

PRODUCT INFORMATION

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|--|--|--|--------------------|--------------|
| PRODUCT | <i>(TYPICAL PROPERTIES)</i> These should not be considered as specifications. | | | |
| | TOUGH-SEAL 23 A/B (KEY PC2023A/B) HIGH VISCOSITY TOUGH-SEAL | | | |
| DESCRIPTION | <p>KEY PC2023A/B is a tough and durable two component, hybrid epoxy elastomer that features a higher viscosity than KEY Tough-Seal 21 to limit lateral flow in "glob top" encapsulation. KEY PC2023A/B is a superior electrical potting compound with excellent thermal cycling performance. It maintains this exceptional flexibility from -40°C to 150°C (-40°F to 300°F) and it resists contraction during thermal cycles so it protects sensitive electronics. Since KEY PC2023A/B is an epoxy and not a urethane, it does not incorporate isocyanates and KEY PC2023A/B has a mild health and safety profile.</p> | | | |
| ADVANTAGES & APPLICATIONS | <ul style="list-style-type: none"> ✓ Excellent Thermal Cycling Performance & Thermal Shock Resistance ✓ Resilient, Tough, Durable, High Elongation ✓ Low Embedment Stress on Electronics, Low Shrinkage ✓ Adhesion to Thermoplastics and Wire Insulation, Specific Adhesion to Aluminum | | | |
| PHYSICAL PROPERTIES <i>(Typical)</i> | | KEY PC2023A | KEY PC2023B | MIX |
| | Color | Off White | Black | Grey / Black |
| | Viscosity at 25°C | Paste | Paste | Paste |
| | Specific Gravity | 1.34 | 1.28 | 1.29 |
| | Density (lbs/gal) | 11.2 | 10.7 | 10.8 |
| CURED PROPERTIES <i>(Typical)</i> | Property | ASTM | Temperature | Value |
| | Elongation at Break | D638 | 25°C (77°F) | 225% |
| | Hardness, Shore A | D2240 | 25°C (77°F) | 64A |
| CURE SCHEDULE <i>(Typical)</i> | Gel Time (100g): | 10 minutes at 25°C (77°F) | | |
| | Hard Cure | Overnight at 25°C (77°F) | | |
| | Full Cure | 3 to 5 Days, Dependent on part size | | |
| | Accelerated Cure | Yes, Mild Heating 66 to 80°C (150-175°F) | | |
| INSTRUCTIONS FOR USE | MIX RATIO By | WEIGHT | VOLUME | |
| | KEY PC2023 Part A | 52 A | 1 A | |
| | KEY PC2023 Part B | 100 B | 2 B | |
| | Combine Part A and B and mix thoroughly, being careful to limit entrapped air during mixing. Scrape sides, walls and bottom of container. Pour material into part and cure. Bulk meter-mix dispensing machines and convenient cartridges provide air free mixing. | | | |
| SAFETY & HANDLING | PLEASE READ MATERIAL SAFETY DATA SHEET BEFORE USING. Avoid all contact with skin, eyes, clothing and food. Wash thoroughly after handling. | | | |
| SHELF LIFE & STORAGE INFO <i>For Unopened, Factory Sealed Containers</i> | Tough-Seal 23A | 3 Months from Date of Shipment (4.5°C to 32.2°C) | | |
| | Tough-Seal 23A | 12 Months from Date of Shipment (-28.8°C to 4.4°C) | | |
| | Tough-Seal 23B | 12 Months from Date of Manufacture (-28.8°C to 32.2°C) | | |
| | Tough-Seal 23AB Cartridges | 3 Months from Date of Shipment (4.5°C to 32.2°C) | | |
| | Tough-Seal 23AB Cartridges | 12 Months from Date of Shipment (-28.8°C to 4.4°C) | | |

DCO# 5082 Revision AB

KEY POLYMER
CORPORATION

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SPECIALTY CHEMICAL COMPOUNDS

17 Shepard Street, Lawrence, MA 01843-1023 ■ 978/683-9411 ■ FAX 978/686-7729

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| | TOUGH-SEAL 23 A/B (KEY PC2023A/B) HIGH VISCOSITY TOUGH-SEAL | | | | | |
| CURED PROPERTIES <i>(Typical) Page 2</i> | Electrical Properties | | | | | |
| | | ASTM | Temperature | Value | | |
| | Dielectric Strength | D149 | 25°C (77°F) | 350 Volts/mil | | |
| | Volume Resistivity | D257 | 25°C (77°F) | 1.2 x 10 ¹² Ω-cm | | |
| | Dielectric Constant | 1 MHz | D150 | 25°C (77°F) | 5.00 | |
| | | | 1 kHz | D150 | 25°C (77°F) | 5.50 |
| | | | | D150 | 25°C (77°F) | 5.75 |
| | Dissipation Factor | 1 MHz | D150 | 25°C (77°F) | 0.026 | |
| | | | 1 kHz | D150 | 25°C (77°F) | 0.028 |
| | | | | D150 | 25°C (77°F) | 0.064 |
| | Thermal Properties | | | | | |
| | | ASTM | Condition | Value | | |
| | Heat Capacity, Cp | E1461 | 25°C (77°F) | 1.37 J/g°K | | |
| | Thermal Conductivity | E1461 | 25°C (77°F) | 0.26 W/m°K | | |
| | Coefficient of Thermal Expansion | E831 E1545 | -65°C to 75°C | 135 ppm/°C | | |
| | | | 75°C to 100°C | 0 ppm/°C | | |
| | | | 100°C to 150°C | 75 ppm/°C | | |
| | Mechanical Properties | | | | | |
| | | ASTM | Condition | Value | | |
| | Tensile Strength | D638 | 25°C (77°F) | 450 psi | | |
| | Elongation at Break | D638 | 25°C (77°F) | 225% | | |
| | Linear Shrinkage (Upon Cure) | D2256 | 25°C (77°F) | <0.001 in/in | | |
| | Hardness vs Temperature Shore A | D2240 | -75°C (-103°F) | 88 A | | |
| | | D2240 | -25°C (-13°F) | 75 A | | |
| | | D2240 | 5°C (41°F) | 69 A | | |
| | | D2240 | 25°C (77°F) | 64 A | | |
| | | D2240 | 50°C (122°F) | 62 A | | |
| | | D2240 | 66°C (150°F) | 61 A | | |
| | | D2240 | 80°C (176°F) | 62 A | | |
| | | D2240 | 100°C (212°F) | 57 A | | |
| | | D2240 | 120°C (248°F) | 51 A | | |
| | | D2240 | 150°C (302°F) | 47 A | | |
| Hardness vs RT Cure | 1 Hour 2 Hours 4 Hours 8 Hours 12 Hours 1 Day 2 Days 3 Days 4 Days 1 Week 1 Month | D2240 | 25°C (77°F) | 15 A | | |
| | | D2240 | 25°C (77°F) | 26 A | | |
| | | D2240 | 25°C (77°F) | 31 A | | |
| | | D2240 | 25°C (77°F) | 35 A | | |
| | | D2240 | 25°C (77°F) | 35 A | | |
| | | D2240 | 25°C (77°F) | 39 A | | |
| | | D2240 | 25°C (77°F) | 46 A | | |
| | | D2240 | 25°C (77°F) | 52 A | | |
| | | D2240 | 25°C (77°F) | 57 A | | |
| | | D2240 | 25°C (77°F) | 60 A | | |
| | | D2240 | 25°C (77°F) | 68 A | | |

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(TYPICAL PROPERTIES)

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PRODUCT

TOUGH-SEAL 23 A/B (KEY PC2023A/B)
HIGH VISCOSITY TOUGH-SEAL

CURED PROPERTIES
(Typical) Page 3

| METALLIC ADHESION | ASTM | Temperature | Value |
|---|-------|-------------|--------------|
| Tensile Lap Shear Strength, 1" x 4" Adherands, 20 mil bondline gap, 1 inch overlap Co = Cohesive Bond Mode Ad = Adhesive Bond Mode | | | |
| Aluminum Bare | D1002 | 25°C (77°F) | 540 psi [Co] |
| Steel Bare | D1002 | 25°C (77°F) | 530 psi [Ad] |
| Steel Ground | D1002 | 25°C (77°F) | 480 psi [Co] |
| Primed Steel | D1002 | 25°C (77°F) | 530 psi [Co] |
| Galvanized Steel | D1002 | 25°C (77°F) | 560 psi [Co] |
| Tin Plated Steel | D1002 | 25°C (77°F) | 470 psi [Co] |
| Chrome Plated Steel | D1002 | 25°C (77°F) | 560 psi [Co] |
| FRP ADHESION | ASTM | Temperature | Value |
| Tensile Lap Shear Strength, 1" x 4" Adherands, 20 mil bondline gap, 1 inch overlap Co = Cohesive Bond Mode Ad = Adhesive Bond Mode | | | |
| FRP – Polyester Fiberglass | D3163 | 25°C (77°F) | 540 psi [Co] |
| Garolite G-9 Melamine/Glass | D3163 | 25°C (77°F) | 530 psi [Co] |
| Garolite G-10 Epoxy/Glass | D3163 | 25°C (77°F) | 550 psi [Co] |
| Garolite XX Phenolic/Paper | D3163 | 25°C (77°F) | 570 psi [Co] |
| THERMOPLASTIC ADHESION | ASTM | Temperature | Value |
| Tensile Lap Shear Strength, 1" x 4" Adherands, 20 mil bondline gap, 1 inch overlap Co = Cohesive Bond Mode Ad = Adhesive Bond Mode | | | |
| Acrylic | D3163 | 25°C (77°F) | 560 psi [Co] |
| Acrylic / PVC | D3163 | 25°C (77°F) | 430 psi [Co] |
| PVC - Polyvinyl Chloride | D3163 | 25°C (77°F) | 530 psi [Co] |
| CPVC - Chlorinated PVC | D3163 | 25°C (77°F) | 660 psi [Co] |
| ABS Acrylonitrile Butadiene Styrene | D3163 | 25°C (77°F) | 500 psi [Co] |
| PETG Polyethylene Terephthalate | D3163 | 25°C (77°F) | 610 psi [Co] |
| Lexan - Polycarbonate | D3163 | 25°C (77°F) | 520 psi [Co] |
| Nylon 6/6 - Polyamide | D3163 | 25°C (77°F) | 520 psi [Co] |
| Polypropylene | D3163 | 25°C (77°F) | 50 psi [Ad] |
| Polyethylene LDPE | D3163 | 25°C (77°F) | 20 psi [Ad] |
| Polyethylene HDPE | D3163 | 25°C (77°F) | 40 psi [Ad] |
| Teflon PTFE Polytetrafluoroethylene | D3163 | 25°C (77°F) | 40 psi [Ad] |
| Noryl Polyphenylene Oxide/Polystyrene | D3163 | 25°C (77°F) | 220 psi [Ad] |
| Ultem - Polyetherimide | D3163 | 25°C (77°F) | 540 psi [Co] |

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**KEY POLYMER CORP.
LAWRENCE, MA 01843**

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