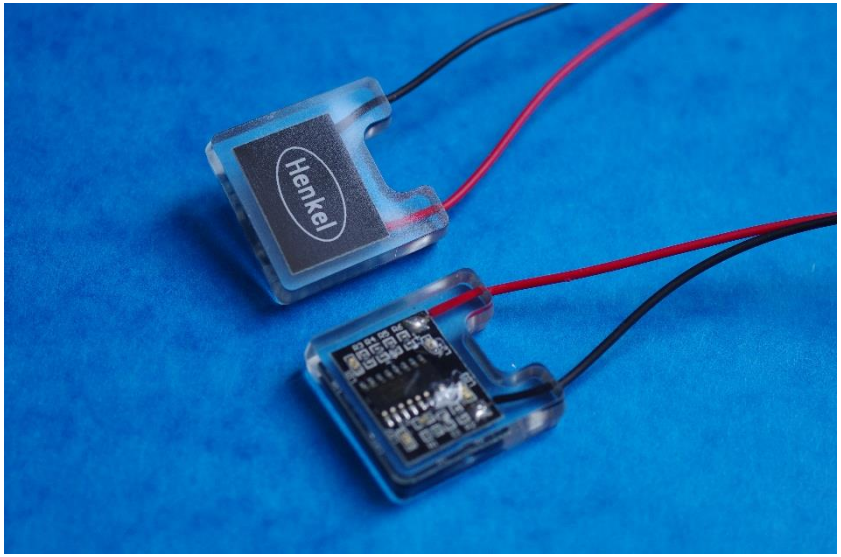
Technomelt PA 668 white

Properties

- UV stabilised
- Good mechanical properties
- Suitable for LED applications
- -40 up to 85°C
- Adhesion to polar substrates

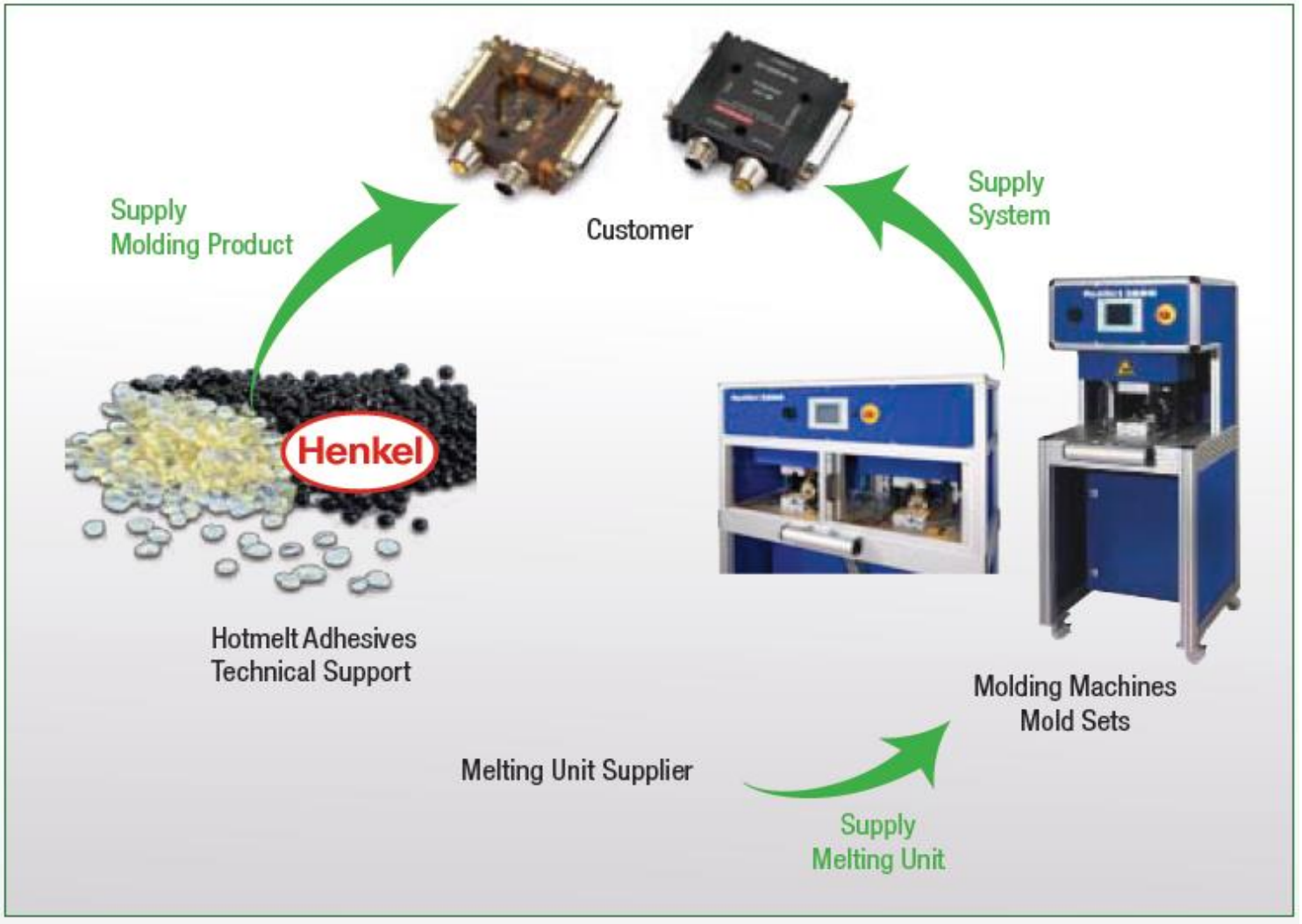
Henkel Innovations

Transparent Hotmelt Adhesive – Technomelt AS4226

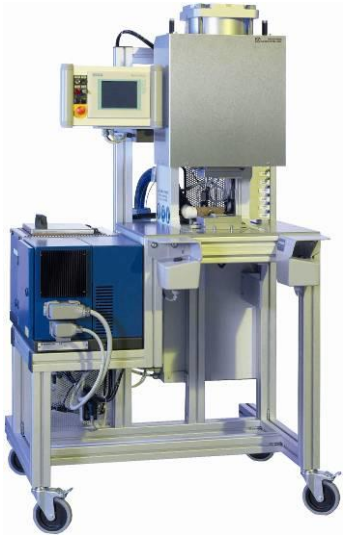


Functionality Test with pcb with LED	
Temperature Shock Test 10 x 85°C/-40°C (1h)	Ok
Temperature Exposure Test 1000h/85°C	Ok
Temperature Exposure Test 1000h/-40°C	Ok

Equipment Partners



Examples of Automated Molding Machines

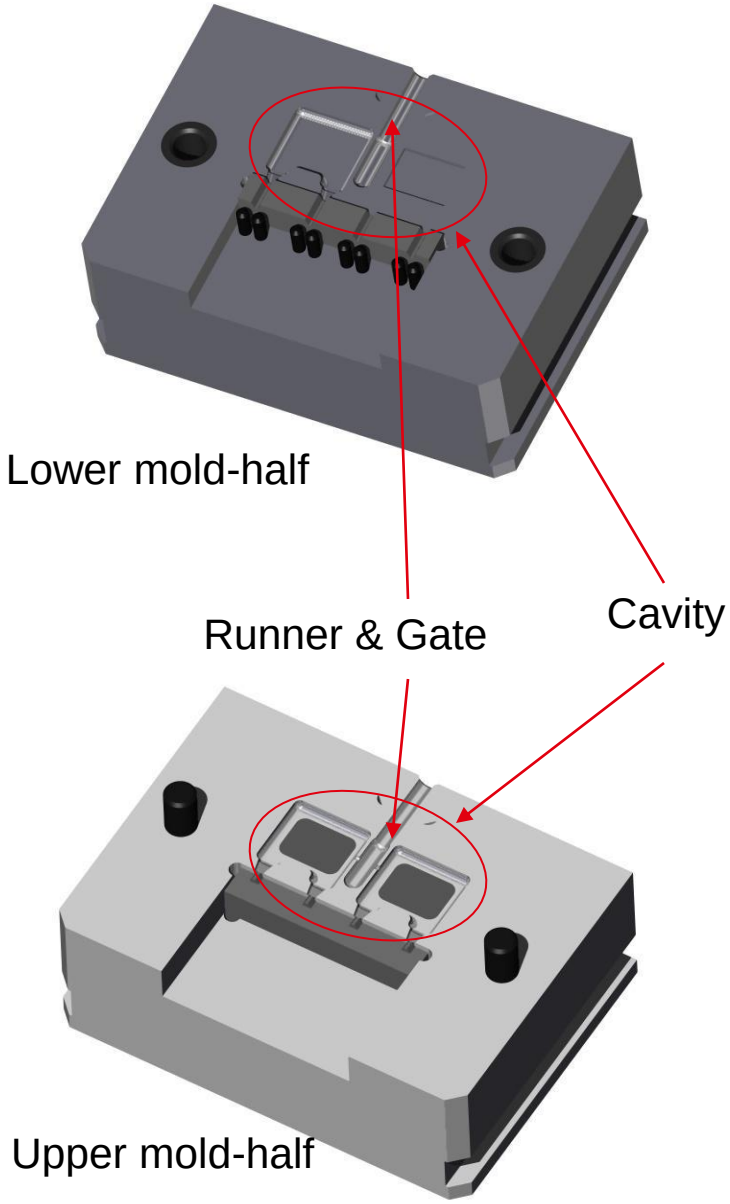


Mold Tools

- **Material**
  Usually aluminum
  - Easy to mill, drill, erode
  - Good release of the molded pieces

  Steel inserts recommended in contact areas to plastic or metal parts

- **Lifetime**
  Very long, as Technomelt is not abrasive nor corrosive



References

- **Video**

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Thank you!

Questions?