ABS

It is the most widespread polymer in professional 3D printing, given its good mechanical, chemical and thermal characteristics which make it the first choice for any commonly used application, where no special features are required. Good impact resistance and low load stress.

Used both in prototyping and in production, the field of applications is infinite.

It lends itself very well to finishing, manual and/or mechanical processing.

It is glued with most of the glues on the market (cyano-acrylates and acrylics in particular) and lends itself well to painting and (with some caution) to the treatments of galvanic finishing.

Suggested use

Prototypes	Multi-material applications
Fit and assembly	Final parts
Mech tests	Spare parts
Tools	MRO
Jig and fixtures	

Compatibilities

Support compatibility	SSU00 (break-away)
	SSU09 (Soluble with WAVE powder [1])
Material compatibility	ABS FAST, ABS HD, ABS V0
	ABS ESD
	Elasto 85, Elasto 95
	IGUS I180 PF
	PC-ABS, PC-ABS V0

[1] The SSU09 support is degradable with an alkaline solution obtained by WAVE powder; the proportion of 170 g of powder per 7 liters of water is recommended. We recommend the use of an ultrasonic tank and water at 70 °C.

Easy profiles suggested

Layer	Ø 0.3 mm	Ø 0.4 mm	Ø 0.6mm	Ø 0.8 mm
0.10	**			
0.15	**	*		
0.20	*	**	**	
0.25		**		
0.30		*	**	*
0.40			*	**
0.50				*

** : Recommended
* : Discrete quality

Before printing

Drying	Gentle drying (55 °C) before and during the job is recommended
Cleaning	It's suggested to clean the bed with IPA before print
Print directly on bed*	Feasible but brim is recommended
Extruder configuration**	NORMAL (HI-TEMP recommended)
Nozzle	Standard
SPFU	Not compatible

*: not available on A2 and A4

** valid only on A2 and A4 – all other machines need no mounting option

General advice

In case of multi-material print in combination with ELASTO 95, by SSI it is possible to choose SSU00 as support. Both ELASTO have not a good adhesion with SSU00, thus, it is preferable to orientate object in the way that only ABS touches the support.

*Physical properties**

Propriety	Symbol	Standard	Value
Density	ρ	ISO 1183	$1.03\ \frac{g}{cm^3}$
Water absorption	w_w	N/A	N/A

*Thermal properties**

Propriety	Symbol	Standard	Value
Melting flow index	M. F. I.	ISO 1133	220 °C · 10 kg
Glass transition temperature	T_g	//	85 °C
Temperature deflection under load	T_f 1,8	ISO 75 Unannealed	86 °C
Vicat softening temperature	VST B50	ISO 306 50 °C/min	92 °C
Coefficient of linear thermal expansion	α	ISO 11359	$9.3 \cdot 10^{-5}\ °C^{-1}$
Flammability		UL94	N/A

*Electrical properties**

Propriety	Symbol	Standard	Value
Surface resistivity	σ_e	N/A	N/A
Electric strength	E_B	N/A	N/A

* values provided by polymer supplier

Mechanical properties

Based on layer-by-layer deposition, additively manufactured parts, especially with the FDM technique, present a not negligible anisotropy on mechanical properties.

The user must think about the correct displacement of the part in the machine for maximize its mechanical properties.

For this reason, we report the mechanical properties of our specimens considering the three main orientations, by plane x-y (flat), by plane y-z (on edge), and by plane z-x (upright).

All specimens are made with the same printing conditions:

- Infill: 100%
- Nozzle: 0,4 mm
- Layer thickness: 0.2 mm
- Raster angle: 45 °

For more information about the test and specimens' conditions, we suggest checking the ISO references that are reported in the following tables.

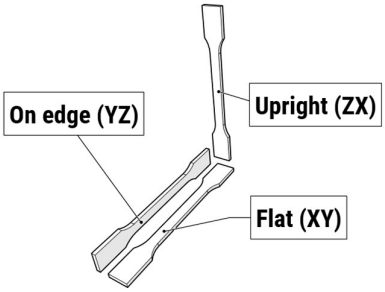


Figure 1: specimen displacement to determine tensile properties (ref. ISO 527-2)

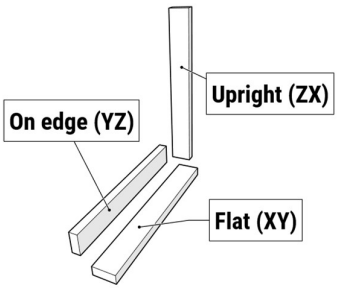
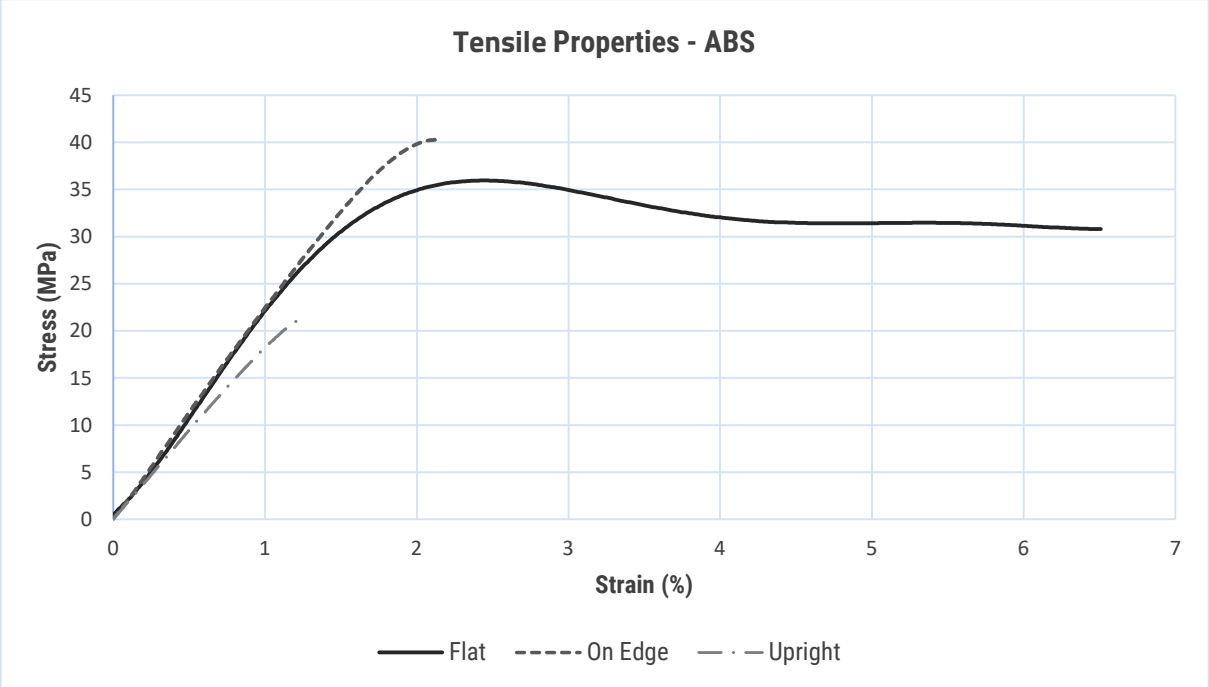


Figure 2: specimen displacement to determine flexural and impact properties (ref. ISO 178 and 179-1)

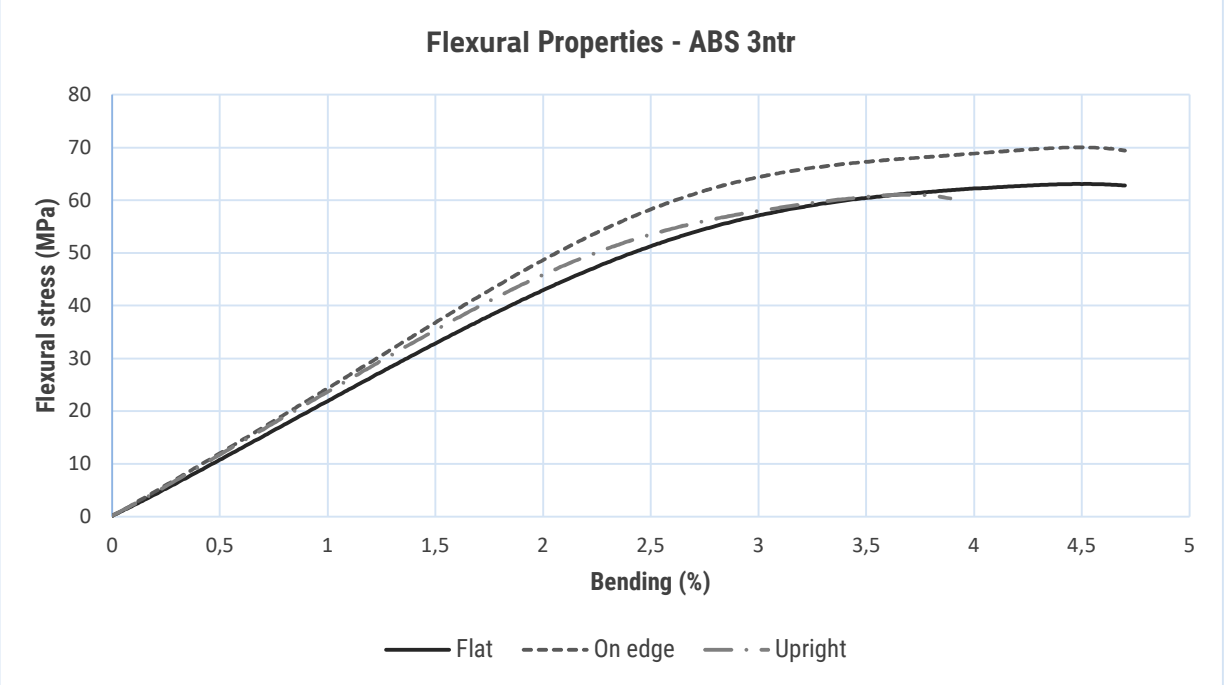
Tensile properties

ISO 527-2	Flat	On edge	Upright
Tensile modulus	2189 MPa	2226 MPa	1879 MPa
Yeld stress	36.6 MPa	-	-
Yeld strain	2.19%	-	-
Strength at break	30.3 MPa	38.8 MPa	22 MPa
Strain at break	>5 %	2.13 %	1.26 %



Flexural properties

ISO 178	Flat	On edge	Upright
Flexural modulus	2086 MPa	2336 MPa	2274 MPa
Flexural strength	61 MPa	67 MPa	61 MPa



Impact properties

ISO 179	Flat	On edge	Upright
Charpy unnotched impact strength	32 kJ/m^2	57 kJ/m^2	13 kJ/m^2
Type of failure	Comp. Break	Comp. Break	Comp. Break

Chemical stability

Substance	Resistance
Weak acids (3<pH<6)	*A*
Strong acids (pH<3)	*B*
Weak Bases (8<pH<10)	*A*
Strong Bases (pH>10)	*B*
Sea Water	*A*
Aliphatic hydrocarbons	*A*
Aromatic hydrocarbons	*B*
Halogenated hydrocarbons	*B*
Alcohol	*A*
Esters	*A*
Lubricants oils	*A*
Fuel oils	*A*
Fuels	*A*
Coolants	*A*

A= excellent B= good C= limited D= poor

The fine print

- The information and values listed into this document are provided in good faith, based on specimens printed with 3ntr machines according to the latest version of SSI print parameters valid at the date of issuance.
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