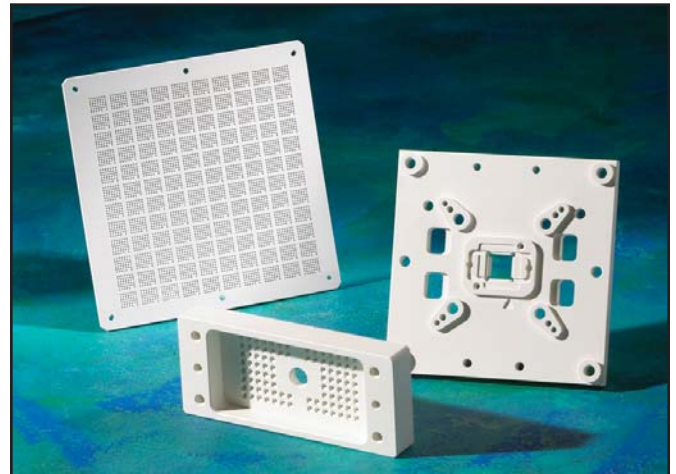


EPM-2204U-W Grade Based on VICTREX® PEEK™ Polymer

PIPER PLASTICS MANUFACTURES MICROPROCESSOR TEST SOCKETS USING ITS PROPRIETARY GRADE

The Semiconductor industry's demand for smaller, tight tolerance IC packages that operate at higher frequencies is making it increasingly difficult for traditional materials previously used for test socket applications. New, high performance test socket components made from a proprietary grade based on VICTREX® PEEK™ polymer are available from Piper Plastics Inc., a precision machined plastics parts manufacturer. This new Piper Plastics grade, designated EPM-2204U-W, provides a competitive advantage in key microprocessor test socket applications due to its significantly lower moisture absorption and tight tolerance machining.

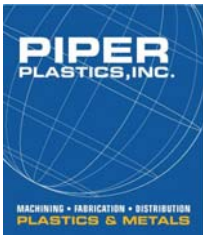
Test sockets are used in the final stage of the semiconductor manufacturing process where the microprocessor chips are plugged into a circuit board for various system function tests. According to Dave Wilkinson, Materials Engineering Manager, Piper Plastics, "Because these chips have hundreds of metal contacts inserted into a single socket over 100,000 times, dimensional stability is critical in making sure the metal contactors are aligned correctly with the circuit board. Our proprietary grade has excellent dimensional stability and tolerance control across a broad range of temperature and humidity conditions."



The EPM-2204U-W grade maintains impact strength, stiffness and minimum levels of creep. When compared to some traditional test socket materials such as polyamideimide (PAI) and other imidized polymers, this grade based on VICTREX PEEK polymer has greater hydrolytic stability. And, when compared with ceramics, it is half the weight and offers greater impact resistance and toughness. It also has excellent processability and wear performance. Additional benefits include good dielectric properties for insulative applications and a clean, white color.

Says Wilkinson, "We machine test socket components from blanks that we mold using the EPM-2204U-W grade. We like the excellent machinability for tighter pitch and fine diameter holes. Our tight tolerance machining and near net injection molding capabilities lend themselves very well to this new grade."





**EPM-2204U-W Grade
Based on VICTREX® PEEK™ Polymer**

TYPICAL PROPERTIES

| PERMANENCE | English | SI Metric | Method |
|-------------------|----------------|------------------|---------------|
| Specific Gravity | 1.51 | 1.51 | D 792 |
| Color | White | White | |

MECHANICAL

| | | | |
|-----------------------------------|---------------|----------|--------|
| Impact Strength, Izod | | | |
| notched 1/8 in (3.2 mm) section | 1.0 ft-lbs/in | 53 J/m | D 256 |
| unnotched 1/8 in (3.2 mm) section | No Break | No Break | D 4812 |
| Tensile Strength | 13000 psi | 90 MPa | D 638 |
| Tensile Elongation | > 10.0 % | > 10.0 % | D 638 |
| Tensile Modulus | 650,000 psi | 4482 MPa | D 638 |
| Flexural Strength | 23,000 psi | 159 MPa | D 790 |
| Flexural Modulus | 650,000 psi | 4482 MPa | D 790 |
| Compressive Strength | 17,000 psi | 117 MPa | D 695 |
| Hardness (Rockwell, M) | 103 | 103 | D 785 |
| Water Absorption, Saturation | .37% | .37% | D 570 |

ELECTRICAL

| | | | |
|----------------------------------|-------------|-------------|-------|
| Dielectric Strength, S/T, in oil | 400 VPM | 15.7 kV/mm | D 149 |
| Dielectric Constant, 1MHz, Dry | 3.5 | 3.5 | D 150 |
| Dissipation Factor, 1MHz, Dry | <0.0050 | <0.0050 | D 150 |
| Volume Resistivity | 1E15 ohm.cm | 1E15 ohm.cm | D 257 |
| Surface Resistivity | >10E13 | >10E13 | |

THERMAL

| | | | |
|------------------------------------|----------------------------------|--------------------------|--------|
| Melting Point | 645°F | 341°C | D 3418 |
| T _g Glass Transition | 290°F | 143°C | D 3418 |
| Heat Deflection Temperature | | | |
| @ 66 psi (455 kPa) | >500°F | >260°C | D 648 |
| Coeff. Of Linear Thermal Expansion | 2.0x10 ⁻⁵ /°F | 3.6x10 ⁻⁵ /°C | E 831 |
| Thermal Conductivity | 2.40 BTU.in/hrft ² °F | 0.35 W/m.K | E 1530 |

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