

# Celanex® 3216

Polybutylene Terephthalate

Celanese Corporation

## Message:

Celanex 3216 is a non-exuding (UL and CSA approved V-0 at 1/32 inch and 5V at 1/8 inch ), 15% fiberglass reinforced polybutylene terephthalate which has an excellent balance of mechanical properties and processability. It is well suited for electrical connector applications where its UL approved 50% regrind use capability allows maximum use of purchased product.

| General Information    |                                                                                         |               |
|------------------------|-----------------------------------------------------------------------------------------|---------------|
| UL YellowCard          | E42337-234671                                                                           | E45575-239383 |
| Filler / Reinforcement | Glass fiber reinforced material, 15% filler by weight                                   |               |
| Features               | Workability, good                                                                       |               |
| Uses                   | Electrical/Electronic Applications<br>Connector                                         |               |
| RoHS Compliance        | Contact manufacturer                                                                    |               |
| Multi-Point Data       | Isothermal Stress vs. Strain (ISO 11403-1)<br>Shear Stress vs. Shear Rate (ISO 11403-1) |               |

| Physical                                     | Nominal Value | Unit                   | Test Method         |
|----------------------------------------------|---------------|------------------------|---------------------|
| Specific Gravity                             | 1.54          | g/cm <sup>3</sup>      | ASTM D792, ISO 1183 |
| Melt Volume-Flow Rate (MVR) (250°C/2.16 kg)  | 9.00          | cm <sup>3</sup> /10min | ISO 1133            |
| Molding Shrinkage                            |               |                        |                     |
| Flow                                         | 0.40 - 0.60   | %                      | ASTM D955           |
| Vertical flow direction                      | 1.1           | %                      | ISO 294-4           |
| Flow direction                               | 0.30 - 0.60   | %                      | ISO 294-4           |
| Water Absorption (Equilibrium, 23°C, 50% RH) | 0.17          | %                      | ISO 62              |
| Hardness                                     | Nominal Value | Unit                   | Test Method         |
| Rockwell Hardness (M-Scale)                  | 87            |                        | ISO 2039-2          |
| Mechanical                                   | Nominal Value | Unit                   | Test Method         |
| Tensile Modulus                              | 6700          | MPa                    | ISO 527-2/1A/1      |
| Tensile Strength                             |               |                        |                     |
| Fracture, 23°C                               | 100           | MPa                    | ASTM D638           |
| Fracture                                     | 100           | MPa                    | ISO 527-2/1A/5      |
| Tensile Elongation                           |               |                        |                     |
| Fracture, 23°C                               | 4.0           | %                      | ASTM D638           |
| Fracture                                     | 3.0           | %                      | ISO 527-2/1A/5      |
| Flexural Modulus (23°C)                      | 6000          | MPa                    | ISO 178             |
| Flexural Stress (23°C)                       | 155           | MPa                    | ISO 178             |

| Impact                                    | Nominal Value | Unit              | Test Method             |
|-------------------------------------------|---------------|-------------------|-------------------------|
| Charpy Notched Impact Strength            |               |                   | ISO 179/1eA             |
| -30°C                                     | 6.0           | kJ/m <sup>2</sup> | ISO 179/1eA             |
| 23°C                                      | 6.0           | kJ/m <sup>2</sup> | ISO 179/1eA             |
| Charpy Unnotched Impact Strength          |               |                   | ISO 179/1eU             |
| -30°C                                     | 28            | kJ/m <sup>2</sup> | ISO 179/1eU             |
| 23°C                                      | 28            | kJ/m <sup>2</sup> | ISO 179/1eU             |
| Notched Izod Impact (23°C)                | 5.5           | kJ/m <sup>2</sup> | ISO 180/1A              |
| Thermal                                   | Nominal Value | Unit              | Test Method             |
| Heat Deflection Temperature               |               |                   |                         |
| 0.45 MPa, not annealed                    | 217           | °C                | ISO 75-2/B              |
| 0.45 MPa, annealed                        | 213           | °C                | ASTM D648               |
| 1.8 MPa, not annealed                     | 185           | °C                | ASTM D648               |
| 1.8 MPa, not annealed                     | 200           | °C                | ISO 75-2/A              |
| 8.0 MPa, not annealed                     | 95.0          | °C                | ISO 75-2/C              |
| Glass Transition Temperature <sup>1</sup> | 60.0          | °C                | ISO 11357-2             |
| Vicat Softening Temperature               | 206           | °C                | ISO 306/B50             |
| Melting Temperature <sup>2</sup>          | 225           | °C                | ISO 11357-3, ASTM D3418 |
| Linear thermal expansion coefficient      |               |                   | ISO 11359-2             |
| Flow                                      | 3.6E-5        | cm/cm/°C          | ISO 11359-2             |
| Lateral                                   | 1.0E-4        | cm/cm/°C          | ISO 11359-2             |
| Electrical                                | Nominal Value | Unit              | Test Method             |
| Surface Resistivity                       | 1.0E+15       | ohms              | IEC 60093               |
| Volume Resistivity                        |               |                   |                         |
| --                                        | 2.0E+16       | ohms · cm         | ASTM D257               |
| --                                        | 1.0E+15       | ohms · cm         | IEC 60093               |
| Dielectric Strength                       |               |                   |                         |
| -- <sup>3</sup>                           | 26            | kV/mm             | ASTM D149               |
| --                                        | 30            | kV/mm             | IEC 60243-1             |
| Dielectric Constant                       |               |                   |                         |
| 1 MHz                                     | 3.20          |                   | ASTM D150               |
| 100 Hz                                    | 3.70          |                   | IEC 60250               |
| 1 MHz                                     | 3.50          |                   | IEC 60250               |
| Dissipation Factor                        |               |                   |                         |
| 1 MHz                                     | 0.010         |                   | ASTM D150               |
| 100 Hz                                    | 3.3E-3        |                   | IEC 60250               |
| 1 MHz                                     | 0.016         |                   | IEC 60250               |
| Arc Resistance                            | 79.0          | sec               | ASTM D495               |
| Comparative Tracking Index                | 250           | V                 | IEC 60112, ASTM D3638   |
| Flammability                              | Nominal Value | Unit              | Test Method             |
| Flame Rating                              |               |                   | UL 94                   |
| 0.380 mm                                  | V-0           |                   | UL 94                   |

| 3.00 mm                                                                                          | 5VA                   | UL 94 |
|--------------------------------------------------------------------------------------------------|-----------------------|-------|
| Oxygen Index                                                                                     | 27 - 32               | %     |
| ISO 4589-2                                                                                       |                       |       |
| Injection                                                                                        | Nominal Value         | Unit  |
| Drying Temperature                                                                               | 120 - 130             | °C    |
| Drying Time                                                                                      | 4.0                   | hr    |
| Suggested Max Moisture                                                                           | 0.020                 | %     |
| Suggested Max Regrind                                                                            | 50                    | %     |
| Hopper Temperature                                                                               | 20.0 - 50.0           | °C    |
| Rear Temperature                                                                                 | 230 - 240             | °C    |
| Middle Temperature                                                                               | 235 - 250             | °C    |
| Front Temperature                                                                                | 235 - 250             | °C    |
| Nozzle Temperature                                                                               | 250 - 255             | °C    |
| Processing (Melt) Temp                                                                           | 235 - 255             | °C    |
| Mold Temperature                                                                                 | 65.0 - 93.0           | °C    |
| Injection Rate                                                                                   | Moderate-Fast         |       |
| Back Pressure                                                                                    | 0.00 - 0.345          | MPa   |
| Injection instructions                                                                           |                       |       |
| Manifold Temperature: 250 to 260°CZone 4 Temperature: 240 to 255°CFeed Temperature: 230 to 240°C |                       |       |
| NOTE                                                                                             |                       |       |
| 1.                                                                                               | 10°C/min              |       |
| 2.                                                                                               | 10°C/min              |       |
| 3.                                                                                               | Method A (short time) |       |

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