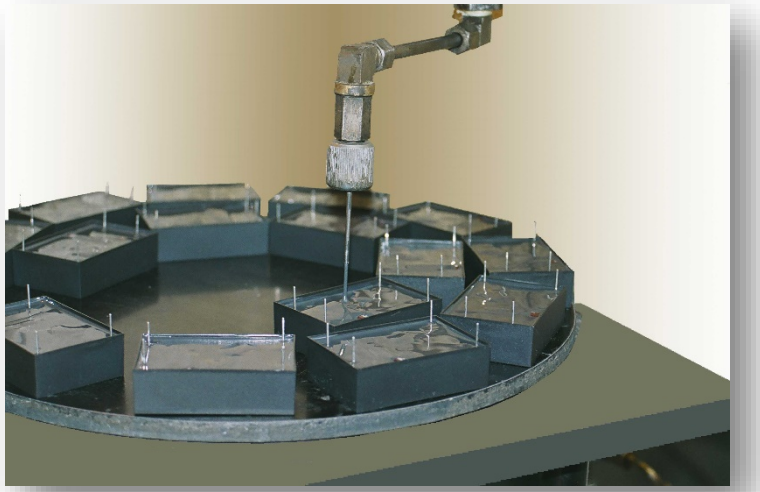
MTM POWER

The secret of a perfect encapsulation

If you've always wanted to know how to completely encapsulate all of the electronics in a power supply, then you'll find the answer here. Learn from the experts the best method to achieve a "cemented joint" using perfect encapsulation technology.

Thermoselective Vacuum Encapsulation (U.S. Patent No. 8, 821, 778 B2)

- **Technology**
- **Advantages**
- **Process**
- **Comparison**



MTM POWER COMPETENCE

Thermoselective Vacuum Encapsulation (U.S. Patent No. 8, 821, 778 B2)

Technology

Our power supplies and converters are not simply filled with resin but using the patented technology of the "Thermoselective Vacuum Encapsulation" in order to completely and permanently encapsulate our components.

Our target is to produce a "**cemented joint**", an absolutely inseparable link between the potting material and the components.
Aging, heat, cold, rapid temperature changes and other environmental influences shall not result in delamination, cracking or air pockets under any circumstances.
A "cemented joint" meets the requirements for solid insulation, i. e. air and creepage distances do not have to be considered any longer. Only a minimal layer thickness of the potting material is used as insulating clearance.

As a result, the thermoselective vacuum encapsulation achieves permanent and complete encapsulation of the entire electronics.

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Thermoselective Vacuum Encapsulation (U.S. Patent No. 8, 821, 778 B2)

Advantages

- No electrolyte loss of electrolytic capacitors, thus longer life
- Homogenous temperature distribution, aimed cooling of hot spots
- Solid insulation acc. to "cemented joint" test – no consideration of air and creepage distances necessary
- Base Plate Cooling Technology – heat dissipation through potting material to base plate / device surface, enabling contact cooling of all critical components
- Absolutely resistant against shock and vibration
- No impact of humidity and condensation
- No impact of conductive material of any kind
- Increase in test voltage up to 8 kV

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Process

- Consideration of flow passages, gaps and layer thicknesses already during the design of a device
- Careful cleaning of the components before encapsulation to remove chemical residues such as grease or soldering fluxes
- Specific drying and pre-heating of the components at device-specific temperatures and time-lines before encapsulation
- Encapsulation under vacuum in one or more steps
  - Using a specific PU two component resin with a defined mixing ratio between hardener and resin
  - Set up and controlling of all parameters (flow rate, mixing ratio, vacuum, position and inclination of the decive, underpressure, processing temperature) by process computer
  - Encapsulation in air-conditioned and dehumidified production facilities
  - Regular production and storage of potting material samples
  - Special compounds consisting of resin and extender added to adjust different expansion coefficients of large volume devices
- Specific drying and hardening of the encapsulated components at device-specific temperatures and duration

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Comparison

- Sliced MTM Power DC/DC converter with 400 W for railway technology with "cemented joint"



- Partially and fully potted competitor product without "cemented joint"