

## 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.

## TYPICAL PROPERTIES OF NYLONS (DRY, AS MOLDED)

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, 3 mm 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>3</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, 3 mm	V-2	V-2	V-2	—
ELECTRICAL					
IEC243	Dielectric strength (kV/mm)				
	Short time, 3 mm 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.

ASTM TEST	PROPERTY	CAST 6 NYLON	CAST 12 NYLON	CAST 6 NYLON WITH OIL IMPREGNATION	CAST NYLON 6/12	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)	10,000-13,500	7,900	9,500-12,000	8,700-11,600	9,700-10,800	12,000-13,500
D638	Tensile elongation (%)	20-45	>50	20-55	25-80	25-35	20-30
D638	Tensile modulus (psi)	350-550,000	230,000	350-475,000	240-330,000	375-440,000	485-550,000
D695	Compressive strength (psi)						
	At 10% offset	13,500-16,000	10,000	11,000-14,000	11,000-12,500	11,000-15,000	13,500-16,000
D695	Compressive modulus (psi)	300-400,000	224,000	275,000-375,000	200,000-300,000	250,000-350,000	300-310,000
D790	Flexural strength (psi)	12,500-17,500	9,000	12,500-16,000	15,000-20,000	12,000-13,000	15,000-17,000
D790	Flexural modulus (psi)	350-450,000	238,000	350,000-475,000	285-385,000	330-350,000	420-500,000
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)	0.6-0.9	3.02	1.0-1.8	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	110-125
D2240	Hardness, Shore D	78-83	76	74-80	75-81	76-78	76-83
D789	Melting point (°F)	450 +/- 10	351	420-460	380-420	450 +/- 10	450 +/- 10
D696	Coefficient of linear thermal expansion (in/in-°F)	5.0×10 <sup>-5</sup>	5.50×10 <sup>-5</sup>	5×10 <sup>-5</sup>	4-5×10 <sup>-5</sup>	4.5×10 <sup>-5</sup>	5×10 <sup>-5</sup>
D621	Deformation under load (%)	0.5-2.5	—	0.78	dependent on grade	1.0-3.5	0.5-2.5
D648	Deflection temperature (°F)						
	At 264 psi	200-400	124	200-400	200-400	330-400	200-400
	At 66 psi	370-430	347	370-450	370-450	400-430	370-430
—	Continuous service temperature (°F)	230	230-250	230	220	230	250
—	Intermittent service temperature (°F)	340	300	320	320	330	355
—	Coefficient of friction dynamic (1)	0.2-0.4	0.2-0.3	0.12-0.15	0.2-0.4	0.22-0.45	0.2-0.4
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	5.0-6.5	1.4	4.5-6.0	4.0-5.0	4.0-6.0	6.5
D149	Dielectric strength, Short time (V/mil)	500-600	500-600	500-600	500-600	500-600	500-600
D150	Dielectric constant						
	At 60 cycles	3.7	3.7	3.7	3.7	3.7	3.7
	At 1,000 cycles	3.7	3.7	3.7	3.7	3.7	3.7
	At 100,000 cycles	3.7	3.7	3.7	3.7	3.7	3.7

ISO TEST	PROPERTY	CAST 6 NYLON	CAST 12 NYLON	CAST 6 NYLON WITH OIL IMPREGNATION	CAST NYLON 6/12	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)	68.95-93.08	54.47	65.50-83.73	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	930-1100	690	830-960	760-860	860-1035	930-1100
ASTM D695	Compressive modulus (bar)	24,000	15,000	18,000	17,000	17,000	21,000
ISO178	Flexural strength (MPa)	140	90	135	135	82.74-89.63	120
ISO178	Flexural modulus (MPa)	2895-3447	2200	2585-3275	1965-2654	2275-2413	2895-3447
ISO537	Shear strength (MPa)	68.95-76.00	42.06	50-96	120	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	110-125
ISO868	Hardness, Shore D	78-83	76	74-80	75-81	76-78	76-83
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)	0.7-0.9	0.99	0.7-0.8	0.7-0.8	0.81	0.7-0.8
ASTM D621	Deformation under load (%)	0.5-2.5	—	0.78	dependent on grade	1.0-3.5	0.5-1.0
ISO75	Deflection temperature (°C) At 1.80 MPa	95-204	51	95-175	95-175	166-204	95-204
	At 0.45 MPa	188-221	188-232	188-232	188-232	204-221	188-221
—	Continuous service temperature (°C)	105	110	105	105	110	105
—	Intermittent service temperature (°C)	170	150	160	160	166	180
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	6.5	1.4	4.5-6.0	4.0-5.0	4.0-6.0	6.5
IEC243	Dielectric strength, Short time (kV/mm)	50	50	50	50	50	—
IEC250	Dielectric constant At 60 cycles	3.7	3.7	3.7	3.7	3.7	3.7
	At 1,000 cycles	3.7	3.7	3.7	3.7	3.7	3.7
	At 100,000 cycles	3.7	3.7	3.7	3.7	3.7	3.7