

# WINDFORM<sup>®</sup> SP

**CLASS OF MATERIAL:** Polyamide based material carbon filled

**TECHNOLOGY:** Selective Laser Sintering

Windform<sup>®</sup> SP is a composite polyamide based carbon filled material characterised by deep black colour. Windform<sup>®</sup> SP is a “Top” level material within the polyamide Windform<sup>®</sup> materials for additive manufacturing. Windform<sup>®</sup> SP has excellent mechanical properties similar to Windform XT 2.0. In addition it has the added advantage of increased resistance to shocks, vibrations and deformations. This material shows increases in impact strength and elongation at break. Moreover the Windform<sup>®</sup> SP retains its excellent thermal properties and resistance to high temperature. Windform<sup>®</sup> SP is a material with optimal mechanical characteristics per density units. Another important element of this material is represented by its waterproof properties and therefore its resistance to absorption of liquids and moisture.

## **APPLICATIONS:**

Windform<sup>®</sup> SP is the suitable material to create accurate and reliable prototypes and is perfect for functional applications in motorsports, automotive (suitable for example for components under the hood, such as intake manifolds), Air (components for UAV , Unmanned Aerial Vehicle) and aerospace design, since it allows applications fully functional as well as dyno tests, track tests and development of pre-serie parts. It is also recommended for all applications requiring resistance to damage, vibration and deformation. These applications are given only as an example, the versatility of the product combined with the technology used allows infinite possibilities.

## **WHERE TO FIND THE WINDFORM<sup>®</sup> PRODUCTS**

CRP Technology produces Windform<sup>®</sup> SP parts and it also distributes the material in Europe, USA and Japan, offering customized service as regards timing and delivery conditions of the product, according to customer's requests anywhere in the world.

## **HOW TO GET WINDFORM<sup>®</sup> PRODUCTS**

For any further information on product availability, request quotes or check delivery times, please visit [www.windform.eu](http://www.windform.eu) or send an inquiry to [info@crp.eu](mailto:info@crp.eu). CRP Technology customer service will contact you to answer all questions.



*Ph: Energica electric superbike*

PROPERTIES WINDFORM® SP	Test Method	SI Unity	Windform® SP
<b>GENERAL PROPERTIES</b>			
Density (20° C)		g/cc	1,106
Colour			BLACK
<b>THERMAL PROPERTIES</b>			
Melting point	ISO 11357-2	°C	193,3
HDT, 1,82 Mpa	ASTM D 648 TYPE B	°C	186,5
Vicat 10N	ASTM D1525-09	°C	189,9
<b>MECHANICAL PROPERTIES</b>			
Tensile Strength	UNI EN ISO 527-1:1997	Mpa	76,10
Tensile Modulus	UNI EN ISO 527-1:1997	Mpa	6219,60
Elongation at break	UNI EN ISO 527-1:1997	%	11,38
Flexural Strength	UNI EN ISO 14125:2000	Mpa	120,08
Flexural Modulus	UNI EN ISO 14125:2000	Mpa	4647,40
Impact Strength Unnotched (Charpy 23°C)	UNI EN ISO 179-1:2007	KJ/m <sup>2</sup>	28,68
Impact Strength Notched (Charpy 23°C)	UNI EN ISO 179-1:2007	KJ/m <sup>2</sup>	5,82
<b>ELECTRICAL PROPERTIES</b>			
RESISTIVITY, VOLUME	ASTM D257:1993	ohm * cm	<10 <sup>8</sup>
RESISTIVITY, SURFACE	ASTM D257:1993	ohm	<10 <sup>8</sup>
<b>SURFACE FINISH</b>			
After SLS Process		Ra µm	6,20
After manual finishing		Ra µm	1,45
After CNC machining		Ra µm	1,15
<b>PROPERTIES PER DENSITY UNIT</b>			
UTS per density unit		Mpa/(g/cc)	68,81
Tensile Modulus per density unit		Mpa/(g/cc)	5623,51
Flexural Strength per density unit		Mpa/(g/cc)	108,57
Flexural Modulus per density unit		Mpa/(g/cc)	4201,99

**Note: these are all indicative values.** Data were generated from the testing of parts produced with Windform® SP material under optimal processing conditions.

**Standard Technical Details for Accuracy versus Tolerance:**

For parts up to 6" (150 mm) the standard tolerance is: +/- 0.012 inch (0,3 mm)

For parts more then 6" (150 mm) the standard tolerance is: +/- 0.002 inch per inch (0,05 mm per 25 mm)