vydyne 20NSP Series **data sheet**

Product Description

Vydyne®20NSP is a general-purpose, highly nucleated Nylon 66 resin with internal and external lubricant. Available in natural and black. It is designed to crystallize rapidly when cooled from the molten state. This rapid crystallization can result in reduced cycle times and increased productivity through faster part setup when compared with standard general purpose Nylon 66 resins. The crystalline structure resulting from nucleation will alter part properties, yielding increased modulus or rigidity, increased tensile strength, reduced elongation, reduced impact strength, and mold shrinkage compared with standard general-purpose Nylon 66.

Vydyne 20NSP Series resins have an internal lubricant for improved machine feed and mold release. This formulation is designed to provide easy release of parts from molds using standard molding conditions. The rapid crystallization of Vydyne 20NSP resins may allow part ejection at higher temperatures compared with general-purpose Nylon 66. This will reduce the mold closed time and thereby decrease the molding cycle. Critical factors unique to each application such as mold/ part design, tolerances, etc., may negate these cycle time benefi ts. It is recommended to check critical part dimensions against specifi cations before implementing shorter molding cycles on a routine basis.

Typical Applications/End Uses

Typical end uses for Vydyne 20NSP are terminal blocks, bearings, business control cams, electrical connectors, housings, wire ties, fasteners, switch components, and general industrial parts that require stiffness and rigidity.

Typical Properties for Vydyne 20NSP Series

Test temperature 23°C unless otherwise noted

Physical Properties	Test Conditions	Dry as Molded	Conditioned 2.5% Moisture
Specific Gravity (g/cm3)	ISO 1183	1.14	—
Mold Shrinkage (%)	ISO 294-4		
2 mm - Parallel		0.8	—
2 mm - Normal		1.2	—
Water Absorption @ 23°C (%)	ISO 62		
24 Hours		1.1	—
Equilibrium at 50% RH		2.4	—
Mechanical Properties	**Test Conditions**	**Dry as Molded**	**Conditioned 2.5% Moisture**
Tensile Strength @ Yield (MPa)	ISO 527	98	72
Tensile Strength @ Break (MPa)	ISO 527	—	—
Elongation @ Yield (%)	ISO 527	4.5	25
Elongation @ Break (%)	ISO 527	13	55
Tensile Modulus (MPa)	ISO 527	3,600	1,750
Poisson's Ratio	ISO 527	0.41	—
Flexural Modulus (MPa)	ISO 178	3,500	1,900
Flexural Strength (MPa)	ISO 178	95	24
Notched Charpy Impact (KJ/M2)	ISO 179		
23°C		4.7	—
-30°C		4.6	—
Unnotched Charpy Impact (KJ/M2)	ISO 179		
23°C		NB	—
-30°C		NB	—
Notched Izod Impact (KJ/M2)	ISO 180	3.3	—
Thermal Properties	**Test Conditions**	**Dry as Molded**	**Conditioned 2.5% Moisture**
Melting Point (°C)	ISO 3146	260	—
Heat Deflection Temperature (°C)	ISO 75		
1.82 MPa		78	—
0.45 MPa		231	—
Vicat @ 50N (°C)	ISO 306	240	—
Coefficient of Linear Thermal Expansion	ISO 11359		
2 mm - Parallel, 23°C-55°C (10-5 mm/mm/°C)		1.2	—
2 mm - Normal, 23°C-55°C (10-5 mm/mm/°C)		1.2	—
Electrical Properties	**Test Conditions**	**Dry as Molded**	**Conditioned 2.5% Moisture**
Dielectric Strength (kV/mm) (step-by-step) 3.0 mm	IEC 60243	12	—
Volume Resistivity (ohm-cm x 1015) 3.0 mm	IEC 60093	6	—
Comparative Tracking Index (volts) 3.0 mm	IEC 60112	> 600	—

Flammability Properties for Vydyne 20NSP

Flammability Properties	Test Conditions	Dry as Molded
Glow Wire Flammability Index (GWFI/°C)	IEC 60695-2-12	
0.71 mm		**800**
1.5 mm		**800**
3.0 mm		**930**
Glow Wire Ignition Temperature (GWIT/°C)	IEC 60695-2-12	
0.71 mm		**700**
1.5 mm		**700**
3.0 mm		**700**
Limiting Oxygen Index (%)	ASTM D-2863	**26**

Underwriters Laboratories Recognized Component Ratings

Yellow Card File Number E70062

Color: All

Parameters	Test Conditions	Thickness (mm)			
		0.4	0.71	1.5	3.0
Temperature Index (°C)	UL 746B				
Electrical		**130**	**130**	**130**	**130**
Mechanical w/Impact		**75**	**75**	**75**	**75**
Mechanical w/o Impact		**75**	**85**	**85**	**85**
Hot Wire Ignition (Rating)	UL 746A	**—**	**4**	**3**	**2**
UL94 Flammability Class (Rating)	UL Flame Test	**V-2**	**V-2**	**V-2**	**V-2**
High Amperage Arc Ignition (Rating)	UL 746A	**—**	**0**	**0**	**0**
High Volt Track Rate (Rating)	UL 746A	**—**	**—**	**—**	**0**
D495 Arc Resistance (Rating)	UL 746A	**—**	**—**	**—**	**5**
UL 746A Track Rate (CTI) (Rating)	UL 746A	**—**	**—**	**—**	**0**

Virgin and regrind up to 50% by weight have the same basic material characteristics.

All numerical flame spread ratings appearing in this data sheet are not intended to reflect hazards presented by this or any other material under actual fire conditions. Each end user should determine whether potential fire hazards are associated with the finished product and whether Vydyne resin is suitable for the particular use. Products made from Vydyne resins should not be exposed to open flames. In the case of direct exposure to open fire, Vydyne resins and products made therefrom can ignite and burn. Always store and use finished products in locations well away from open flames and sources of ignition.

Typical Molding Conditions for Vydyne 20NSP Series

Optimal processing conditions will depend on such features as machine size, screw design, die design, and material residence time. The settings below are a guide to achieving stable processing and good part quality. It is best to use a hand-held pyrometer to measure stock melt temperature in an air shot.

Suggested Machine Conditions

Melt Temperature, 275 to 305 ºC

Parameters	Machine Settings
Cylinder Settings °C	**270 to 310**
Mold Surface Temperature, ºC	**15 to 95**
Injection Pressure, MPa	**55 to 140**
Holding Pressure, MPa	**55 to 140**
Injection Time, sec	**< 1 to 2.5**
Screw Back Pressure, MPa	**0.2 to 1.0**
Screw Speed, rpm	**50 to 150**
Cushion, mm	**3.0 to 6.4**
Clamp Pressure, tons/cm2	**0.3 to 0.7**

vydyne 20NSP Series **data sheet**

Suggested Guidelines for Molding

1. Your Vydyne nylon resins arrive packaged in moisture-protected containers. If you do not open the original package prior to use, then drying is not necessary. However, if drying is necessary, we recommend that you use a dehumidifi ed air-type dryer (desiccant bed) with a maximum air temperature of 70°C for 1 to 3 hours.

2. The recommended melt temperatures for Vydyne general-purpose resins are 275 to 305°C. Measure the stock in an air shot with a hand-held pyrometer. In addition to the barrel heater bands, screw back pressure and rotation speed add heat to the melt.

3. Maintain mold surface temperatures in a range of 15 to 95°C. We recommend temperatures on the high end, as the molding cycle allows, to aid in mold fi lling and to improve the appearance of the molded part.

4. Injection fi ll rates should be fast. Minimize the use of back pressure 0.2 to 1.0 MPa to yield a consistent melt and/or adequate mixing of color concentrates. Set the screw rotation speed at the minimum required to maintain the molding cycle (50 to 150 rpm).

5. Hold pressure should be set high enough to prevent screw bounce. Hold time should be set until the gate freezes.

6. Maintain your machine's shot-weight-to-barrel-size ratio at 40% to 80% of rated (polystyrene) capacity. A lower shot-to-barrel ratio results in excess residence time and polymer degradation, which can permanently embrittle the molded part. At a shot-to-barrel ratio above the recommended ratio, molding machinery is often unable to deliver a uniform melt or the desirable fast mold fi ll.

7. Regrind must be dry when molded. The preferred procedure is to grind and reuse immediately after molding. Regrind-to-virgin ratios of 25% or less have shown no signifi cant property loss when properly molded. However, to ensure adequate performance of your molded part, determine acceptable levels for each application through actual part testing.