Technical Data Sheet (TDS)

SmartAgain® PA/PO Alloy 3D Printer Filament

SmartAgain® is a high-performance engineering alloy which combines the properties of polyamides (nylon) and polyolefins such as polypropylene.

It is suitable for functional prototypes, design evaluation models, small manufacturing runs, and end use consumer products.

SmartAgain® PA/PO alloy is also available in granular form with the grade name TX501. It is suitable for most conventional plastic processing technologies such as extrusion, injection molding and blow molding.

General properties	Test Method	Condition	Typical Value
Density	ISO 1183	23°C, 50%RH	0.980 gr/cm^3
Melt flow rate	ISO 1133	230°C / 2.16kg	2.0 gr/10 min
Melting peak	ASTM D3418	Heating 10K/min	160/220 °C
Crystallization Peak	ASTM D3418	Cooling 20K/min	104 °C
Moisture absorption	Internal method	23°C, 50%RH/24hr	0.1%
Water absorption	Internal method	Saturated	<1.5%

Engineering properties	Test Method	Condition	Unit	Typical Value (Conditioned)						
Sample specimens				Injection Molded	3D Printed [1] (0.3mm layer height)					
					± 45°		90°		0°	
					Fan on	Fan off	Fan on	Fan off	Fan on	Fan off
Tensile modulus	ISO527-1-2	1mm/min	MPa	1450	1350	1400	1650	1750	900	1050
Yield (Break) stress	ISO527-1-2	50mm/min	MPa	34	28	30	30	32	10	12
Yield strain	ISO527-1-2	50mm/min	%	6.3	6.0	6.0	n.a.	n.a.	n.a.	n.a.
Strain at break	ISO527-1-2	50mm/min	%	>50	11.0	12.0	4.2	3.1	1.0	1.0
Charpy Impact Notched	ISO179-1	23°C 50%RH	kJ/m^2	8	8	7	28	12	2	2
HDT B	ISO 75-1-2	0.46 Mpa	°C	102	102	108	98	102	95	105

Note 1): Testing samples (ISO-3167 type 1a multi purpose specimen) are printed with standard SmartAgain® 0.3mm print profile at Ultimaker s5 (2.85mm) without air manager and JG Aurora A6 (1.75mm) without enclosure, except for three adjustments: 1) Only with top/bottom layers ie. 100% filled; 2) Cooling (Fan) switched on or off; 3) top/bottom layer line directions (see next page).

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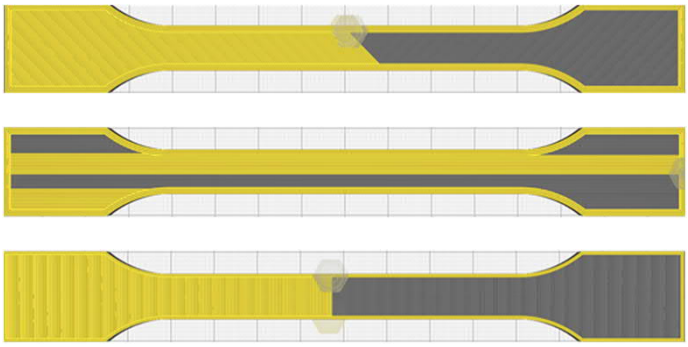

± 45°, wall thickness 1.2 mm

90°, wall thickness 1.2 mm

0°, wall thickness 0.4 mm

The results can give a good indication on the key engineering properties of the printed shell (wall and top/bottom layers). It could also serve as an engineering property prediction, if the printed object will be produced in future via conventional plastic processing technologies.

Dimensional accuracy	Test Method	Condition	Unit	Typical dimensional shrinkage			
Sample specimens				3D Printed[2] (0.3mm layer height)			
				± 45°		90°	
				Fan on	Fan off	Fan on	Fan off
X Direction	Internal	23°C 50%RH	%	1.1%	1.5%	1.4%	1.9%
Y Direction	Internal	23°C 50%RH	%	1.1%	1.5%	1.1%	1.4%
Z direction	Internal	23°C 50%RH	%	0.3%	2.5%	0.6%	2.5%

Note 2): Testing Samples (ISO 294-4, 65 x 65 x 3.2mm) are printed with standard SmartAgain® 0.3mm print profile JG Aurora A6 (1.75mm) without enclosure, except for three adjustments: 1) Only with top/bottom layers ie. 100% filled; 2) Cooling (Fan) switched on or off; 3) top/bottom layer line directions.

Warning: Next the the shrinkage property is material itself, the accuracy of printer can also influence the dimensional accuracy.