

# HAGE3D

## MATERIAL DATA SHEET

ENGINEERING PLASTICS														
Material	ABS	ASA	ABS-ESD	ABS-FR	HT-PETG	PCTG	TPC	TPU	PA6	PA12	CoPA	PC	PC-FR	PC-ABS
Diameter	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm	1,75 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm
Applications	Design objects Large objects Design proto- types Functional prototypes	Design objects Large objects Design proto- types Functional prototypes	Electrical parts Electronical assemblies	Functional prototypes Small series production Automotive Mechanical constructions	Functional prototypes Small series production Automotive Mechanical constructions	Electronical assemblies Automotive Mechanical constructions	Flexible parts	Flexible parts	Functional prototypes Small series production Automotive Mechanical constructions	Functional prototypes Small series production Automotive Mechanical constructions	Functional prototypes Small series production Automotive Mechanical constructions	Functional prototypes Small series production Automotive Mechanical constructions	Functional prototypes Small series production Automotive Mechanical constructions	Functional prototypes Small series production Automotive Mechanical constructions
Notched impact strength (23 °C max)	58 kJ/m <sup>2</sup>	18 kJ/m <sup>2</sup>	11 kJ/m <sup>2</sup>	29 kJ/m <sup>2</sup>	860 J/m	2 kJ/m <sup>2</sup>	No Break	No Break	-	-	10 kJ/m <sup>2</sup>	25 kJ/m <sup>2</sup>	8 kJ/m <sup>2</sup>	13 kJ/m <sup>2</sup>
Tensile strength (max)	44 MPa	48 MPa	24 MPa	36 MPa	43 MPa	37 MPa	8 MPa	50 MPa	80 MPa	80 MPa	67 MPa	60 MPa	67 MPa	40 MPa
Youngs modulus (max)	2030 MPA	2020 MPA	1121 MPA	1860 MPA	-	1763 MPA	29 MPA	150 MPA	3400 MPA	3300 MPA	2300 MPA	2048 MPA	2634 MPA	1832 MPA
Elongation at break (max)	34 %	15 %	-	9 %	-	3 %	390 %	450 %	4 %	-	10 %	12 %	4 %	-
Flexural strength (max)	-	-	27 MPa	66 MPa	64 MPa	56 MPa	-	-	-	-	97 MPa	94 MPa	97 MPa	66 MPa
Flexural modulus (max)	-	-	856 MPa	2148 MPa	1575 MPa	1613 MPa	-	-	2370 MPa	-	1667 MPa	2044 MPa	2518 MPa	2081 MPa
Hardness	-	98A (Shore)	-	-	111 (Rockwell)	-	34D (Shore)	98A (Shore)	-	-	-	-	-	-
Operating temperature (long run)	95 °C	95 °C	85 °C	90 °C	100 °C	75 °C	90 °C	138 °C	90 °C	100 °C	110 °C	110 °C	110 °C	135 °C
Specific traits	good mechanical behaviour good look	good mechanical behaviour UV-resistant	low static charge	UL 94 VO	High performance PETG	related to PETG ESD-safe	elastical UV-resistant	elastical good mechanical behaviour	tensile good mechanical behaviour	tensile good mechanical behaviour	very tensile	High isotropy	UL 94 VO	High impact strength
Average extrusion temperature (1,75 mm)	245 °C	245 °C	260 °C	250 °C	260 °C	260 °C	230 °C	240 °C	275 °C	290 °C	265 °C	270 °C	270 °C	260 °C
Active build chamber heating	depends on the shape	depends on the shape	yes	yes	no	yes	no	no	yes	yes	yes	yes	yes	yes
Support system	BVOH, PLA	BVOH, PLA	BVOH	BVOH	BVOH	BVOH	BVOH	BVOH	BVOH	BVOH	PolyDissolve S1 BVOH	PolyDissolve S2 BVOH	PolyDissolve S2 BVOH	PolyDissolve S2 BVOH

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	STANDARD PLASTICS				REINFORCED PLASTICS (SHORT FIBRES)					METAL	HIGH TEMPERATURE PLASTICS		SUPPORT		
Material	PP	PETG	PLA	Design PLA	PA6 / CF	PA6 / GF	PA12 / CF	PP / GF	PC / CF	316 L	PEKK	PPSU	PVA	BVOH	
Diameter	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	1,75 mm	1,75 mm	1,75 mm	1,75 mm	1,75 mm	1,75 mm	1,75 mm	1,75 mm	1,75 mm 2,85 mm	1,75 mm 2,85 mm	
Applications	Functional prototypes Small series production	Functional prototypes Small series production Mechanical constructions	Functional prototypes	Design objects Functional prototypes	Functional prototypes Small series production Mechanical constructions Automotive	Functional prototypes Small series production Mechanical constructions Automotive	Functional prototypes Small series production Mechanical constructions Automotive	Functional prototypes Small series production Mechanical constructions Automotive	Functional prototypes Small series production Mechanical constructions Automotive	Functional prototypes Small series production Mechanical constructions Automotive	Spare parts Small series production Mechanical constructions	Functional prototypes Small series production Mechanical constructions Automotive	Functional prototypes Small series production Mechanical constructions Automotive	-	-
Notched impact strength (23 °C; max)	-	7 kJ/m <sup>2</sup>	6 kJ/m <sup>2</sup>	7 kJ/m <sup>2</sup>	47 kJ/m <sup>2</sup>	-	35 kJ/m <sup>2</sup>	23 kJ/m <sup>2</sup>	23 kJ/m <sup>2</sup>	-	-	-	-	-	
Tensile strength (max)	12 MPa	50 MPa	105 MPa	45 MPa	120 MPa	90 MPa	90 MPa	42 MPa	70 MPa	485 MPa	85 MPa	70 MPa	-	-	
Youngs modulus (max)	-	1940 MPa	3145 MPa	3000 MPa	14400 MPa	5560 MPa	11500 MPa	2628 MPa	6200 MPa	193 GPa	2850 MPa	2340 GPa	-	-	
Elongation at brake (max)	> 600 %	120 %	175 %	4 %	1 %	2 %	-	4 %	2 %	-	8 %	7 %	-	-	
Flexural strength (max)	-	71 MPa	54 MPa	67 MPa	-	-	-	77 MPa	90 MPa	-	-	91 MPa	-	-	
Flexural modulus (max)	402 MPa	2148 MPa	2364 MPa	3640 MPa	4780 MPa	3080 MPa	4120 MPa	3507 MPa	5890 MPa	-	-	2410 MPa	-	-	
Hardness	50D (Shore)	105 (Rockwell)	72D (Shore)	72D (Shore)	-	-	-	-	-	-	-	-	-	-	
Operating temperature (long run)	100 °C	75 °C	62 °C	55 °C	120 °C	90 °C	90 °C	127 °C	135 °C	-	172 °C	207 °C	-	-	
Specific traits	very media resistant	allround material	easy to print	good surface quality	high tensile strength	high tensile strength	high tensile strength	high tensile strength	very high tensile strength	Sintered metal parts	HT-ready UL 94 VO	HT-ready UL 94 VO	soluble in water	soluble in water	
Average extrusion temperature (1,75 mm)	230 °C	230 °C	210 °C	210 °C	275 °C	275 °C	290 °C	250 °C	300 °C	240 °C	380 °C	380 °C	230 °C	230 °C	
Active build chamber heating	yes	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no	no	
Support system	P-Support 279	BVOH	PLA	PVA	BVOH	BVOH	BVOH	P-Support 279	BVOH	in preparation	in preparation	in preparation	-	-	