KIMYA
Additive Manufacturing by ARMOR

PORTFOLIO JANUARY 2020

	PROPERTIES										CERTIFICATIONS						
MATERIALS	Ease to print	Shrinkage (No, Low, Yes)	Rigid	Elasticity	Impact Strenght	Hydrophobic	Solvent resistance	Abrasion resistance	UV resistance	Weather resistance	RoHS	EU 10/2011	FDA	UL94 - Vo	ESD protection	ADVANTAGES	DISADVANTAGES
ASA-S	**	Y	**	*	*	**	**	*	***	***	Y	N	N	N	N	Resistance to weather and UV: outdoor application.	Warping
ABS-S	**	Y	**	*	*		**	*			Y	Y	Y	N	N	Impact resistance, good temperature resistance compare to PLA.	Warping
ABS CARBON	**	L	**	*	*	**	**	**	*		N	N	N	N	N	Better interlayer adhesion, no shrinkage, lighweight, better tensile modulus and abrasion R. than ABS.	
ABS-ESD Naturel	**	L	*	**	**		**	*			Y	N	N	N	Y	Good flexibility and impact resistance, easy to print, ESD protection.	Sensitive to humidity and UV rays.
ABS KEVLAR	**	L	**	*	*		**	**	*		N	N	N	N	N	Smooth surface, light-weighted, low warping, no Shrinkage.	Sensitive to UV and humidity.
HIPS-R	***	L	**	**	*	**	**	*			N	N	N	N	N	Support material, 100% recycled material	
PC-S	**	L	**	**			**				Y	N	Y	N	N	High temp R. (140°C), stérilizable, food contact FDA	Sensitive to abrasion and UV.
PEBA-S	***	N	*	*****	***	**	***	***	***	***	Y	N	N	N	N	Elongation at break >550% , im^pact resistance, light weight, excellent energy return.	
PEKK-A[a]	**	N	**	**	*	***	***	***	***	***	Y	N	N	Y	N	Easier to print compared to PEEK and PEI High temp. R., Chem T., flam retardant.	
PEKK CARBON[a]	**	N	**	**	*	***	***	***	***	***	N	N	N	Y	N	Easier to print compared to PEEK and PEI, high temp. R., Chem T., flam retardant, abrasion resistant.	
PEI-1010[a]	**	N	***	**	*	*	***	*	***	**	Y	N	N	Y	N	High temp. R., Chem T., Flam retardant, excellent dimensional stability.	High temperature printer required than PEKK and PEEK.
PEI-9085	**	N	***	**	*	*	***	*	***	**	Y	N	N	Y	N	High temp. R., Chem T., excellent dimensional stability, flame retardant : UL94 V0 & FAR 25.853	High temperature printer required

[a] Based on injected plates, printed parts are in progress
[b] Depending on colors, please for more information contact us
[c] UL 94 is the standard for safety of flammability of plastic materials. From lowest (least flame-retardant) - to highest (most flame-retardant) HB < V2 < V1 < V0 < 5VB < 5VA .

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PETG CARBON	***	N	***	*	**	**	**		**	**	N	N	N	N	N	Possible post-production; humidity resistance.	Abrasive; sensitive to UV rays.
PETG-S	***	N	**	**	*	**	**		**	**	Y	Y	Natural only	N	N	Odorless, no shrinkage, high flexibility and impact strength; food contact ; hydrophobic.	Sensitive to UV rays and scratches.
PLA-HI	*****	N	**	*	**	*					N	Y	N	N	N	Odorless; biosourced material; easy to print; no heat-bed needed; increased resistance.	Sensitive to humidity and UV rays; medium durability.
PLA-R	*****	N	**	*	*							N	N	N	N	≥ 99 % Recycled material, ≥ 99 % Biosourced material, easy to print, no odor.	Sensitive to humidity and UV rays.
PLA-S	*****	N	**	*	*						Y	Y[b]	N	N	N	Odorless; biosourced material; easy to print; no heat-bed needed.	Sensitive to humidity and UV rays; medium durability; hard post-pro-
PPSU-S	**	N	***	**	***	***	***	*	***	**		Y	N	Y	N	High temp. R., Chem T., Flam retardant, impact resistant, resistance to hydrolysis	High temperature printer required
PS	***	L	**	**	*	**	**	*			N	N	N	N	N	Partly recycled; smooth surface; easy post-production; fast printing.	
TPC-91A	****	N	*	****	***	***	***	***	***	***	N	N	N	N	N	Elongation > 500%, easy to print, printability.	
TPC-ESD	****	N	*	****	***	***	***	***	***	***	N	N	N	N	Y	Elongation at break > 400%, easy to print, flexible, ESD protection.	
TPU-92A	***	N	*	***	***	***	***	***	***	***	Y	Y	Y (except black)	N	N	Resistant to solvents, elastic.	
TPU-R	***	N	*	***	***	***	***	***	***	***	N	N	N	N	N	Flexibility, 100% recycled material	

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	PRINTING SETTINGS							GLASS TRANSITION TEMP.	MELTING TEMP.	MAX TEMP. USAGE	DENSITY	RESISTANCE TO IMPACT	ELONGATION AT BREAK	MODULE TRACTION	MODULE BENDING	HARDNESS SHORE
	Extrusion Temperature	Bed Temperature	Chamber Temperature	Printing speed	Recommended bed surface	Compulsory Drying	Drying recommendations	Tg	Tf		ISO 1183	ISO 179	ISO 527	ISO 527	ISO 178	ISO 868
								DSC	DSC			Charpy	5A	5A		
												Notched	50mm/min	1mm/min		
MATERIALS	°C	°C	°C	mm/s		Yes/No		°C	°C	°C	g/cm³	kJ/m²	%	MPa	MPa	
ASA-S	240-260 (250)	90-100 (95)	Without or 70	20 - 60 (50)	Glass + adhesive product or PEI	NO	80°C / 2-4h	108	-	90	1.056	13	4.3	1,685	1,662	74D
ABS-S	250-270 (260)	85-100 (90)	Without or 70	20 - 60 (50)	Glass + adhesive product or PEI	NO	80°C / 2-4h	107	-	90	1.035	24.7	9.8	1,484	1,443	70D
ABS CARBON	250-270 (260)	90-110 (100)	Without 70-80	40-70 (50)	Glass + adhesive product or PEI	NO	80°C / 2-4h	100	N/A	90	1.032	7.3	3.1	2,189	1,822	72.2D
ABS-ESD Natural	260	100	Without or 70	40	Glass + adhesive product or PEI	NO	80°C / 2-4h	107	-	90	1.03	10.9	6.4	1,121	856	66.7D
ABS KEVLAR	250-270 (260)	90-110 (100)	Without or 70	40-70 (50)	Glass + adhesive product or PEI	NO	80°C / 2-4h	100	N/A	90	1.037	8.86	4.9	1,775	1,509	65.2D
HIPS-R	250-290 (270)	60-110 (85)	-	20-70 (60)	Glass + adhesive product or PEI	No	80°C / 2-4h	97	N/A	85	1.03	7.3	11.5	1,273	1,533	76.6D
PC-S	280-320 (295)	100-120 (105)	Without or 70	40-70 (45)	Glass + adhesive product (dimafix)	NO	120°C / 4h	140	-	140	1.193	7.9	4.8	2,172	1,640	79.2D
PEBA-S	210 - 260 (240)	70-90 (85)	-	20 - 60 (44)	Glass + blue tape ou PEI + blue tape	YES	80°C / 2-4h	-	149	100	1.013	No break	>550	63	70	93A
PEKK-A[a]	350-400	110 - 170	Without or up to 120	20-40	Glass + PET tape	YES	120°C / 4h	159	308	150	1.261	2.5	>5	2,510	1,660	-
PEKK CARBON[a]	350-390	110-150	Without or up to 120	20-40	Glass + PET tape	YES	120°C / 4h	160	300	150	1.27	5.0	80	2,900	3,000	-
PEI-1010[a]	360-400	140-170	100-120	10-40	Glass or PEI	YES	120°C / 4-6h	215	N/A	200	1.27	10	60	3,200	3,300	-
PEI-9085	350-380	120-160	100-120	20-35	Glass or PEI	YES	120°C / 4-6h	175	N/A	170	1.34	11	-	-	-	-

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	Extrusion Temperature	Bed Temperature	Chamber Temperature	Printing speed	Recommended bed surface	Compulsory Drying	Drying recommenda-tions	Tg	Tf		ISO 1183	ISO 179	ISO 527	ISO 527	ISO 178	ISO 868
								DSC	DSC			Charpy	5A	5A		
												Notched	50mm/min	1mm/min		
	°C	°C	°C	mm/s		Yes/No		°C	°C	°C	g/cm³	kJ/m²	%	MPa	MPa	
PETG CARBON	220-260	60-100	Without 70-80	40-70 (50)	Glass + blue tape 3M or PEI + blue tape	NO	65°C / 2-4h	76	N/A	80	1.317	4	3.4	4,015	2,987	76.4D
PETG-S	195-230 (225)	35-60 (60)	-	40-70 (50)	Glass + blue tape 3M or PEI + blue tape	NO	65°C / 2-4h	80	N/A	70	1.274	4	24.3	1,833	1,641	72.5D
PLA-HI	190-210 (200)	20-60 (60)	-	40-150 (50)	Glass + blue tape 3M or PEI or Buildtak	NO	65°C / 2-4h	60	156	55	1.210	16.5	4.2	2,491	2,097	76.8D
PLA-R	190-210 (200)	20-60 (60)	-	40 - 150 (50)	Glass + blue tape 3M or PEI or Buildtak	NO	65°C / 2-4h	61	150	55	1.24	3.22	4	2,963	2,675	79.1D
PLA-S	190-210 (200)	20-60 (60)	-	40-150 (50)	Glass + blue tape 3M or PEI or Buildtak	NO	65°C / 2-4h	60	155	55	1.246	3.5	3.2	2,862	2,285	77.3D
PPSU-S	360-400	140-170	100-120	15-30	Glass ou PEI	YES	120°C / 4h	220	N/A	180	1.29	-	-	-	-	-
PS	200-260 (250)	60-100 (95)	-	40-150 (50)	Glass + adhesive product or PEI	NO	80°C / 2-4h	96	N/A	85	1.009	7.5	18.3	1,679	1,526	74.7D
TPC-91A	230-270 (260)	60-85 (60)	-	20 - 60 (44)	Glass + blue tape 3M or PEI + blue tape	NO	80°C / 2-4h	N/A	159	125	1.22	No break	> 500	67	66	91A
TPC-ESD	230-270 (260)	60-85 (60)	-	20 - 60 (44)	Glass + blue tape ou PEI + blue tape	NO	80°C / 2-4h	-	160	125	1.2	No break	>400	57	54	91A
TPU-92A	210-250 (225)	60-90 (85)	-	20-70 (25)	Glass + blue tape 3M or PEI + blue tape	YES	80°C / 2-4h	N/A	N/A	-	1.159	No break	351.6	90	81	92A
TPU-R	210-250 (225)	60-90 (85)	-	20-70 (25)	Glass + blue tape 3M or PEI + blue tape	YES	80°C / 2-4h	N/A	N/A	-	1.140	No Break	>300	55.2	45.6	90A

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