

TYPICAL PROPERTIES OF NYLONS (DRY, AS MOLDED)

ASTM or UL Test	Property	TYPE			
		6/6	6	6/12	11
PHYSICAL					
D792	Specific gravity	1.14	1.13	1.06	1.04
D792	Specific volume (in <sup>3</sup> /lb)	24.2	24.5	25.9	26.6
D570	Water absorption, 24 h, 1/8-in thk (%)	1.2	1.6	0.25	0.4
MECHANICAL					
D638	Tensile strength (psi)	12,000	11,800	8,800	8,500
D638	Elongation (%)	60	150	150	120
D638	Tensile modulus (10 <sup>5</sup> psi)	4.2	3.8	2.9	1.8
D790	Flexural modulus (10 <sup>5</sup> psi)	4.1	4.0	2.9	1.5
D256	Impact strength, Izod (ft-lb/in of notch)	1.0	1.0	1.0	3.3
D785	Hardness, Rockwell R	121	119	114	—
THERMAL					
C177	Thermal conductivity (Btu-in/hr-ft <sup>2</sup> -°F)	1.7	1.7	1.5	—
D696	Coefficient of thermal expansion (10 <sup>-5</sup> in/in-°F)	4.0	4.5	5.0	5.1
D648	Deflection temperature (°F)				
	At 264 psi	194	152	194	118
	At 66 psi	455	365	356	154
UL 94	Flammability rating, 1/8 in	V-2	V-2	V-2	—
ELECTRICAL					
D149	Dielectric strength (V/mil)				
	Short time, 1/8-in thk	600	400	400	425
D150	Dielectric constant				
	At 1 kHz	3.9	3.7	4.0	3.3
D150	Dissipation factor				
	At 1 kHz	0.02	0.02	0.02	0.03
D257	Volume resistivity (ohm-cm)				
	At 73°F, 50% RH	10 <sup>15</sup>	10 <sup>15</sup>	10 <sup>15</sup>	2×10 <sup>13</sup>
D495	Arc resistance (s)	116	—	121	—

\*0.040-in thick specimen.



P&A Plastics Inc.  
 150 Main St. East  
 Hamilton ON L8N 3W9  
 (800) 263-6559  
 (905) 547-1675  
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ISO or UL Test	Property	----- TYPE -----			
		6/6	6	6/12	11
PHYSICAL					
ISO1183	Specific gravity	1.14	1.13	1.06	1.04
ISO1183	Specific volume (cm <sup>3</sup> /g)	0.871	0.882	0.932	0.957
ISO62	Water absorption, 24 h, 3mm thk (%)	1.2	1.6	0.25	0.4
MECHANICAL					
ISO527	Tensile strength (MPa)	82.74	81.36	60.67	58.61
ISO527	Elongation (%)	60	150	150	120
ISO527	Tensile modulus (10 <sup>3</sup> MPa)	2.89	2.62	1.99	1.24
ISO178	Flexural modulus (10 <sup>2</sup> MPa)	2.83	2.75	1.99	1.03
ISO180	Notched izod impact strength (J/m)	53	53	53	176
ISO2039	Hardness, Rockwell R	121	119	114	—
THERMAL					
ASTM C177	Thermal conductivity (Btu-in/hr-ft <sup>2</sup> -°F)	1.7	1.7	1.5	—
ISO11359	Coefficient of thermal expansion (10 <sup>-4</sup> m/m °C)	0.72	0.81	0.90	0.92
ISO75	Deflection temperature (°C)				
	At 1.80 MPa	90	67	90	48
	At 0.45 MPa	235	185	185	68
UL 94	Flammability rating, 3mm	V-2	V-2	V-2	—
ELECTRICAL					
IEC243	Dielectric strength (kV/mm)				
	Short time, 3mm thk	23.6	15.75	15.75	16.73
IEC250	Dielectric constant				
	At 1 kHz	3.9	3.7	4.0	3.3
IEC250	Dissipation factor				
	At 1 kHz	0.02	0.02	0.02	0.03
IEC93	Volume resistivity (ohm-cm)				
	At 23°C, 50% RH	10 <sup>15</sup>	10 <sup>15</sup>	10 <sup>15</sup>	2×10 <sup>13</sup>
ASTM D495	Arc resistance (s)	116	—	121	—
*0.10-mm thick specimen.					



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ASTM TEST	PROPERTY	CAST 6 NYLON	CAST 12 NYLON	CAST 6 NYLON WITH OIL IMPREGNATION	CAST NYLON 612	CAST 6 NYLON WITH PLASTICIZER	HEAT STABILIZED CAST NYLON
D792	Specific gravity	1.15-1.17	1.03	1.14-1.15	1.10-1.13	1.14-1.16	1.15-1.17
D638	Tensile strength (psi)	12,000-13,500	7,900	9,500-11,000	8,700-11,500	9,700-10,800	12,000-13,500
D638	Tensile elongation (%)	20-45	>50	45-55	25-80	25-35	20-30
D638	Tensile modulus (psi)	485-550,000	230,000	375,000-475,000	240-330,000	375-440,000	485-550,000
D695	Compressive strength (psi)						
	At 10% offset	15,500-18,000	10,000	12,000-14,000	—	22,000-25,000	—
D695	Compressive modulus (psi)	300-350,000	224,000	275,000-375,000	—	250,000-275,000	300-310,000
D790	Flexural strength (psi)	15,500-17,500	9,000	14,000-16,000	15,000-20,000	12,000-13,000	15,000-16,000
D790	Flexural modulus (psi)	420-500,000	238,000	375,000-475,000	285-385,000	330-350,000	420-440,000
D712	Shear strength (psi)	10,000-11,000	6,100	8,000-9,000	7,600-9,000	10,000-11,000	10,000-11,000
D256	Notched izod impact (ft-lb/in)	0.7-0.9	3.02	1.4-1.8	0.9-1.4	0.82-0.91	0.7-0.9
D785	Hardness, Rockwell R	115-125	108	110-115	100-115	110-115	110-115
D2240	Hardness, Shore D	78-83	76	74-78	75-81	76-78	76-78
D789	Melting point (°F)	450 +/- 10	351	450 +/- 10	410 +/- 10	450 +/- 10	450 +/- 10
D696	Coefficient of linear thermal expansion (in/in-°F)	5.0x10 <sup>-5</sup>	5.50x10 <sup>-5</sup>	3.50x10 <sup>-5</sup>	4-4.5x10 <sup>-5</sup>	4.5x10 <sup>-5</sup>	4.5x10 <sup>-5</sup>
D621	Deformation under load (%)	0.5-2.5	—	0.78	dependent on grade	1.0-3.5	0.5-1.0
D648	Deflection temp. (°F)						
	At 264 psi	330-400	124	330-400	330-400	330-400	330-400
	At 66 psi	400-430	347	400-430	400-430	400-430	400-430
—	Continuous service temp. (°F)	230	250	230	210	230	250
—	Intermittent service temp. (°F)	330	300	330	300	330	330
—	Coefficient of friction						
	dynamic (1)	0.22	0.2-0.3	0.12	N/A	N/A	0.22
D570	Water absorption (%)						
	24 h	0.5-0.6	0.12	0.5-0.6	0.5-0.6	0.5-0.6	0.5-0.6
	Saturation	5.0-6.0	.45 (480 hrs)	2.0-2.5	4.0-5.0	5.0-6.0	5.0-6.0
D149	Dielectric strength, Short time (V/mil)	500-600	—	500-600	500-600	500-600	—
D150	Dielectric constant						
	At 60 cycles	3.7	—	3.7	3.7	3.7	—
	At 1,000 cycles	3.7	—	3.7	3.7	3.7	—
	At 100,000 cycles	3.7	—	3.7	3.7	3.7	—



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ISO TEST	PROPERTY	CAST 6 NYLON	CAST 12 NYLON	CAST 6 NYLON WITH OIL IMPREGNATION	CAST NYLON 612	CAST 6 NYLON WITH PLASTICIZER	HEAT STABILIZED CAST NYLON
ISO1183	Specific gravity	1.15-1.17	1.03	1.14-1.15	1.10-1.13	1.14-1.16	1.15-1.17
ISO527	Tensile strength (MPa)	82.74-93.08	54.47	65.50-75.84	59.98-79.29	66.88-74.46	82.74-93.08
ISO527	Tensile elongation (%)	20-45	>50	45-55	25-80	25-35	20-30
ISO527	Tensile modulus (MPa)	3343-3792	1586	2585-3275	1654-2275	2585-3033	3343-3792
ASTM D695	Compressive strength (bar) At 10% offset	1070-1200	690	830-960	—	1500-1700	—
ASTM D695	Compressive modulus (bar)	24,000	15,000	18,000	—	17,000	21,000
ISO178	Flexural strength (MPa)	106.87-120.66	62.05	96.53-110.32	103.42-137.90	82.74-89.63	103.42-110.32
ISO178	Flexural modulus (MPa)	2895-3447	1640	2585-3275	1965-2654	2275-2413	2895-3033
ISO537	Shear strength (MPa)	68.95-76.00	42.06	55.16-62.05	52.40-62.10	68.95-75.84	68.95-75.84
ISO180	Notched izod impact strength (J/m)	37-48	161	75-96	48-75	44-49	37-48
ISO2039	Hardness, Rockwell R	115-125	108	110-115	100-115	110-115	110-115
ISO868	Hardness, Shore D	78-83	76	74-78	75-81	76-78	76-78
ISO3146	Melting point (°C)	232 +/- 5	177	232 +/- 5	210 +/- 5	232 +/- 5	232 +/- 5
ISO11359	Coefficient of linear thermal expansion (10 <sup>-4</sup> m/m °C)	0.90	0.99	0.63	0.80	0.81	0.81
ASTM D621	Deformation under load (%)	0.5-2.5	—	0.78	dependent on grade	1.0-3.5	0.5-1.0
ISO75	Deflection temp. (°C) At 1.80 MPa	166-204	51	166-204	166-204	166-204	166-204
	At 0.45 MPa	204-221	175	204-221	204-221	204-221	204-221
—	Continuous service temp. (°C)	110	121	110	100	110	121
—	Intermittent service temp. (°C)	166	150	166	150	166	150
ISO62	Water absorption (%) 24 h	0.5-0.6	0.12	0.5-0.6	0.5-0.6	0.5-0.6	0.5-0.6
	Saturation	5.0-6.0	.45 (480 hrs)	2.0-2.5	4.0-5.0	5.0-6.0	5.0-6.0
IEC243	Dielectric strength, Short time (kV/mm)	19.7-23.6	—	19.7-23.6	19.7-23.6	19.7-23.6	—
IEC250	Dielectric constant At 60 cycles	3.7	—	3.7	3.7	3.7	—
	At 1,000 cycles	3.7	—	3.7	3.7	3.7	—
	At 100,000 cycles	3.7	—	3.7	3.7	3.7	—



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