



## Vydyne® R633H05

Ascend Performance Materials Operations LLC - Polyamide 66/6 Copolymer

Monday, November 4, 2019

### General Information

#### Product Description

Vydyne R633H05 is 33% glass-fiber reinforced PA66/6 copolymer resin for superior surface appearance. Available in black, this injection-molding grade resin is lubricated for machine feed and mold release.

Vydyne R633H05 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 PA66/6 resins over aluminum and/or zinc die-cast parts.

Vydyne R633H05 is specially formulated to minimize the oxidative and thermal degradation of the PA66/6 copolymer when exposed to elevated temperatures for extended periods of time. Product provides improved retention of physical properties under exposure to longterm heat.

Vydyne R633H05 provides a higher heat distortion temperature, better resistance to creep, higher impact and better dimensional stability compared with unreinforced PA66/6. This product also provides a combination of excellent surface appearance with high tensile and modulus properties. This property balance enables usage of Vydyne R633H05 in applications where aesthetics and performance are important.

#### Typical Applications/End Uses:

Vydyne R633H05 resin has been used for many under-the-hood automotive applications, motor housings for power tools, and garden appliances. These resins have also been used in miscellaneous brackets, gears and clips that require high rigidity and strength.

#### General

|                           |                                     |                             |                         |
|---------------------------|-------------------------------------|-----------------------------|-------------------------|
| Material Status           | • Commercial: Active                |                             |                         |
| Availability              | • Asia Pacific                      | • Europe                    | • North America         |
| Filler / Reinforcement    | • Glass Fiber, 33% Filler by Weight |                             |                         |
| Additive                  | • Heat Stabilizer                   | • Lubricant                 |                         |
| Features                  | • Copolymer                         | • Good Surface Finish       | • High Tensile Strength |
|                           | • Good Mold Release                 | • Heat Stabilized           | • Lubricated            |
| Uses                      | • Automotive Under the Hood         | • Housings                  | • Metal Replacement     |
|                           | • Gears                             | • Lawn and Garden Equipment | • Power/Other Tools     |
| Agency Ratings            | • ASTM D4066 PA112G35               | • ASTM D6779 PA082G35       |                         |
| Automotive Specifications | • CHRYSLER MS-DB-41<br>CPN4005      | • FORD ESL-M4D533-A         | • GM GMP.PA66/6.004     |
|                           | • FORD ESB-M4D133-A                 | • GM GMP.PA66/6.002         |                         |
| UL File Number            | • E70062                            |                             |                         |
| Appearance                | • Black                             |                             |                         |
| Forms                     | • Pellets                           |                             |                         |
| Processing Method         | • Injection Molding                 |                             |                         |

### ASTM & ISO Properties <sup>1</sup>

| Physical                       | Dry  | Conditioned | Unit              | Test Method |
|--------------------------------|------|-------------|-------------------|-------------|
| Density                        | 1.39 | --          | g/cm <sup>3</sup> | ISO 1183    |
| Molding Shrinkage              |      |             |                   | ISO 294-4   |
| Across Flow : 73°F, 0.0787 in  | 0.90 | --          | %                 |             |
| Flow : 73°F, 0.0787 in         | 0.40 | --          | %                 |             |
| Water Absorption (24 hr, 73°F) | 1.3  | --          | %                 | ISO 62      |
| Water Absorption               |      |             |                   | ISO 62      |
| Equilibrium, 73°F, 50% RH      | 2.3  | --          | %                 |             |

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| Mechanical                                 | Dry        | Conditioned | Unit                  | Test Method |
|--------------------------------------------|------------|-------------|-----------------------|-------------|
| Tensile Modulus (73°F)                     | 1.57E+6    | 1.16E+6     | psi                   | ISO 527-2   |
| Tensile Stress (Break, 73°F)               | 26700      | 18900       | psi                   | ISO 527-2   |
| Tensile Strain (Break, 73°F)               | 4.0        | 6.0         | %                     | ISO 527-2   |
| Flexural Modulus (73°F)                    | 1.28E+6    | 986000      | psi                   | ISO 178     |
| Flexural Strength (73°F)                   | 37000      | 28300       | psi                   | ISO 178     |
| Poisson's Ratio                            | 0.40       | --          |                       | ISO 527-2   |
| Impact                                     | Dry        | Conditioned | Unit                  | Test Method |
| Charpy Notched Impact Strength             |            |             |                       | ISO 179/1eA |
| -22°F                                      | 5.1        | 7.1         | ft·lb/in <sup>2</sup> |             |
| 73°F                                       | 5.6        | 12          | ft·lb/in <sup>2</sup> |             |
| Charpy Unnotched Impact Strength           |            |             |                       | ISO 179/1eU |
| -22°F                                      | 21         | 43          | ft·lb/in <sup>2</sup> |             |
| 73°F                                       | 24         | 44          | ft·lb/in <sup>2</sup> |             |
| Notched Izod Impact Strength               |            |             |                       | ISO 180     |
| -22°F                                      | 5.7        | 9.0         | ft·lb/in <sup>2</sup> |             |
| 73°F                                       | 6.2        | 10          | ft·lb/in <sup>2</sup> |             |
| Thermal                                    | Dry        | Conditioned | Unit                  | Test Method |
| Heat Deflection Temperature                |            |             |                       | ISO 75-2/B  |
| 66 psi, Unannealed                         | 446        | --          | °F                    |             |
| Heat Deflection Temperature                |            |             |                       | ISO 75-2/A  |
| 264 psi, Unannealed                        | 428        | --          | °F                    |             |
| Melting Temperature                        | 451        | --          | °F                    | ISO 11357-3 |
| CLTE - Flow (73 to 131°F, 0.0787 in)       | 8.3E-6     | --          | in/in/°F              | ISO 11359-2 |
| CLTE - Transverse (73 to 131°F, 0.0787 in) | 5.6E-5     | --          | in/in/°F              | ISO 11359-2 |
| Electrical                                 | Dry        | Conditioned | Unit                  | Test Method |
| Arc Resistance (0.118 in)                  | PLC 5      | --          |                       | ASTM D495   |
| Comparative Tracking Index                 |            |             |                       | IEC 60112   |
| 0.118 in                                   | 250 to 399 | --          | V                     |             |
| High Amp Arc Ignition (HAI)                |            |             |                       | UL 746      |
| 0.030 in                                   | PLC 0      | --          |                       |             |
| 0.06 in                                    | PLC 0      | --          |                       |             |
| 0.12 in                                    | PLC 0      | --          |                       |             |
| High Voltage Arc Tracking Rate (HVTR)      | PLC 2      | --          |                       | UL 746      |
| Hot-wire Ignition (HWI)                    |            |             |                       | UL 746      |
| 0.030 in                                   | PLC 4      | --          |                       |             |
| 0.06 in                                    | PLC 4      | --          |                       |             |
| 0.12 in                                    | PLC 3      | --          |                       |             |
| Flammability                               | Dry        | Conditioned | Unit                  | Test Method |
| Flame Rating                               |            |             |                       | UL 94       |
| 0.030 in                                   | HB         | --          |                       |             |
| 0.06 in                                    | HB         | --          |                       |             |
| 0.12 in                                    | HB         | --          |                       |             |

## Processing Information

| Injection             | Dry        | Unit |
|-----------------------|------------|------|
| Drying Temperature    | 176        | °F   |
| Drying Time           | 4.0        | hr   |
| Suggested Max Regrind | 25         | %    |
| Rear Temperature      | 536 to 590 | °F   |

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| Injection              | Dry        | Unit |
|------------------------|------------|------|
| Middle Temperature     | 536 to 590 | °F   |
| Front Temperature      | 536 to 590 | °F   |
| Nozzle Temperature     | 536 to 590 | °F   |
| Processing (Melt) Temp | 545 to 581 | °F   |
| Mold Temperature       | 149 to 203 | °F   |

### Notes

<sup>1</sup> Typical properties: these are not to be construed as specifications.