# Vydyne® R220
## polyamide 66

Vydyne R220 is a 40% mineral-reinforced PA66 resin formulated for improved impact strength. Available in natural, it is an injection-molding grade formulated to retain the inherent processing advantages of unreinforced PA66 while enhancing rigidity, strength and heat resistance. Vydyne R220 maintains the chemical resistance typical of PA66 to a wide variety of chemicals, gasoline, oils, greases and solvents.

Vydyne R220 resin utilizes a unique mineral-reinforced PA66 system developed by Ascend Performance Materials to satisfy the market need for a high-rigidity thermoplastic as an alternative to certain metals. This mineral system provides two key features:
(1) isotropic behavior-property development in molded parts is usually independent of flow direction.
(2) a reduction in the tendency to develop sink marks in heavy cross sections such as molded-in bosses and ribs.

While not sink-free, parts made from Vydyne R220 can often permit boss and rib design or wall cross section changes that would not be tolerable in other unreinforced thermoplastic materials. Thus Vydyne R220 resin offers more uniform molded part strength and performance, as well as wider latitude in part design.

Vydyne R220 resin is a workhorse of Ascend Performance Materials' full line of mineral-reinforced PA66 resins, providing the best overall balance of properties. Vydyne R220 is heat stabilized and designed to provide increased ductility and reduced melt viscosity vs. unreinforced materials.This ductility improvement results in tougher, more impact-resistant molded parts. The reduction in melt viscosity enhances overall ease of injection-molding, resulting in minor reductions in tensile strength, modulus and heat distortion temperature. Parts manufactured from Vydyne R220 have successfully withstood paint bake oven cycles without significant loss of either dimensional stability or part properties.

| General | | | |
|---|---|---|---|
| Material Status | • Commercial: Active | | |
| Availability | • Asia Pacific | • Europe | • North America |
| Filler / Reinforcement | • Mineral, 40% Filler by Weight | | |
| Additive | • Heat Stabilizer | | |
| Features | • Chemical Resistant<br>• Ductile<br>• Gasoline Resistant<br>• Good Impact Resistance | • Good Strength<br>• Good Toughness<br>• Grease Resistant<br>• Heat Stabilized | • High Heat Resistance<br>• High Rigidity<br>• Oil Resistant<br>• Solvent Resistant |
| Uses | • Automotive Exterior Parts<br>• Automotive Under the Hood<br>• Cams | • Gears<br>• Housings<br>• Industrial Applications | • Power/Other Tools |
| Agency Ratings | • ASTM D4066 PA114M40 | • ASTM D6779 PA084M40 | |
| Automotive Specifications | • CHRYSLER MS-DB-41 CPN 2310<br>• CHRYSLER MS-DB-41 CPN 3189 | • DELPHI SD-2-214 Sec. 4.1<br>• FORD ESB-M4D353-A4 | • GM GMP.PA66.007 |
| UL File Number | • E70062 | | |
| Appearance | • Natural Color | | |
| Forms | • Pellets | | |
| Processing Method | • Injection Molding | | |

| Physical | Dry | Conditioned | Unit | Test Method |
|---|---|---|---|---|
| Density | 1.48 | -- | g/cm³ | ISO 1183 |
| Molding Shrinkage | | | | ISO 294-4 |
| Across Flow : 23°C, 2.00 mm | 1.0 | -- | % | |
| Flow : 23°C, 2.00 mm | 1.1 | -- | % | |
| Water Absorption | | | | ISO 62 |
| 24 hr, 23°C | 1.1 | -- | % | |
| Equilibrium, 23°C, 50% RH | 1.6 | -- | % | |
| **Mechanical** | **Dry** | **Conditioned** | **Unit** | **Test Method** |
| Tensile Modulus (23°C) | 6900 | 2600 | MPa | ISO 527-2 |
| Tensile Stress (Break, 23°C) | 103 | 73.0 | MPa | ISO 527-2 |
| Tensile Strain | | | | ISO 527-2 |
| Yield, 23°C | 1.5 | 16 | % | |
| Break, 23°C | 6.0 | 30 | % | |
| Flexural Modulus (23°C) | 6100 | 2300 | MPa | ISO 178 |
| Flexural Stress (23°C) | 124 | 50.0 | MPa | ISO 178 |
| Poisson's Ratio | 0.40 | -- | | ISO 527 |
| **Impact** | **Dry** | **Conditioned** | **Unit** | **Test Method** |
| Charpy Notched Impact Strength | | | | ISO 179 |
| -30°C | 6.0 | 8.0 | kJ/m² | |
| 23°C | 7.0 | 17 | kJ/m² | |
| Charpy Unnotched Impact Strength | | | | ISO 179 |
| -30°C | 110 | 130 | kJ/m² | |
| 23°C | 140 kJ/m² | No Break | | |
| Notched Izod Impact Strength | | | | ISO 180 |
| -30°C | 7.0 | 7.0 | kJ/m² | |
| 23°C | 9.0 | 16 | kJ/m² | |
| **Thermal** | **Dry** | **Conditioned** | **Unit** | **Test Method** |
| Heat Deflection Temperature | | | | |
| 0.45 MPa, Unannealed | 222 | -- | °C | ISO 75-2/B |
| 1.8 MPa, Unannealed | 118 | -- | °C | ISO 75-2/A |
| Melting Temperature | 258 | -- | °C | ISO 11357-3 |
| CLTE | | | | ISO 11359-2 |
| Flow : 23 to 55°C, 2.00 mm | 6.3E-4 | -- | cm/cm/°C | |
| Transverse : 23 to 55°C, 2.00 mm | 6.0E-4 | -- | cm/cm/°C | |
| **Additional Information** | **Dry** | **Conditioned** | **Unit** | **Test Method** |
| Automotive Materials - (thickness d = 1mm) | + | -- | | FMVSS 302 |

| Injection | Dry | Unit |
|---|---|---|
| Drying Temperature | 80 | °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 to 95 | °C |

| Notes |
|---|
| Typical properties: these are not to be construed as specifications. |

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