

Product Update Memo

May, 2006

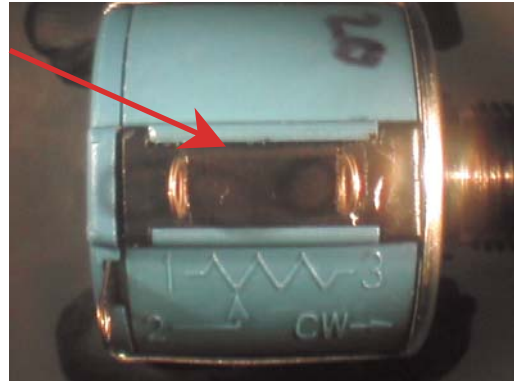
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Bourns® Sensors & Controls Division Announces Model 3540 Series Material Change

Bourns® Sensors and Controls Division will be changing the plastic material used in molding the terminal block of our Models 3540, 3541, 3543 and 3545. The change from Fortron 6165A4 to Thermocomp® OF-1008 is due to a phase out of the Fortron material at our current supplier and the lack of availability from other suppliers.

Thermocomp® material is equivalent to the Fortron material and has been qualified for use in the standard 3540 series product. Please reference the adjacent photo identifying the terminal block. There is no change in fit, form or function on any of the models listed.

The transition to Thermocomp® material is currently in progress for standard catalog part numbers. Thermocomp® plastic is a UL rated (V-0) engineering material. Attached you will find data sheets for both Fortron and Thermocomp® plastics for your review. The UL certification for Thermocomp® is QMFZ2.E45195 and is available on the UL website at www.ul.com



Thermocomp® is a registered trademark of General Electric Custom Engineered Products Division.


FORTRON 6165A4 | PPS-X65 | Mineral / Glass Reinforced
Description

Fortron 6165A4 offers a unique balance of properties based on a high mineral and glass reinforced composition. The heat resistance under load bearing conditions is excellent for this product. As with all Fortron grades this product is inherently flame-retardant. Applications include electronic components (i.e. lamp houses, connection parts and sockets) and components in industry (i.e. pumps and pistons).

Physical properties

| | Value Unit | Test Standard |
|------------------------------|-------------------------------|----------------------|
| Density | 1950 kg/m ³ | ISO 1183 |
| Molding shrinkage (parallel) | 0.2 - 0.6 % | ISO 294-4 |
| Molding shrinkage (normal) | 0.3 - 0.7 % | ISO 294-4 |
| Water absorption | 0.02 % | ISO 62 |

Mechanical properties

| | Value Unit | Test Standard |
|---|-----------------------------|----------------------|
| Tensile modulus | 19000 MPa | ISO 527-2/1A |
| Stress at break (5mm/min) | 130 MPa | ISO 527-2/1A |
| Strain at break (5mm/min) | 1.2 % | ISO 527-2/1A |
| Flexural modulus (23 °C) | 18800 MPa | ISO 178 |
| Flexural stress @ break | 210 MPa | ISO 178 |
| Charpy impact strength (+23 °C) | 20 kJ/m ² | ISO 179/1eU |
| Charpy impact strength (-30 °C) | 20 kJ/m ² | ISO 179/1eU |
| Charpy notched impact strength (+23 °C) | 7 kJ/m ² | ISO 179/1eA |
| Charpy notched impact strength (-30 °C) | 7 kJ/m ² | ISO 179/1eA |
| Unnotched impact str (Izod) @ 23 °C | 20 kJ/m ² | ISO 180/1U |
| Notched impact strength (Izod) @ 23 °C | 6 kJ/m ² | ISO 180/1A |
| Notched impact strength (Izod) @-30 °C | 6 kJ/m ² | ISO 180/1A |
| Rockwell hardness | 100 M-Scale | ISO 2039-2 |

Thermal properties

| | Value Unit | Test Standard |
|--|--------------------|----------------------|
| Melting temperature (10 °C/min) | 280 °C | ISO 11357-1,-2,-3 |
| Glass transition temperature (10 °C/min) | 90 °C | ISO 11357-1,-2,-3 |
| Temp. of deflection under load (1.80 MPa) | 270 °C | ISO 75-1/-2 |
| Temp. of deflection under load (8.00 MPa) | 215 °C | ISO 75-1/-2 |
| Coeff.of linear therm. expansion (parallel) | 0.19 E-4/°C | ISO 11359-2 |
| Coeff.of linear therm. expansion (normal) | 0.24 E-4/°C | ISO 11359-2 |
| Oxygen index | 53 % | ISO 4589 |
| Burning Behav. at 1.6mm nom. thickn.(ISO 1210) | V-0 class | UL94 |
| Thickness tested | 1.5 mm | UL94 |
| Burning Behav. at thickness h (ISO 1210) | V-0 class | UL94 |
| Thickness tested | 0.75 mm | UL94 |
| Burning Behav. 5V at thickn. H (ISO 10351) | 5VA class | UL94 |
| Thickness tested | 3 mm | UL94 |

Electrical properties

| | Value Unit | Test Standard |
|-------------------------------|-----------------------|----------------------|
| Relative permittivity - 10kHz | 5.4 - | IEC 60250 |
| Relative permittivity (1 MHz) | 5.6 - | IEC 60250 |
| Dissipation factor - 10kHz | 10 E-4 | IEC 60250 |
| Dissipation factor (1 MHz) | 20 E-4 | IEC 60250 |
| Volume resistivity | >1E15 Ohm*m | IEC 60093 |
| Surface resistivity | >1E15 Ohm | IEC 60093 |
| Electric strength | 25 kV/mm | IEC 60243-1 |
| Comparative tracking index | 175 - | IEC 60112 |

Test specimen production

| | Value Unit | Test Standard |
|--|-------------------|----------------------|
|--|-------------------|----------------------|

| | | |
|-------------------------------------|---------------------|---------|
| Injection Molding, melt temperature | 310 - 340 °C | ISO 294 |
| Injection Molding, mold temperature | 135 - 160 °C | ISO 294 |

| Rheological Calculation properties | Value Unit | Test Standard |
|------------------------------------|----------------------|---------------|
| Spec. heat capacity of melt | 1600 J/(kg K) | Internal |

Other Processing

Injection Molding

On injection molding machines with 15-25 D long three-section screws, are usual in the trade, the unreinforced FORTRON is processable. A shut-off nozzle is preferred to a free-flow nozzle.

| | | |
|-----------------------|--------------|------|
| Melt temperature | 320-340 | degC |
| Mold wall temperature | at least 140 | degC |

A medium injection rate is normally preferred. All mold cavities must be effectively vented.

Disclaimer

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colorants or other additives may cause significant variations in data values. Properties of molded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design, processing conditions and environmental exposure. Any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. The information contained in this publication should not be construed as a promise or guarantee of specific properties of our products. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that exist. We recommend that persons intending to rely on any recommendation or to use any equipment, processing technique or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards. We strongly recommend that users seek and adhere to the manufacturer's current instructions for handling each material they use, and entrust the handling of such material to adequately trained personnel only. Please call the telephone numbers listed listed (+49 (0) 69 30516299 for Europe and +1 908 598-4169 for the Americas) for additional technical information. Call Customer Services for the appropriate Materials Safety Data Sheets (MSDS) before attempting to process our products. The products mentioned herein are not intended for use in medical or dental implants.



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Thursday

Thermocomp® OF-1008

LNP Engineering Plastics Inc. - Polyphenylene Sulfide

Actions

-- - ISO Data Sheet

Product Characteristics

| | |
|--------------------------|-----------------------------|
| Material Status | ● Commercial: Active |
| Availability | ● North America |
| Test Standards Available | ● ASTM |
| Filler/Reinforcement | ● Glass fiber reinforcement |
| Forms | ● Pellets |
| Processing Method | ● Injection Molding |

Properties ¹

| Physical | Nominal Values (English) | Test Method |
|--------------------------------------|--------------------------|-------------|
| Density -Specific Gravity (Method A) | 1.70 sp gr 23/23 °C | ASTM D792 |
| Mold Shrink, Linear-Flow | 0.0030 in/in | ASTM D955 |
| Mold Shrink, Linear-Trans | 0.010 in/in | ASTM D955 |

| Mechanical | Nominal Values (English) | Test Method |
|--|----------------------------------|-------------|
| Tensile Strength @ Break | 23300 psi | ASTM D638 |
| Tensile Elongation @ Brk | 1.5 % | ASTM D638 |
| Flexural Modulus | 2060000 psi | ASTM D790 |
| Flexural Strength | 34000 psi | ASTM D790 |
| Coef. of Friction | | ASTM D1894 |
| (vs. Steel - Dynamic) | 0.41 | |
| (vs. Steel - Static) | 0.50 | |
| Wear Factor (10 ⁻¹⁰) (40 psi, 50 ft/min) | 373 in ⁵ -min/ft-lb-h | |

| Impact | Nominal Values (English) | Test Method |
|----------------------------------|--------------------------|-------------|
| Notched Izod Impact (0.125 in) | 1.80 ft-lb/in | ASTM D256 |
| Unnotched Izod Impact (0.125 in) | 9.82 ft-lb/in | ASTM D256 |

| Thermal | Nominal Values (English) | Test Method |
|---------------------------|--------------------------|-------------|
| DTUL @264psi - Unannealed | 508 °F | ASTM D648 |

Additional Properties

The values displayed above as Coef. of Friction and Wear Factor were tested in accordance with LNP WI-0687.

COEFFICIENT OF FRICTION vs. Steel, Dynamic @ 40 psi, 50 ft/min, LNP WI-0687: 0.41

COEFFICIENT OF FRICTION vs. Steel, Static @ 40 psi, LNP WI-0687: 0.5

WEAR FACTOR @ 40 psi, 50 ft/min, LNP WI-0687: 373 10⁻¹⁰ in⁵-min/ft-lb-hr

Processing Information

| Injection Molding Parameters | Nominal Values (English) | Test Method |
|------------------------------|--------------------------|-------------|
| Drying Temperature | 250 to 300 °F | |
| Drying Time | 4.0 hr | |
| Processing (Melt) Temp | 600 to 610 °F | |
| Mold Temperature | 275 to 325 °F | |
| Back Pressure | 25.0 to 50.0 psi | |

Notes

¹ Typical properties; not to be construed as specifications.

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