

# Zytel® 103HSL NC010

NYLON RESIN  
DuPont Performance Polymers

Message:  
Unreinforced, Heat Stabilized, Polyamide 66

| General Information                        |      |                                              |                    |             |
|--------------------------------------------|------|----------------------------------------------|--------------------|-------------|
| UL YellowCard                              |      | E41938-234370                                |                    |             |
| Additive                                   |      | Heat Stabilizer                              |                    |             |
|                                            |      | Lubricant                                    |                    |             |
|                                            |      | Mold Release                                 |                    |             |
| Features                                   |      | Heat Stabilized                              |                    |             |
|                                            |      | Lubricated                                   |                    |             |
| Agency Ratings                             |      | UL Unspecified Rating                        |                    |             |
| Forms                                      |      | Pellets                                      |                    |             |
| Processing Method                          |      | Coating                                      |                    |             |
|                                            |      | Extrusion                                    |                    |             |
|                                            |      | Injection Molding                            |                    |             |
| Multi-Point Data                           |      | Isothermal Stress vs. Strain (ISO 11403-1)   |                    |             |
|                                            |      | Secant Modulus vs. Strain (ISO 11403-1)      |                    |             |
|                                            |      | Shear Modulus vs. Temperature (ISO 11403-1)  |                    |             |
|                                            |      | Shear Stress vs. Shear Rate (ISO 11403-1)    |                    |             |
|                                            |      | Specific Volume vs Temperature (ISO 11403-2) |                    |             |
|                                            |      | Viscosity vs. Shear Rate (ISO 11403-2)       |                    |             |
| Part Marking Code (ISO 11469)              |      | >PA66<                                       |                    |             |
| Resin ID (ISO 1043)                        |      | PA66                                         |                    |             |
| Physical                                   | Dry  | Conditioned                                  | Unit               | Test Method |
| Density                                    | 1.14 | --                                           | g/cm <sup>3</sup>  | ISO 1183    |
| Molding Shrinkage                          |      |                                              |                    | ISO 294-4   |
| Across Flow                                | 1.3  | --                                           | %                  |             |
| Flow                                       | 1.3  | --                                           | %                  |             |
| Water Absorption                           |      |                                              |                    | ISO 62      |
| 23°C, 24 hr, 2.00 mm                       | 8.5  | --                                           | %                  |             |
| Equilibrium, 23°C, 2.00 mm, 50% RH         | 2.6  | --                                           | %                  |             |
| Viscosity Number (90% HCOOH (Formic Acid)) | 136  | --                                           | cm <sup>3</sup> /g | ISO 307     |

| Mechanical                                | Dry                   | Conditioned | Unit              | Test Method |
|-------------------------------------------|-----------------------|-------------|-------------------|-------------|
| Tensile Modulus                           | 3100                  | 1400        | MPa               | ISO 527-2   |
| Tensile Stress (Yield)                    | 85.0                  | 58.0        | MPa               | ISO 527-2   |
| Tensile Strain (Yield)                    | 4.5                   | 25          | %                 | ISO 527-2   |
| Nominal Tensile Strain at Break           | 20                    | > 50        | %                 | ISO 527-2   |
| Tensile Creep Modulus                     |                       |             |                   | ISO 899-1   |
| 1 hr                                      | --                    | 1190        | MPa               |             |
| 1000 hr                                   | --                    | 540         | MPa               |             |
| Flexural Modulus                          | 2800                  | 1200        | MPa               | ISO 178     |
| Films                                     | Dry                   | Conditioned | Unit              | Test Method |
| Tensile Elongation - MD (Yield)           | 4.5                   | --          | %                 | ISO 527-3   |
| Impact                                    | Dry                   | Conditioned | Unit              | Test Method |
| Charpy Notched Impact Strength            |                       |             |                   | ISO 179/1eA |
| -30°C                                     | 4.5                   | 3.5         | kJ/m <sup>2</sup> |             |
| 23°C                                      | 5.5                   | 12          | kJ/m <sup>2</sup> |             |
| Charpy Unnotched Impact Strength          |                       |             |                   | ISO 179/1eU |
| -30°C                                     | 400 kJ/m <sup>2</sup> | No Break    |                   |             |
| 23°C                                      | No Break              | No Break    |                   |             |
| Notched Izod Impact Strength              |                       |             |                   | ISO 180/1A  |
| -40°C                                     | 5.5                   | --          | kJ/m <sup>2</sup> |             |
| -30°C                                     | 6.0                   | 5.0         | kJ/m <sup>2</sup> |             |
| 23°C                                      | 5.0                   | 10          | kJ/m <sup>2</sup> |             |
| Unnotched Izod Impact Strength            |                       |             |                   | ISO 180/1U  |
| -30°C                                     | 300 kJ/m <sup>2</sup> | No Break    |                   |             |
| 23°C                                      | No Break              | No Break    |                   |             |
| Thermal                                   | Dry                   | Conditioned | Unit              | Test Method |
| Heat Deflection Temperature               |                       |             |                   |             |
| 0.45 MPa, Unannealed                      | 200                   | --          | °C                | ISO 75-2/B  |
| 1.8 MPa, Unannealed                       | 70.0                  | --          | °C                | ISO 75-2/A  |
| Glass Transition Temperature <sup>1</sup> | 60.0                  | --          | °C                | ISO 11357-2 |
| Vicat Softening Temperature               | 240                   | --          | °C                | ISO 306/B50 |
| Melting Temperature <sup>2</sup>          | 262                   | --          | °C                | ISO 11357-3 |
| CLTE                                      |                       |             |                   | ISO 11359-2 |
| Flow                                      | 1.0E-4                | --          | cm/cm/°C          |             |
| Transverse                                | 1.1E-4                | --          | cm/cm/°C          |             |
| Electrical                                | Dry                   | Conditioned | Unit              | Test Method |

|                                            |          |             |                   |             |
|--------------------------------------------|----------|-------------|-------------------|-------------|
| Surface Resistivity                        | 1.0E+12  | --          | ohms              | ASTM D257   |
| Volume Resistivity                         | 1.0E+15  | 1.0E+13     | ohms·cm           | IEC 60093   |
| Electric Strength                          | 31       | 28          | kV/mm             | IEC 60243-1 |
| Dielectric Constant                        |          |             |                   |             |
| 100 Hz                                     | 3.60     | --          |                   | ASTM D150   |
| 1 MHz                                      | 3.50     | --          |                   | ASTM D150   |
| 100 Hz                                     | 3.80     | 12.8        |                   | IEC 60250   |
| 1 MHz                                      | 3.50     | 4.00        |                   | IEC 60250   |
| Dissipation Factor                         |          |             |                   |             |
| 100 Hz                                     | 7.5E-3   | 0.58        |                   |             |
| 1 MHz                                      | 0.017    | 0.070       |                   |             |
| Comparative Tracking Index (CTI) (3.00 mm) | PLC 0    | --          |                   | UL 746      |
| Comparative Tracking Index                 | 600      | --          | V                 | IEC 60112   |
| Flammability                               | Dry      | Conditioned | Unit              | Test Method |
| Flammability Classification                |          |             |                   |             |
| 0.710 mm                                   | V-2      | --          |                   |             |
| 1.50 mm                                    | V-2      | --          |                   |             |
| Oxygen Index                               | 28       | --          | %                 | ISO 4589-2  |
| Fill Analysis                              | Dry      | Conditioned | Unit              | Test Method |
| Melt Density                               | 0.980    | --          | g/cm <sup>3</sup> |             |
| Specific Heat Capacity of Melt             | 2790     | --          | J/kg/°C           |             |
| Thermal Conductivity of Melt               | 0.16     | --          | W/m/K             |             |
| Effective Thermal Diffusivity              | 0.0500   | --          | cSt               |             |
| Emission of Organic Compounds              | 2.10     | --          | µgC/g             | VDA 277     |
| Odor                                       | 2.5      | --          |                   | VDA 270     |
| NOTE                                       |          |             |                   |             |
| 1.                                         | 10°C/min |             |                   |             |
| 2.                                         | 10°C/min |             |                   |             |

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