vydyne 49 **data sheet**

49 Natural, 49H Natural, 49H Black impact modified nylon

Product Description

Vydyne® 49 Nylon resins are general purpose polyamide, impact modified grades. They are available in natural, black and heat stabilized for improved resistance to elevated temperatures. The heat stabilization package for Vydyne 49H was formulated to provide thermal endurance when used in applications in which continuous or extended high temperature exposure is anticipated.

Vydyne 49 Series is recognized for all the processing and property advantages inherent to PA66 with the addition of improved impact strength. These resins offer a well balanced combination of engineering properties characterized by high melt point; good surface lubricity, abrasion resistance; and resistance to many chemicals including solvents, gasoline, and machine and motor oils.

Typical Applications/End Uses

The Vydyne 49 family may be used in most market segments including industrial, consumer, automotive, and electrical applications. Typical end uses include clips, fasteners, gears, cable ties, electrical connectors, and many other parts that require additional toughness at room and low temperatures.

Typical Properties for Vydyne 49 Series

Test temperature 23°C unless otherwise noted

Physical Properties	Test Conditions	Dry as Molded	Conditioned 2.5% Moisture
Density (g/cc)	ISO 1183	**1.12**	
Mold Shrinkage (%)	ISO 294-4		
2 mm – Parallel		**1.6**	
2 mm – Normal		**1.6**	
Water Absorption @ 23C, 24 hours (%)	ISO 62	**1.3**	
Rockwell Hardness (R Scale)	IS0 2039	**124**	
Mechanical Properties	**Test Conditions**	**Dry as Molded**	**Conditioned 2.5% Moisture**
Tensile Strength @ Yield (MPa)	ISO 527	**70**	**50**
Tensile Strength @ Break (MPa)	ISO 527	**46**	**42**
Tensile Elongation @ Break (%)	ISO 527	**17**	**40**
Tensile Modulus (MPa)	ISO 527	**3040**	
Flexural Modulus (MPa)	ISO 178	**2600**	**892**
Flex Str. at Conv. Defl. (MPa)	ISO 178	**81**	**27**
Notched Charpy (kJ/m^2)	ISO 179		
23°C		**13**	
-30°C		**11**	
-40°C		**8**	
Notched Izod (kJ/m^2)	ISO 180		
23°C		**10**	
-30°C		**9**	
-40°C		**8**	
Thermal Properties	**Test Conditions**	**Dry as Molded**	**Conditioned 2.5% Moisture**
Melting Point (°C)	ISO 3146	**260**	
Heat Deflection Temp. (°C)	ISO 75		
1.82 MPa		**69**	
0.45 MPa		**202**	
CLTE (10^{-5} /°C)	ISO 11359		
2 mm Parallel (23°C-55°C)		**8.6**	
2 mm Normal (23°C-55°C)		**12.2**	
Electrical Properties	**Test Conditions**	**Dry as Molded**	**Conditioned 2.5% Moisture**
Dielectric Strength (V/mil) short time, 1/4" electrodes in oil, 500 V/sec	ASTM D 149-97a (2004)		
1.0 mm		**670**	
2.0 mm		**440**	
3.0 mm		**380**	

Volume Resistivity (10^{14} ohm-cm)	ASTM D 257-07		
1.0 mm		**12**	
2.0 mm		**9.7**	
3.0 mm		**9.6**	
Comparative Tracking Index, 3.0 mm (V)	IEC 60112	**550-600**	
Flammability	**Test Conditions**	**Dry as Molded**	**Conditioned 2.5% Moisture**
UL Flame Rating	UL 94		
0.71 mm		**HB**	
1.5 mm		**HB**	
3.0 mm		**HB**	
Oxygen Index (%)	ASTM D 2863-06a (Proc. A)	**21.8**	

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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 dehumidified 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 impact-modified resins are 280 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 filling and to improve the appearance of the molded part.

4. Injection fill 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 fill.

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 significant property loss when properly molded. However, to ensure adequate performance of your molded part, determine acceptable levels for each application through actual part testing.

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