



# Figure 4™ PRO-BLK 10

## Production Rigid

Figure 4®

Production-grade additive manufacturing material with game-changing thermoplastic-like mechanical properties and long-term environmental stability

### VERSATILE RIGID HEAT RESISTANT MATERIAL COMBINES SPEED, STRENGTH, EXCELLENT MECHANICAL PROPERTIES FOR TOOL-LESS, DIRECT PRODUCTION OF PLASTIC PARTS

Figure 4 PRO-BLK 10 delivers on the promise of additive manufacturing with true direct digital production of plastic parts. Go from CAD to manufacturing line in one day with tool-less, same day part production. With a fast print speed and simplified post-processing that includes a single curing cycle and single solvent cleaning, this material delivers exceptional throughput. It is a high precision resin producing parts with a smooth surface finish and sidewall quality, and has excellent mechanical properties and long-term environmental stability that brings a new level of assurance to 3D production.

#### Liquid Material

MEASUREMENT	CONDITION	METRIC	U.S.
Viscosity	@ 25 °C (77 °F)	293 cps	709 lb/ft-hr
Color		Black	
Liquid Density	@ 25 °C (77 °F)	1.07 g/cm <sup>3</sup>	0.039 lb/in <sup>3</sup>
Package Volume		1 kg bottle - Figure 4 Standalone 2.5 kg cartridge - Figure 4 Modular 10 kg container - Figure 4 Production	
Layer Thickness (Standard Mode)		0.05 mm	0.02 in
Vertical Build Speed (Standard Mode)		62 mm/hr	2.4 in/hr
Draft Mode		81 mm/hr	3.2 in/hr

#### APPLICATIONS

- Tool-less, same day production
- Direct production of small black plastic parts; examples include: motor housings, connectors, snap-fits, automotive interior and other general-use parts
- Digital production to replace injection molding or soft tooling processes

#### BENEFITS

- Improved environmental stability of mechanical and performance properties over time
- Fast throughput for part-in-hand with no secondary thermal cure required
- Simple, single solvent cleaning
- Excellent surface quality and repeatability
- Accurate, low distortion material for fast first article print success

#### FEATURES

- Fast print speed up to 62 mm/hr at 50 micron layer thickness
- 70 °C heat deflection temperature, 12% elongation at break
- Durability and strength



## Post-Cured Material

MECHANICAL PROPERTIES				
MEASUREMENT	CONDITION	METRIC	U.S.	
Solid Density (g/cm <sup>3</sup>   lb/in <sup>3</sup> )	ASTM D792	1.16	0.042	
Tensile Strength, Ultimate (MPa   PSI)	ASTM D412	63	9140	
Tensile Strength, at Yield (MPa   PSI)	ASTM D412	63	9140	
Tensile Modulus (MPa   KSI)	ASTM D412	2320	336	
Elongation at Break	ASTM D412	12%		
Elongation at Yield	ASTM D412	4.7%		
Flexural Strength (MPa   PSI)	ASTM D790	92	13340	
Flexural Modulus (MPa   KSI)	ASTM D790	2290	332	
Notched Izod Impact Strength (J/m   Ft-lbs/in)	ASTM D256	24	0.5	
Unnotched Izod Impact Strength (J/m   Ft-lbs/in)	ASTM D4812	614	11.5	
Glass Transition (T <sub>g</sub> ), DMA, E'	ASTM E1640	62 °C	144 °F	
Heat Deflection Temperature @ 0.45 MPa (66 PSI)	ASTM D648	70 °C	158 °F	
		@ 1.82 MPa (264 PSI)	56 °C	133 °F
Coefficient of Thermal Expansion (CTE) (ppm/°C   ppm/°F)	ASTM E831	< T <sub>g</sub>	71	39
		> T <sub>g</sub>	188	104
Hardness, Shore	ASTM D2240	79D		
Water Absorption (24 hour)	ASTM D570	1.16%		



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