



DuraForm PA12 Black

Production Tough

Long-term UV stable, matches toughness of injection molded thermoplastic parts.

Selective Laser Sintering
(SLS)

PRODUCTION-GRADE, DURABLE NYLON WITH EXCELLENT SURFACE QUALITY AND FEATURE DETAILS

DuraForm PA12 Black is ideal for industrial applications including parts designed for low- to mid-volume production, functional testing, and prototyping. This high recyclability material matches the toughness of injection molded thermoplastic parts and proves to be more cost-effective with a low refresh rate. Good control over particle size and distribution enables outstanding feature details and a smooth surface finish. DuraForm PA12 Black is encapsulated carbon (versus a blended powder) that delivers solid black parts with better depth of color– even when scratched or cut.



APPLICATIONS

- Housings and enclosures
- Impellers
- Connectors
- Consumer sporting goods
- Vehicle dashboards and grills
- Bumpers
- Snap-fit designs
- Living hinges

BENEFITS

- Excellent surface quality and feature detail
- Appropriate for low- to mid-volume rapid manufacturing of end-use parts
- Easy to process
- Produces tough end-use parts
- Compatible with automotive fluids and chemicals
- High recyclability lowers cost per part

FEATURES

- Builds prototypes for functional testing
- Ideal for industrial applications
- Supports part finishing and will not lose color with surface damage
- UV-stable and good isotropic properties
- Precipitated black (encapsulated) gives deeper, more colorfast black than blended powders

MATERIAL PROPERTIES

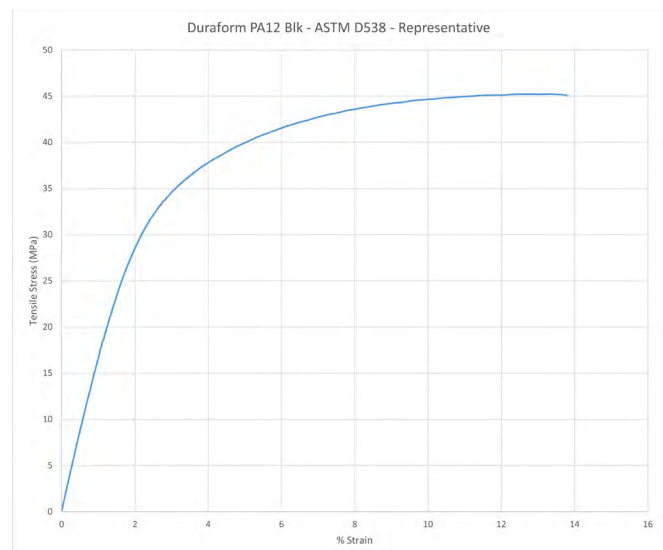
The full suite of mechanical properties is given per ASTM and ISO standards where applicable. In addition, properties such as flammability, dielectric properties, and 24 hour water absorption are provided. This allows for better understanding of the material capability to aid in design decisions for the material. All parts are conditioned per ASTM recommended standards for a minimum of 40 hours at 23°C, 50% RH.

Solid material properties reported were printed along the XY-axis.

SOLID MATERIAL						
METRIC	ASTM METHOD	METRIC	ENGLISH	ISO METHOD	METRIC	US
PHYSICAL				PHYSICAL		
Solid Density	ASTM D792	1 g/cm ³	0.036 lb/in ³	ISO 1183	1 g/cm ³	0.036 lb/in ³
24 Hour Water Absorption	ASTM D570	0.32 %	0.32 %	ISO 62	0.32 %	0.32 %
MECHANICAL				MECHANICAL		
Tensile Strength Ultimate	ASTM D638 Type IV	45 MPa	6500 psi	ISO 527 -1/2	44 MPa	6300 psi
Tensile Strength at Yield	ASTM D638 Type IV	45 MPa	6500 psi	ISO 527 -1/2	44 MPa	6300 psi
Tensile Modulus	ASTM D638 Type IV	1800 MPa	260 ksi	ISO 527 -1/2	1700 MPa	250 ksi
Elongation at Break	ASTM D638 Type IV	13.7 %	13.7 %	ISO 527 -1/2	13.9 %	13.9 %
Elongation at Yield	ASTM D638 Type IV	13.3 %	13.3 %	ISO 527 -1/2	13.3 %	13.3 %
Flex Strength	ASTM D790	67 MPa	9700 psi	ISO 178	53 MPa	7700 psi
Flex Modulus	ASTM D790	1500 MPa	210 ksi	ISO 178	1500 MPa	215 ksi
Izod Notched Impact	ASTM D256	35 J/m	0.7 ft-lb/in	ISO 180-A	4 kJ/m ²	0.0019 ft-lb/in ²
Izod Unnotched impact	ASTM D4812	410 J/m	8 ft-lb/in	ISO 180-U	30 kJ/m ²	0.0121 ft-lb/in ²
Shore Hardness	ASTM D2240	75 D	75 D	ISO 7619	75 D	75 D
THERMAL				THERMAL		
Tg (DMA E")	ASTM E1640 (E" Peak)	44 °C	111 °F	ISO 6721-1/11 (E" Peak)	44 °C	111 °F
HDT 0.455MPa/66PSI	ASTM D648	177 °C	350 °F	ISO 75- 1/2 B	175 °C	346 °F
HDT 1.82MPa/264 PSI	ASTM D648	84 °C	184 °F	ISO 75-1/2 A	81 °C	177 °F
CTE -30 TO 50C	ASTM E831	112 ppm/°C	62 ppm/°F	ISO 11359-2	112 ppm/°C	62 ppm/°F
CTE 75 TO 150C	ASTM E831	192 ppm/°C	106 ppm/°F	ISO 11359-2	192 ppm/°C	106 ppm/°F

STRESS-STRAIN CURVE

The graph represents the stress-strain curve for DuraForm PA12 Black per ASTM D638 testing.



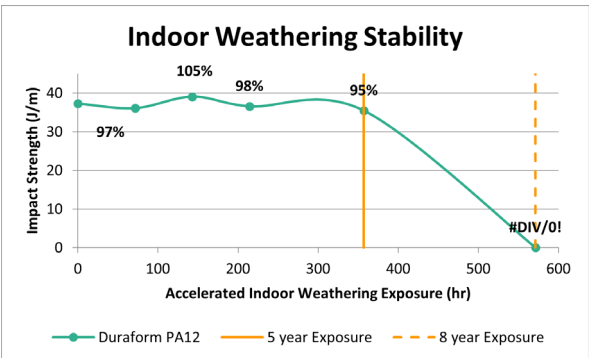
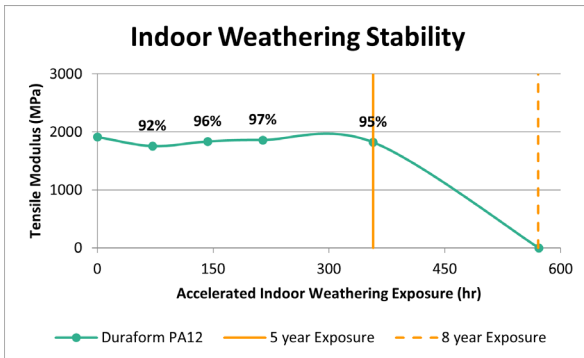
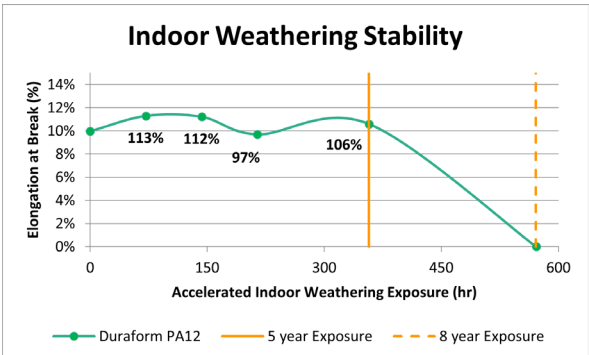
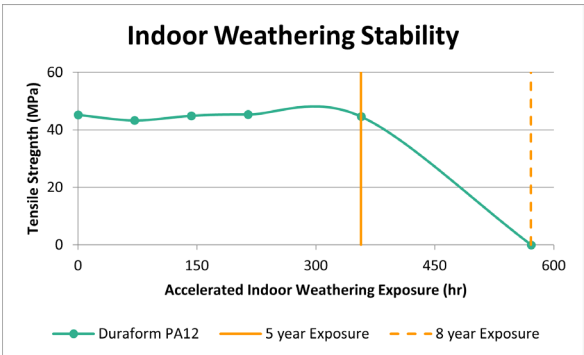
DuraForm PA12 Black

LONG-TERM ENVIRONMENTAL STABILITY

DuraForm PA12 Black is engineered to give long-term environmental UV and humidity stability. This means the material is tested for the ability to retain a high percentage of the initial mechanical properties over a given period of time. This provides real design conditions to consider for the application or part. Actual data value is on Y-axis, and data points are % of initial value.

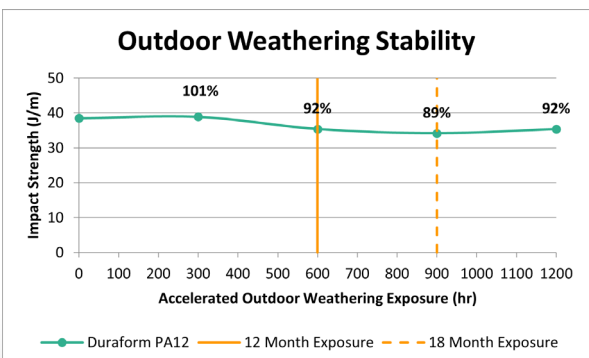
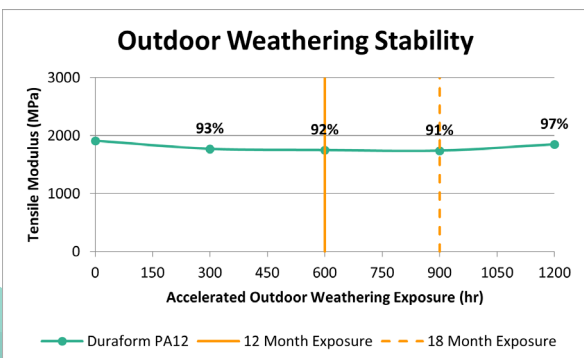
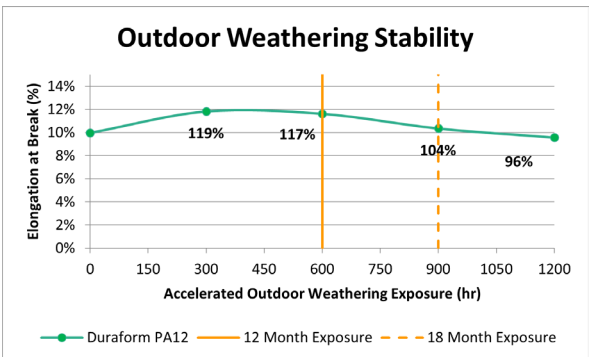
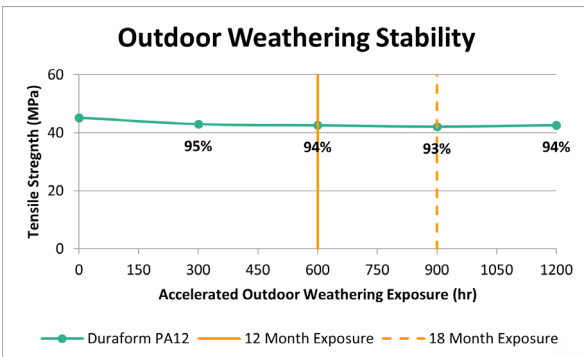
INDOOR STABILITY: Tested per ASTM D4329 standard method.

INDOOR STABILITY



OUTDOOR STABILITY: Tested per ASTM G154 standard method.

OUTDOOR STABILITY



ISOTROPIC PROPERTIES

Selective laser sintering technology prints parts that are generally isotropic in mechanical properties meaning the parts printed along either the XYZ axis will give similar results. Parts do not need to be oriented to get good isotropic behavior in mechanical properties, further improving the degree of freedom for part orientation for mechanical properties.

SOLID MATERIAL					
Metric	Method	Metric			
MECHANICAL					
		ZY	XZ	XY	Z45
Tensile Strength Ultimate	ASTM D638 Type IV	45 MPa	43 MPa	39 MPa	41 MPa
Tensile Strength at Yield	ASTM D638 Type IV	45 MPa	Did not yield	Did not yield	Did not yield
Tensile Modulus	ASTM D638 Type IV	1800 MPa	1700 MPa	1600 MPa	1700 MPa
Elongation at Break	ASTM D638 Type IV	13.7 %	9 %	6.2 %	6.4 %
Elongation at Yield	ASTM D638 Type IV	13.3 %	Did not yield	Did not yield	Did not yield
Flex Strength	ASTM D790	67 MPa	47 MPa	48 MPa	51 MPa
Flex Modulus	ASTM D790	1500 MPa	1300 MPa	1300 MPa	1400 MPa
Izod Notched Impact	ASTM D256	35 J/m	35 J/m	30 J/m	33 J/m
Izod unnotched impact	ASTM D4812	410 J/m	385 J/m	281J/m	249J/m

