

# Vydyne® R513H BK02

Polyamide 66

Ascend Performance Materials Operations LLC

Message:

Vydyne R513H BK02 is high-flow, 13% glass-fiber reinforced, heat-stabilized PA66 resin. Available in black, it is an injection-molding grade resin that is lubricated for machine feed, flow, and mold release. Glass-reinforced Vydyne resins provide a higher heat distortion temperature, better resistance to creep, higher impact, and better dimensional stability when compared with unreinforced PA66. This product has good chemical resistance to a broad range of chemicals, including many aliphatic and aromatic hydrocarbons found in most solvents, gasoline, hydraulic fluids, greases and machine oils. Vydyne R513H BK02 has tensile strength and modulus properties just below aluminum and zinc and can replace these metals in numerous applications due to an excellent balance of properties. Reduction in production costs, energy consumption and part weight are key advantages of Vydyne glass-reinforced PA66 resins over aluminum and/or zinc die-cast parts.

Vydyne R513H BK02 is heat-stabilized and formulated to minimize the oxidative and thermal degradation of the PA66 polymer when exposed to elevated temperatures for extended periods of time. Vydyne R513H BK02 provides improved retention of physical properties under exposure to long-term heat. The continuous operating use temperature is 275° F, with short-term peak temperatures as high as 475° F.

Typical Applications/End Uses:

Vydyne R513H BK02 resin has been used for many under-the-hood automotive applications, motor housings for power tools and garden appliances. This resin has also been used in miscellaneous brackets, gears and clips, which require high rigidity and strength.

| General Information    |                                  |
|------------------------|----------------------------------|
| UL YellowCard          | E70062-249082                    |
| Filler / Reinforcement | Glass Fiber,13% Filler by Weight |
| Additive               | Heat Stabilizer                  |
|                        | Lubricant                        |
| Features               | Gasoline Resistance              |
|                        | Good Chemical Resistance         |
|                        | Good Mold Release                |
|                        | Grease Resistant                 |
|                        | Heat Stabilized                  |
|                        | High Flow                        |
|                        | High Rigidity                    |
|                        | High Strength                    |
|                        | Lubricated                       |
|                        | Oil Resistant                    |
|                        | Solvent Resistant                |
| Uses                   | Automotive Under the Hood        |
|                        | Gears                            |
|                        | Housings                         |
|                        | Power/Other Tools                |
| Agency Ratings         | ASTM D 4066 PA0121G15            |
|                        | ASTM D 6779 PA0121G15            |

| UL File Number                   |        | E70062            |                   |             |
|----------------------------------|--------|-------------------|-------------------|-------------|
| Appearance                       |        | Black             |                   |             |
| Forms                            |        | Pellets           |                   |             |
| Processing Method                |        | Injection Molding |                   |             |
| Physical                         | Dry    | Conditioned       | Unit              | Test Method |
| Density                          | 1.23   | --                | g/cm <sup>3</sup> | ISO 1183    |
| Molding Shrinkage                |        |                   |                   | ISO 294-4   |
| Across Flow : 23°C, 2.00 mm      | 1.0    | --                | %                 |             |
| Flow : 23°C, 2.00 mm             | 0.50   | --                | %                 |             |
| Water Absorption                 |        |                   |                   | ISO 62      |
| 23°C, 24 hr                      | 1.0    | --                | %                 |             |
| Equilibrium, 23°C, 50% RH        | 2.2    | --                | %                 |             |
| Mechanical                       | Dry    | Conditioned       | Unit              | Test Method |
| Tensile Modulus (23°C)           | 6200   | 3900              | MPa               | ISO 527-2   |
| Tensile Stress (Break, 23°C)     | 115    | 75.0              | MPa               | ISO 527-2   |
| Tensile Strain (Break, 23°C)     | 3.0    | 13                | %                 | ISO 527-2   |
| Flexural Modulus (23°C)          | 5200   | 3150              | MPa               | ISO 178     |
| Flexural Stress (23°C)           | 165    | 106               | MPa               | ISO 178     |
| Poisson's Ratio                  | 0.40   | --                |                   | ISO 527-2   |
| Impact                           | Dry    | Conditioned       | Unit              | Test Method |
| Charpy Notched Impact Strength   |        |                   |                   | ISO 179     |
| -30°C                            | 6.0    | 5.3               | kJ/m <sup>2</sup> |             |
| 23°C                             | 6.0    | 7.5               | kJ/m <sup>2</sup> |             |
| Charpy Unnotched Impact Strength |        |                   |                   | ISO 179     |
| -30°C                            | 31     | 37                | kJ/m <sup>2</sup> |             |
| 23°C                             | 38     | 42                | kJ/m <sup>2</sup> |             |
| Notched Izod Impact Strength     |        |                   |                   | ISO 180     |
| -30°C                            | 5.0    | 5.4               | kJ/m <sup>2</sup> |             |
| 23°C                             | 5.1    | 8.5               | kJ/m <sup>2</sup> |             |
| Thermal                          | Dry    | Conditioned       | Unit              | Test Method |
| Heat Deflection Temperature      |        |                   |                   |             |
| 0.45 MPa, Unannealed             | 258    | --                | °C                | ISO 75-2/B  |
| 1.8 MPa, Unannealed              | 240    | --                | °C                | ISO 75-2/A  |
| Melting Temperature              | 260    | --                | °C                | ISO 11357-3 |
| CLTE                             |        |                   |                   | ISO 11359-2 |
| Flow : 23 to 55°C, 2.00 mm       | 3.0E-5 | --                | cm/cm/°C          |             |
| Transverse : 23 to 55°C, 2.00 mm | 1.1E-4 | --                | cm/cm/°C          |             |

|                                       |            |             |         |                |
|---------------------------------------|------------|-------------|---------|----------------|
| RTI Elec                              |            |             |         | UL 746         |
| 0.750 mm                              | 140        | --          | °C      |                |
| 1.50 mm                               | 140        | --          | °C      |                |
| 3.00 mm                               | 140        | --          | °C      |                |
| RTI Imp                               |            |             |         | UL 746         |
| 0.750 mm                              | 120        | --          | °C      |                |
| 1.50 mm                               | 120        | --          | °C      |                |
| 3.00 mm                               | 120        | --          | °C      |                |
| RTI Str                               |            |             |         | UL 746         |
| 0.750 mm                              | 125        | --          | °C      |                |
| 1.50 mm                               | 140        | --          | °C      |                |
| 3.00 mm                               | 140        | --          | °C      |                |
| Electrical                            | Dry        | Conditioned | Unit    | Test Method    |
| Volume Resistivity (0.750 mm)         | 1.0E+13    | --          | ohms·cm | IEC 60093      |
| Dielectric Strength (1.00 mm)         | 20         | --          | kV/mm   | IEC 60243      |
| Arc Resistance (3.00 mm)              | PLC 6      | --          |         | ASTM D495      |
| Comparative Tracking Index (3.00 mm)  | 250 to 399 | --          | V       | IEC 60112      |
| High Amp Arc Ignition (HAI)           |            |             |         | UL 746         |
| 0.750 mm                              | PLC 0      | --          |         |                |
| 1.50 mm                               | PLC 0      | --          |         |                |
| 3.00 mm                               | PLC 0      | --          |         |                |
| High Voltage Arc Tracking Rate (HVTR) | PLC 1      | --          |         | UL 746         |
| Hot-wire Ignition (HWI)               |            |             |         | UL 746         |
| 0.750 mm                              | PLC 4      | --          |         |                |
| 1.50 mm                               | PLC 3      | --          |         |                |
| 3.00 mm                               | PLC 4      | --          |         |                |
| Flammability                          | Dry        | Conditioned | Unit    | Test Method    |
| Flame Rating                          |            |             |         | UL 94          |
| 0.750 mm                              | HB         | --          |         |                |
| 1.50 mm                               | HB         | --          |         |                |
| 3.00 mm                               | HB         | --          |         |                |
| Glow Wire Flammability Index          |            |             |         | IEC 60695-2-12 |
| 0.750 mm                              | 675        | --          | °C      |                |
| 1.50 mm                               | 675        | --          | °C      |                |
| 3.00 mm                               | 675        | --          | °C      |                |
| Glow Wire Ignition Temperature        |            |             |         | IEC 60695-2-13 |
| 0.750 mm                              | 700        | --          | °C      |                |

|                        |              |      |    |            |
|------------------------|--------------|------|----|------------|
| 1.50 mm                | 700          | --   | °C |            |
| 3.00 mm                | 700          | --   | °C |            |
| Oxygen Index           | 25           | --   | %  | ISO 4589-2 |
| Injection              | Dry          | Unit |    |            |
| Drying Temperature     | 80.0         |      | °C |            |
| Drying Time            | 4.0          |      | hr |            |
| Suggested Max Regrind  | 25           |      | %  |            |
| Rear Temperature       | 280 to 310   |      | °C |            |
| Middle Temperature     | 280 to 310   |      | °C |            |
| Front Temperature      | 280 to 310   |      | °C |            |
| Nozzle Temperature     | 280 to 310   |      | °C |            |
| Processing (Melt) Temp | 285 to 305   |      | °C |            |
| Mold Temperature       | 65.0 to 95.0 |      | °C |            |

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