

Manufacturer	Filament_Name	Base_Material	Tensile_Strength_XY	Tensile_Strength_ZZ	Printability
BASF	Ultrafuse 316L (Sintered steel)	1.4404 +POM	235	235	2
Polymaker	PA-CF	Polyamid + Carbon Fiber	113	59,35	2
Polymaker	Polymide CoPA black	PA 6 / PA 6.6 Polyamid	60,95	52,3	1
Polymaker	PA-GF	Polyamid+ Glass Fiber	86,95	45,35	2
fiberthree (D)	F3 PA CF pro black	PA + Carbon Fiber	84	29	1
Polymaker	PolyMax PLA black	PLA + magic additions	26,3	25,7	1
Polymaker	Polyllite ASA black	ASA	50,34	24,67	2
DSM	novamid 1030 white	PA6+PA66	57,68	21,63	1
material4print	PMMA clear	PMMA	45,75	21,17	1
Filamentum (CZ)	FX256 natural (white)	PA	32,64	20,84	3
Verbatim	Durabio	PC (BPA-free)	53,75	20,71	2
ColorFabb	PLA /PHA white	PLA + PHA	34,90	20,7	1
Taulman	Nylon Alloy 910 natural,	PA	40,57	20,7	1...2
material4print	PLA white	PLA	26	17,56	1
3DPrima	Primavalue PLA black	PLA	33,7	16,45	1
Filamentum (CZ)	ASA Extrafill black	ASA	40,16	16,11	1
Polymaker	Polymax PETG black	PETG	37,22	15,57	1
Filamentworld	PLA plus black	PLA	48,25	15,5	2
Formfutura	ApolloX black	ASA	35,6	14,22	1
extrudr	GreenTec black	PLA+Lignin	30,75	13,80	1
Formfutura	HD Glass black	PETG	30,62	13,68	1
DSM	novamid 1030 CF black	PA6+PA66+10%CF	73,94	13,30	1
eSUN	PA CF black	PA + CF	57,67	13,04	1-2
3DXTech	CarbonX black	PA + Carbon Fiber	86	12,81	1
treeD Filaments (I)	Carbonium Nylon black	PA-CF	76,28	12,77	1
rigid.ink (GB)	Carbonyte black	PA12 + Carbon Fiber uncond.	66	12,38	1
Gehr (D)	Fil-A-Gehr PPA natural	PPA	86	12,34	5
Polymaker	Polysmooth grey,petrol	PVB	37,10	12,20	3
material4print (D)	PETG clear	PETG	42,27	12,12	1
IGUS	Iglidur I 150 PF	PTFE/PETG-Mix?	32,75	11,95	2
extrudr	GreenTec pro Carbon	PLA-Lignin +CF	40,92	11,27	1

Important note: The tensile strength values are breaking values. For engineering purposes, appropriate safety factors have to be applied. Typical safety factors for plastic are minimum 5 or more. So, allowed stresses under using conditions (SLS) are about 20% of the tensile strength, or less.

For Ultrafuse 316 L sintered stainless steel, the SLS stress must not exceed 0,5\* of tensile strength. ( ULS:  $\sigma_d = 0,75*$  tensile strength)

The strength values are the lower 5% Quantils of a sample of at least 5 specimen. All PA's are unconditioned (no moisture exposure after printing)

XY = tension in printing layer plane ZZ = tension perpendicular to layer plane . Short list candidate = hot prospect for future applications

Sort order: Tensile Strength ZZ - Direction. **Units for tensile strength are MPa = N/mm<sup>2</sup>**

Printability: Our personal (subjective) mark for bed adhesion, warping, flow and overall fun. 1 = very good .2 = good 3 = still OK 4 = bad 5 = ugly

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multec (D)	PLA HT white	PLA + ABS?	32,52	10,93	1
Polymaker	Polymax PC (PC max) black	PC	57,58	9,6	3
Filament PM (CZ)	JetFR (20% Flame Retardants) white	PETG + Brom-Polystyrol?	33,89	8	2-3
Formfutura	TitanX ABS black	ABS	36	7,9	1
filamentum (CZ)	vinyl 303	PVC	32,16	7,71	1..2
eSUN	ABS white	ABS	23,5	7,61	3
Two Bears (D)	BioFila PowR red	PLA + Lignin?	36,33	7,4	1
Formfutura	Volcano PLA, tempered black	PLA	16,6	6,65	1
Formfutura	Volcano PLA, non tempered black	PLA	17,95	6,5	1
Filamentworld	PLA clear	PLA	43,84	5,86	1...2
Owens Corning XStrand	GF30PA6 black	PA6 + 30% Glass Fibre	82	5,27	1
Formfutura	ABS pro Flame Retardant black	ABS + PC	56,26	5,26	3-4
Formfutura	Styx -2 white	PA12	46	4,86	4
treeD filaments (I)	PA-CF HP black	PA-CF	78,49	4,86	1
Filamentum (CZ)	CPE HD 100 Soul black	PET	30,37	3,4	4
3DPrima	Primaselect PETG black	PETG	49,5	1,66	2
spectrum (PL)	Nylon natural	PA	44	0 (failure before test)	4
3DXtech	Ultem 1010 golden	PEI	37,65	not yet tested	5

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