### SELECTIVE LASER SINTERING MATERIALS FOR UNLIMITED POSSIBILITIES



## **POLYMER POWDERS** FOR LASER SINTERING

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### A WIDE RANGE OF POSSIBILITIES

Our highly thermally-stable selective laser sintering technology is designed to work with premium powders allowing the design of new applications with great promise for your industry and with impressive performance in terms of mechanical, physical and aesthetic properties.

in meaning

#### **INNOVATION AND EXPERTISE**

Prodways has a team of experts with the knowledge and experience to push materials technology into new territory. In addition, strong partnerships with established materials developers has allowed Prodways to be even more effective at providing solutions.

# ProMaker **P SERIES** COMPATIBLE MATERIALS

	PA12-S 1300*	PA	A12-S 1550*	PA12-GF	F 2500*	PA12-GFX 2550	*	PA12-MF 6150*	PA12-CF 6500*
Appearance	Natural cream		l + mass coloring /Blue/Red/Grey	Natural	cream	Grey color in ma	55	Natural cream	Black
Average particle size	N.A		42 μm	N.	A	46 µm		N.A	N.A
Bulk Density	0.45 g/cm3	0	0.50 g/cm <sup>3</sup>	0.67 g	0	1.05 g/cm3		0.55 g/cm <sup>3</sup>	0.51 g/cm <sup>3</sup>
Density of parts	0.95 g/cm3		0.98 g/cm3	1.26 g	2	1.35 g/cm3		1.20 g/cm <sup>3</sup>	1.08 - 1.10 g/cm <sup>3</sup>
Moisture absorption	N.A		% (ASTM D570)	N.		0.33% (ASTM D57	70)	N.A	N.A
Melting Point	180°C		31°C - 183 °C	180		181°C - 183 °C		183°C	180°C
Heat Deflection 1.8 MPa	58°C	10	86°C	88		116°C		N.A.	72°C
ensile Strength	42 MPa		44 MPa	37 N		30 MPa		51 MPa	63 MPa
Tensile Modulus	1300 MPa		1550 MPa	2500		2550 MPa		6150 MPa	6500 MPa
Elongation @ break	30%		15%	5.0		8%		5%	3%
Exural Strength	40 MPa		N.A	54 N		N.A		76 MPa	85 MPa
Flexural Modulus	1200 MPa		1350 MPa	2200		2275 MPa		4633 MPa	3870 MPa
					-				
mpact Strength (unnotched Izod)	34 KJ/m <sup>2</sup>		68 KJ/m <sup>2</sup>	19 KJ		80 KJ/m <sup>2</sup>		20.78 KJ/m <sup>2</sup>	15 KJ/m <sup>2</sup>
hore Test (shore D)	NA.		68 Shore D	N.		77 Shore D		N.A.	N.A.
esistivity domain	Insulator		Insulator	N.		Antistatic		N.A.	N.A.
Ipper facing processed & blasting, Surface Ra	N.A.		7 µm	NJ		8 µm		N.A.	N.A.
pper facing after Finishing, Surface Ra	NA		7 µm	N.		1 µm		N.A.	N.A.
esting standard / Certification	GB/T Excellent mechanical		ISO Iulometry #42 μm	GB Higher modulu		ISO Similar to PP 20% inject		GB/T Stable size, smooth surface	GB/T
pecification	properties Lowest p Good recyclability Refreshi Color stability in contin			ständard PA12 Higher heat de	2 nylon parts Fine granulometry # Lower porosity rema composite Refreshing allows a u in continuous sifting regenerating cycles Economic cost of exp Excellent behavior in temperature and goo chemical resistance		ing for a	Good recyclability High resistance to thermal deformation Small contractive rate Good mechanical properties due to the addition of mineral fabric	Good heat deflection rate: Good modulus range (475 6500Mpa) Uniform black color
fypical Application Examples	Spare parts manufacturing or big parts joining with adhesives Complex production and prototype plastic parts Making car's oil pipe and brake pipe	arts joining with es production and pe plastic parts car's oil pipe and application from co goods to aerospace industry pe and application from co goods to aerospace		om consumer industries		which complex parts which Improved and reliable pro		Wide range of application for aerospace and automotive industry	Wide range of application aerospace and automoti industry
Зу	Prodways Materials by Farsoon	Prodv	ways Materials	Prodways N Fars		Prodways Materia	ls	Prodways Materials by Farsoon	Prodways Materials Farsoon
Зу	Farsoon	Prodv		Fars	oon			Farsoon	Farsoon
	Farsoon PA11-SX 1350*		PA11-SX 1	Fars:	oon PA	11-GF 3450*		Farsoon PA11-GF 3450 Black*	Farsoon FR 106*
ppearance	Farsoon PA11-SX 1350* Mat black color in mas		PA11-SX 1 Natural creat	Farsı 450* m color	oon PA	11-GF 3450*		Farsoon PA11-GF 3450 Black* Mat black	Farsoon FR 106* Natural cream color
ppearance verage particle size	Farsoon PA11-SX 1350* Mat black color in mas 50 μm		PA11-SX 1 Natural creat	450* m color	oon PA Natural cre	11-GF 3450* eam to light grey color 55 μm		Farsoon PA11-GF 3450 Black* Mat black 55 µm	Farsoon FR 106* Natural cream color 95 μm
Appearance Average particle size Julk Density	Farsoon PA11-SX 1350* Mat black color in mas 50 μm 0.55 g/cm3		PA11-SX 1 Natural creat 50 μm 0.55 g/ct	Farso 450* m color n m3	oon PA Natural cre	11-GF 3450* eam to light grey color 55 µm 0.95 g/cm3		Farsoon PA11-GF 3450 Black* Mat black 55 µm 0.95 g/cm3	Farsoon FR 106* Natural cream color 95 μm 0.45 g/cm3
ppearance verage particle size iulk Density	Farsoon PA11-SX 1350* Mat black color in mas 50 μm		PA11-SX 1 Natural creat	Farso 450* m color n m3	oon PA Natural cre	11-GF 3450* eam to light grey color 55 μm		Farsoon PA11-GF 3450 Black* Mat black 55 µm	Farsoon FR 106* Natural cream color 95 μm
ppearance werage particle size wulk Density Pensity of parts	Farsoon PA11-SX 1350* Mat black color in mas 50 μm 0.55 g/cm3		PA11-SX 1 Natural creat 50 μm 0.55 g/ct	Farso 450* m color m3 m3	oon PA Natural cre	11-GF 3450* eam to light grey color 55 µm 0.95 g/cm3		Farsoon PA11-GF 3450 Black* Mat black 55 µm 0.95 g/cm3	Farsoon FR 106* Natural cream color 95 μm 0.45 g/cm3
ppearance werage particle size wulk Density bensity of parts Aoisture absorption	Farsoon PA11-SX 1350* Mat black color in mas 50 μm 0.55 g/cm3 1.02 g/cm3		PA11-SX 1 Natural creat 50 μm 0.55 g/ct 1.02 g/ct	450* 450* m color m3 m3 4 D570)	oon PA Natural cre	11-GF 3450* eam to light grey color 55 µm 0.95 g/cm3 1.40 g/cm3		Farsoon PA11-GF 3450 Black* Mat black 55 µm 0.95 g/cm3 1.40 g/cm3	Farsoon FR 106* Natural cream color 95 µm 0.45 g/cm3 1.07 g/cm3
ppearance verage particle size ulk Density ensity of parts foisture absorption felting Point	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM DS70)		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM	450* 450* m color m3 m3 4 D570) C	PA Natural cre	11-GF 3450* eam to light grey color 55 µm 0.95 g/cm3 1.40 g/cm3 % (ASTM D570)		Farsoon PA11-GF 3450 Black* Mat black 55 µm 0.95 g/cm3 1.40 g/cm3 0.85% (ASTM D570)	Farsoon FR 106* Natural cream color 95 μm 0.45 g/cm3 1.07 g/cm3 N.A
ppearance verage particle size ulk Density ensity of parts foisture absorption felting Point leat Deflection 1.8 MPa	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C	450* 450* m color m3 m3 4 D570) c D648)	PA Natural cre	11-GF 3450* eam to light grey color 55 µm 0.95 g/cm3 1.40 g/cm3 % (ASTM D570) 200 °C		Farsoon           PA11-GF 3450 Black*           Mat black           55 μm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C	Farsoon FR 106* Natural cream color 95 μm 0.45 g/cm3 1.07 g/cm3 N.A 189°C
ppearance verage particle size ulk Density ensity of parts foisture absorption felting Point leat Deflection 1.8 MPa ensile Strength	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM	450* 450* m color m m m m m m 4 D570) - D648) a	PA Natural cre 0.850 133°	11-GF 3450* eam to light grey color 55 µm 0.95 g/cm3 1.40 g/cm3 % (ASTM D570) 200 °C C (ASTM D648)		Farsoon           PA11-GF 3450 Black*           Mat black           55 μm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)
ppearance verage particle size ulk Density ensity of parts foisture absorption felting Point leat Deflection 1.8 MPa ensile Strength ensile Modulus	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP	450* 450* m color m m m m m m 4 D570) - D648) a	PA Natural cre 0.850 133°	11-GF 3450* eam to light grey color 55 µm 0.95 g/cm3 1.40 g/cm3 % (ASTM D570) 200 °C C (ASTM D648) 33 MPa		Farsoon PA11-GF 3450 Black* Mat black 55 µm 0.95 g/cm3 1.40 g/cm3 0.85% (ASTM D570) 199 °C 133°C (ASTM D648) 33 MPa	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa
ppearance verage particle size ulk Density ensity of parts foisture absorption felting Point leat Deflection 1.8 MPa ensile Strength ensile Modulus longation @ break (XY)	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M	450* 450* m color m m m m m m 4 D570) - D648) a	PA Natural cre 0.850 133°	All-GF 3450* eam to light grey color 55 µm 0.95 g/cm3 1.40 g/cm3 % (ASTM D570) 200 °C C (ASTM D648) 33 MPa 3450 MPa		Farsoon PA11-GF 3450 Black* Mat black 55 µm 0.95 g/cm3 1.40 g/cm3 0.85% (ASTM D570) 199 °C 133°C (ASTM D648) 33 MPa 3450 MPa	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A
ppearance verage particle size ulk Density rensity of parts foisture absorption felting Point leat Deflection 1.8 MPa ensile Strength ensile Modulus longation @ break (X)	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45%	450* 450* m color m m m m m m 4 D570) - D648) a	PA Natural cre 0.850 133°	11-GF 3450* aam to light grey color 55 µm 0.95 g/cm3 1.40 g/cm3 % (ASTM D570) 200 °C C (ASTM D648) 33 MPa 3450 MPa 12%		Farsoon           PA11-GF 3450 Black*           Mat black           55 µm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A           38%
ppearance verage particle size ulk Density ensity of parts foisture absorption felting Point leat Deflection 1.8 MPa ensile Strength ensile Modulus longation @ break (XY) longation @ break (Z) lexural Strength	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21%	Fars           450*           m color           n           m3           4 D570)           C           I D648)           a           Pa	oon PA Natural cre 0.850 133*	11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%		Farsoon           PA11-GF 3450 Black*           Mat black           55 µm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%
ppearance verage particle size ulk Density ensity of parts loisture absorption lelting Point eat Deflection 1.8 MPa ensile Strength ensile Modulus longation @ break (XY) longation @ break (Z) lexural Strength lexural Modulus	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%           N.A		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21% N.A	Fars           450*           m color           n           m3           4 D570)           -           D648)           a           Pa           Pa	oon PA Natural cre 0.850 133*	11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A		Farsoon           PA11-GF 3450 Black*           Mat black           55 µm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%           N.A
ppearance verage particle size ulk Density ensity of parts loisture absorption lelting Point eat Deflection 1.8 MPa ensile Strength ensile Modulus longation @ break (XY) longation @ break (Z) lexural Strength lexural Modulus npact Strength (unnotched Izod)	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%           N.A           1250 MPa		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21% NA 1300 M	Fars           450*           m color           n           m3           4 D570)           C           1 D648)           a           Pa           Pa           ak	oon PA Natural cre 0.850 133*	A11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa		Farsoon           PA11-GF 3450 Black*           Mat black           S5 µm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%           N.A           1345 MPa
ppearance verage particle size ulk Density ensity of parts foisture absorption felting Point leat Deflection 1.8 MPa ensile Strength ensile Modulus longation @ break (XY) longation @ break (Z) lexural Strength lexural Modulus mpact Strength (unnotched Izod) hore Test (shore D)	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%           N.A           1250 MPa           No break		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21% NA 1300 M No breat	Fars           450*           m color           n           m3           4 D570)           2           1 D648)           a           Pa           Pa           ak           e D	oon PA Natural cre 0.850 133° 133°	A11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           2300 MPa           N.A		Farsoon           PA11-GF 3450 Black*           Mat black           55 µm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           N.A	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%           N.A           1345 MPa           N.A
expeearance verage particle size iulk Density Pensity of parts Aoisture absorption Adelting Point leat Deflection 1.8 MPa ensile Strength ensile Modulus longation @ break (XY) longation @ break (Z) lexural Strength lexural Modulus mpact Strength (unnotched Izod) hore Test (shore D) esistivity domain	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%           N.A           1250 MPa           No break           75 Shore D		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21% NA 1300 M 1300 M No breat 74 Shore	Fars           450*           m color           n           m3           4 D570)           2           1 D648)           a           Pa           ak           e D           or	oon PA Natural cre 0.850 133° 133°	A11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           X.A           N.A           N.A           N.A           N.A           N.A		Farsoon           PA11-GF 3450 Black*           Mat black           55 µm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           N.A           N.A           N.A           N.A           N.A	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%           N.A           1345 MPa           N.A           N.A
ppearance werage particle size werage particle size wereage particle size wereage particle size wereag	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%           N.A           1250 MPa           No break           75 Shore D           Insulator		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21% NA 1300 M No breat 74 Short Insulato	Fars           450*           m color           n           m3           4 D570)           C           1 D648)           a           Pa           ak           e D           or           n	oon PA Natural cre 0.850 133° 133°	A11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           A.A           N.A           N.A           N.A           N.A           N.A		Farsoon           PA11-GF 3450 Black*           Mat black           55 µm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           N.A           N.A           N.A           N.A           N.A           N.A           N.A	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%           N.A           1345 MPa           N.A           N.A           ISU           AST           AST           N.A           SU           AST           N.A           ISU
	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%           N.A           1250 MPa           No break           75 Shore D           Insulator           9 μm		PA11-SX 1 Natural creat 50 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21% NA 1300 M No bre, 74 Short Insulate 10 µm	Fars           450*           m color           n           m3           4 D570)           C           1 D648)           a           Pa           ak           e D           or           n	oon PA Natural cre 0.850 133° 133°	A11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           Antistatic           11 μm		Farsoon           PA11-GF 3450 Black*           Mat black           55 μm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           N.A           N.A           N.A           11 μm	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%           N.A           1345 MPa           N.A           INA           NA           NA           1345 MPa           N.A           Insulator           NA
ppearance verage particle size ulk Density ensity of parts toisture absorption telting Point eat Deflection 1.8 MPa ensile Strength ensile Modulus longation @ break (XY) longation @ break (XY) longation @ break (Z) lexural Strength lexural Strength lexural Modulus mpact Strength (unnotched Izod) hore Test (shore D) esistivity domain ipper facing processed & blasting, Surface Ra ipper facing after Finishing, Surface Ra lammability 12 Second Burn	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%           N.A           1250 MPa           No break           75 Shore D           Insulator           9 μm           7 μm		PA11-SX 1 Natural creat 50 µm 0.55 g/cr 1.02 g/cr 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21% NA 1300 M No bre, 74 Short Insulat 10 µm 8 µm	Fars           450*           m color           n           m3           4 D570)           C           1 D648)           a           Pa           ak           e D           or           n	oon PA Natural cre 0.850 133° 133°	A11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           Antistatic           11 μm           8 μm		Farsoon           PA11-GF 3450 Black*           Mat black           55 µm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           N.A           N.A           N.A           MA           Antistatic           11 µm           8 µm	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           1.07 g/cm3           V.A           1.07 g/cm3           N.A           1.89°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%           N.A           1345 MPa           N.A           N.A           Insulator           NA           NA
ppearance verage particle size ulk Density ensity of parts oisture absorption elting Point eat Deflection 1.8 MPa ensile Strength ensile Modulus ongation @ break (XY) ongation @ break (ZY) exural Strength exural Modulus npact Strength exural Modulus npact Strength exural Modulus npact Strength exural Modulus npact Strength exural Modulus npact Strength (unnotched Izod) nore Test (shore D) esistivity domain pper facing processed & blasting, Surface Ra ammability 12 Second Burn ammability 60 Second Burn	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%           N.A           1250 MPa           No break           75 Shore D           Insulator           9 μm           7 μm           N.A		PA11-SX 1 Natural creat 50 µm 0.55 g/cr 1.02 g/cr 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21% NA 1300 M No bre, 74 Short Insulat 10 µm 8 µm	Fars           450*           m color           n           m3           4 D570)           C           1 D648)           a           Pa           ak           e D           or           n	oon PA Natural cre 0.850 133° 133°	A11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           Antistatic           11 μm           8 μm           N.A		Farsoon           PA11-GF 3450 Black*           Mat black           55 μm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           N.A           N.A           N.A           MA           MA           MA           N.A           N.A           Antistatic           11 μm           8 μm           N.A	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           1.07 g/cm3           V.A           1.07 g/cm3           N.A           1.89°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%           N.A           1345 MPa           N.A           N.A           Insulator           NA           NA           NA           NA           Pass
Appearance         Average particle size         Bulk Density         Density of parts         Moisture absorption         Welting Point         Heat Deflection 1.8 MPa         Fensile Strength         Fensile Strength         Elongation @ break (XY)         Elongation @ break (Z)         Flexural Modulus         mpact Strength         Flexural Modulus         Mapact Strength (unnotched Izod)         Shore Test (shore D)         Resistivity domain         Upper facing processed & blasting, Surface Ra         Flammability 12 Second Burn         Flammability 60 Second Burn         Flammability 60 Second Burn	Farsoon           PA11-SX 1350*           Mat black color in mas           50 μm           0.55 g/cm3           1.02 g/cm3           1.12% (ASTM D570)           199 °C           46°C (ASTM D648)           45 MPa           1350 MPa           45%           21%           N.A           1250 MPa           No break           75 Shore D           Insulator           9 μm           7 μm           N.A	s	PA11-SX 1 Natural creat 50 µm 0.55 g/cr 1.02 g/cr 1.12% (ASTM 200 °C 47°C (ASTM 45 MP 1450 M 45% 21% NA 1300 M 0 brea 74 Shore 1nsulate 10 µm 8 µm NA NA	450* 450* 450* 450* 450* 450* 450* 450*	oon PA Natural cre Natural cre Natural cre Natural cre Natural cre Similar to inje PP-G Similar to inje PP-G Sranulometry Low shrinkag properties Refreshing at cycles Steps at Steps a	A11-GF 3450*           sam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           Antistatic           11 μm           8 μm           N.A           N.A	Similar 1 PP-GB Granulc Low shr propert Refresh cycles Econom	Farsoon           PA11-GF 3450 Black*           Mat black           55 μm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           2300 MPa           N.A           11 μm           8 μm           N.A           ISO           τo injected PA6-MD30 or           metry refined #55 μm inkage and reliable es           sing at 50% limited to 8-100 ic cost of exploitation	Farsoon           FR 106*           Natural cream color           95 μm           0.45 g/cm3           1.07 g/cm3           N.A           189°C           70°C (ASTM D648)           26 MPa           N.A           38%           21%           N.A           1345 MPa           N.A           Insulator           NA           Pass           Pass
By Appearance Average particle size Bulk Density Density of parts Moisture absorption Melting Point Heat Deflection 1.8 MPa Tensile Strength Tensile Strength 0 Elongation @ break (XY) Elongation @ break (XY) Elongation @ break (XY) Elongation @ break (Z) Flexural Strength Flexural Strength 1 Flexural Strength 1 Flexural Modulus Upper facing processed & blasting, Surface Ra Flamability 12 Second Burn Flamability 25 Second Burn Testing standard / Certification Specification	Farsoon         PA11-SX 1350*         Mat black color in mas         50 μm         0.55 g/cm3         1.02 g/cm3         1.12% (ASTM D570)         199 °C         46°C (ASTM D648)         45 MPa         1350 MPa         45%         21%         N.A         1250 MPa         No break         75 Shore D         Insulator         9 μm         7 μm         N.A         ISO         Granulometry refined #50 μn         Use in continuous sifting- regenerating cycles possible         Tesistance for snapfit and livi	s i i i i i i i i i i i i i i i i i i i	PA11-SX 1 Natural creat S0 µm 0.55 g/ct 1.02 g/ct 1.12% (ASTM 200 °C 47°C (ASTM 45% 21% 45% 21% 1450 M 45% 21% N.A 1300 M No breat 74 Shore 75 Shore 76 Shore 76 Shore 78 µm 88 µm 88 µm 80 N.A 150 / Class VI cer 67 Granulometry refine S0% (limited S0% / Class VI cer 67 applications (limited C) 04 (limited S0% / Class VI cer 67 applications (limited C) 04 (limited S0% / Class VI cer 67 applications (limited C) 04 (limited S0% / Class VI cer 67 applications (limited C) 04 (limited S0% / Class VI cer 67 applications (limited C) 04 (limited S0% / Class VI cer 67 applications (limited C) 04 (limited S0% / Class VI cer 67 applications (limited C) 04 (limited S0% / Class VI cer 67 applications (limited C) 04 (limited S0% / Class VI cer 67 applications (limited C) 04 (limited S0% / Class VI cer 67 applications (limited S0% / Class VI cer 57 applications (limited S0% / Class	450* 450* 450* 450* 450* 450* 450* 450 4570)  - 10648)  a Pa Pa Pa Ak Pa Pa Ak Pa Character 450 450 450 450 450 450 450 450 450 450	A Natural cre Natural cre 0.854 0.854 133° 133° 133° 133° 133° 133° 133° 133	11-GF 3450*           aam to light grey color           55 μm           0.95 g/cm3           1.40 g/cm3           % (ASTM D570)           200 °C           C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           2300 MPa           N.A           S00 MPa           N.A           N.A           N.A           N.A           N.A           N.A           N.A           N.A           S0           N.A           SO           e and reliable           50% limited to 8-10	Similar 1 PP-GB Granulc Low shr propert Refresh cycles Econorr Mat blau Umanufac parts for	Farsoon           PA11-GF 3450 Black*           Mat black           55 μm           0.95 g/cm3           1.40 g/cm3           0.85% (ASTM D570)           199 °C           133°C (ASTM D648)           33 MPa           3450 MPa           12%           9%           N.A           2300 MPa           N.A           2300 MPa           N.A           11 μm           8 μm           N.A           ISO           τo injected PA6-MD30 or           metry refined #55 μm inkage and reliable es           sing at 50% limited to 8-100 ic cost of exploitation	Farsoon       FR 106*       Natural cream color       95 µm       0.45 g/cm3       1.07 g/cm3       N.A       189°C       70°C (ASTM D648)       26 MPa       N.A       38%       21%       N.A       1345 MPa       N.A       Superior Houghtony Federal Aviat Regulation (FAR) Fire retardar requirement ****       Superior thoughtones allows thin walled features while ssi space and weight designs Waintain exceptional mecha

\*Preliminary data. Performance characteristics of these materials may change according to product application, operating conditions, material combined or end use.

\*\* Under reference Innov/PA 1450 from ExcelTec \*\*\* Under reference FR 106 from ALM



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