



Cast In Motion: CIM 500

Additive Manufacturing Casting Resin for Composite Tooling

CIM 500 is a modified epoxy system to be used by Massivit 3D's CIM (Cast In Motion) technology, which was developed for direct printing of tools and molds for the composite materials industry.

Key Advantages:

- Enables isotropic, 3D printed molds
- High heat deflection temperature
- Relatively low thermal expansion

Mechanical Properties

| Character | Testing method | Tested value | |
|--------------------------|----------------------|------------------|--------------------------|
| | | Metric | Imperial |
| Izod Impact (un-notched) | ASTM D4812 / ISO 180 | 60.0 ± 4.0 [J/m] | 1.12 ± 0.004 [ft.lbf/in] |
| Linear Shrinkage | Internal test | 0.1% | 0.1% |
| Shore Hardness | ASTM D2240 | 85D | 85D |
| Tensile | | | |
| Stress at Break | ISO 527 | 50.0 ± 3.1 [MPa] | 7,250 ± 450 [psi] |
| Elongation at Break | ISO 527 | 0.9 ± 0.1% | 0.9 ± 0.1% |
| Elasticity Modulus | ISO 527 | 6.1 ± 0.5 [GPa] | 884,000 ± 72,000 [psi] |
| Flexural | | | |
| Stress at Break | ASTM D790 | 50.7 ± 5.3 [MPa] | 7,350 ± 770 [psi] |
| Elongation at Break | ASTM D790 | 1.2 ± 0.3% | 1.2 ± 0.3% |
| Elasticity Modulus | ASTM D790 | 6.2 ± 0.8 [GPa] | 900,000 ± 110,000 [psi] |
| Compression | | | |
| Compressive Strength | ASTM D695 | 119 [MPa] | 17,260 [psi] |
| Compressive Modulus | ASTM D695 | 2.3 [GPa] | 333,600 [psi] |

Thermal Properties

| Character | Testing method | Tested value | |
|-------------------------|----------------------|-----------------|------------------------|
| | | Metric | Imperial |
| Tg (DSC) | ASTM D3418 | 156 [°C] | 312 [°F] |
| HDT | ASTM D648 / ISO 75-2 | 152 [°C] | 305 [°F] |
| CTE @ 130°C | ASTM D696 | 29 [ppm/°C] | 16 [ppm/°F] |
| Thermal Conductivity, K | ASTM C177 / ISO 8302 | 0.5-0.6 [W/m·k] | 0.30-0.35 [BTU/h·ft·F] |

Physical properties

| Character | Tested value |
|--------------------------|--|
| Mix Ratio by Weight | 75 A: 25 B |
| Mixing Viscosity @45°C | 12,000 [cP] |
| Specific Gravity - Mixed | 1.53 [g/cm ³] |
| Pot Life @60°C | 20 minutes |
| Pot Life @RT | 4 hours |
| Cure Time @RT | 24 Hours & must be followed by post-curing |
| Mixture Color | Gray |

All measurements were done on lab specimens of cured material, followed by a post-cure process. The specifications stated above refer to the Beta version, and results were derived from internal lab tests. The material above is under R&D development.

Storage

The material base -A and hardener -B should be stored in a dry place in the sealed original container at temperatures between +2°C and +40°C. Under these storage conditions, the shelf life is one year. The product should not be exposed to direct sunlight.

Post-Curing Process

To meet the specified properties, CIM 500 should be heat-cured in a dedicated industrial oven. Consult Application Note for detailed instructions. Post-cured CIM 500 specimens can be milled, polished, or coated with a suitable coating or paint. Let coating fully dry before putting part into service.

Precautionary Statement

Massivit maintains up-to-date Material Safety Data Sheets (MSDS) on all of its products. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. Users should review the latest MSDS to determine possible health hazards and appropriate precautions to implement prior to using this material.