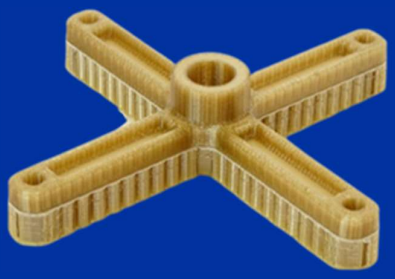
PAEK AM200



This filament is one of the most resistant materials currently available for FFF machines. It is based on a PAEK blend, a semi-crystalline polymer generally known for its high mechanical properties.

Other than that, AM200 can support high temperatures (about 150 °C) and very aggressive chemical environments because of its resistance to the most common acids and bases (only high-concentration nitric acids can dissolve it).

Due to its semi-crystalline structure, this material can become amorphous when exposed to temperatures higher than 150 °C. This process can be possible directly after the printing process only in Spectral printers.

Suggested use

Automotive	
Aerospace	
Oil & Gas	
Harsh chemicals contact	

Compatibilities

Support compatibility	SP001
Material compatibility	

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	Dying before and during the job. 115 °C is recommended
Cleaning	It's suggested to clean the bed with IPA before print
Extruder	HI-TEMP
Nozzle	Standard
SPFU	Not compatible

General advice

Massive parts and/or high infill density can cause deformation and warping. For this reason, it' recommended to use brim (with latch) and inflate support functions.

(Only for Spectral printers): Annealing can produce large deformation and collapse in unsupported parts. It is recommended to design components specifically to be annealed and adopt AM200 for support and raft (SP001 only for the interface).

*Physical properties[1]**

Propriety	Symbol	Standard	Value
Density	ρ	ISO 1183	1.30 g/cm^3
Water absorption	w_w	N/A	N/A

*Thermal properties**

Propriety	Symbol	Standard	Value
Melting flow index	M. F. I.	ISO 11357	N/A
Glass transition temperature	T_g	ISO 11357	151 °C
Melting point	DSC	ISO 11357	303 °C
Crystallization point	DSC	ISO 11357	249 °C
Coefficient of linear thermal expansion	α	ISO 11359	N/A
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.

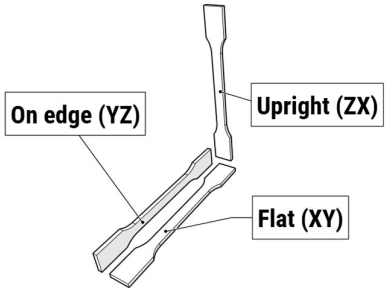


Figure 1: specimen displacement to determine tensile properties (ref. ISO 527-2)

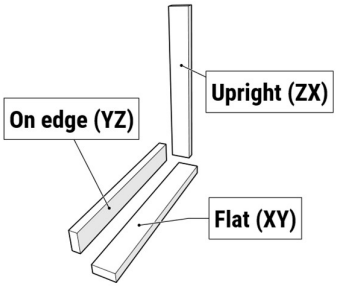
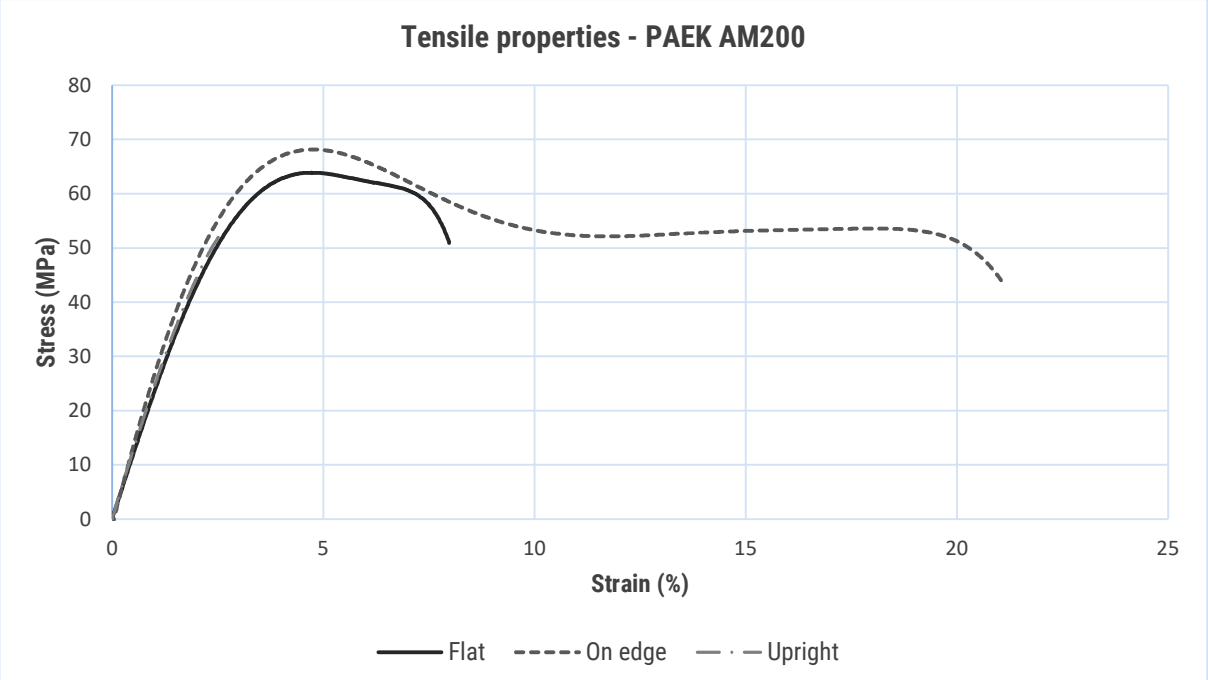


Figure 2: specimen displacement to determine flexural and impact properties (ref. ISO 178 and 179-1)

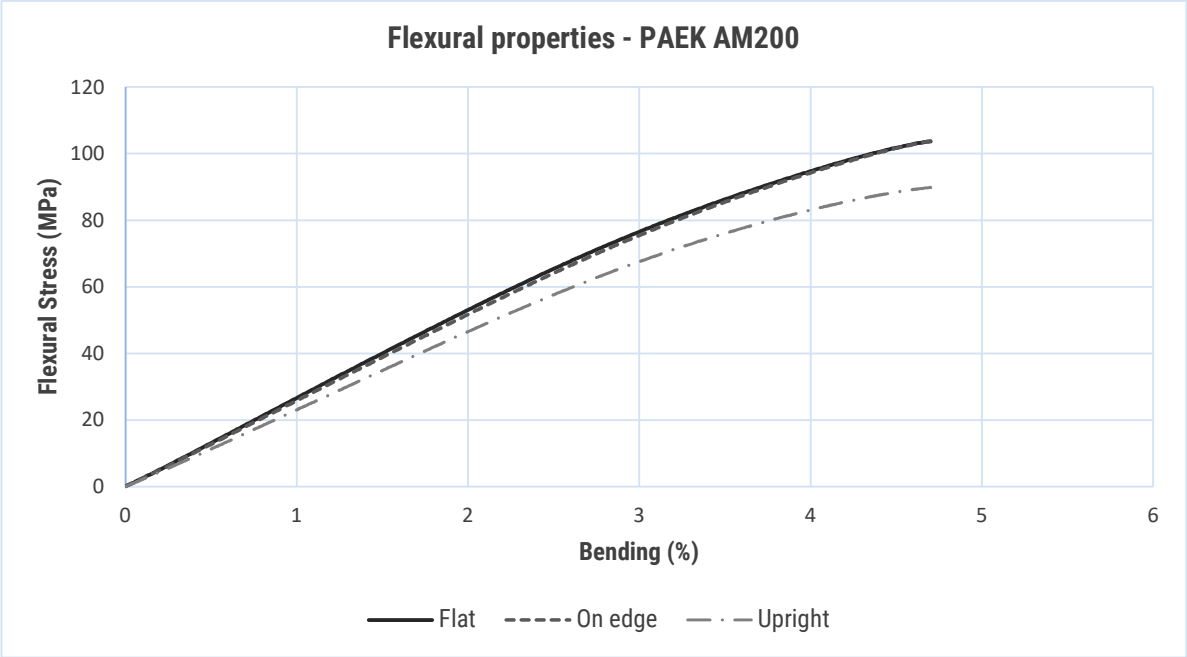
Tensile properties

Propriety	Symbol	Standard	Specimens build direction	Value
Tensile modulus	E_t	ISO 527-2	Flat	2377 MPa
			On edge	2572 MPa
			Upright	2517 MPa
Yield stress	σ_y		Flat	64 MPa
			On Edge	72 MPa
			Upright	No yield
Yield strain	ε_y		Flat	4.7 %
			On Edge	5.5 %
			Upright	No yield
Strength at break	σ_b		Flat	56 MPa
			On Edge	52 MPa
			Upright	53 MPa
Strain at break	ε_b		Flat	8 %
			On Edge	21.1 %
			Upright	2.5 %



Flexural properties

Propriety	Symbol	Standard	Specimens build direction	Value
Flexural modulus	E_f	ISO 178	Flat	2569 MPa
			On edge	2481 MPa
			Upright	2226 MPa
Flexural strength	σ_{fC}		Flat	87 MPa
			On Edge	86 MPa
			Upright[2]	76 MPa



Impact properties

Propriety	Symbol	Standard	Specimens build direction	Value
Charpy unnotched impact strength	a_{cu}	ISO 179	Flat	112 kJ/m^2
			On edge	112 kJ/m^2
			Upright	34 kJ/m^2
Type of failure	ToF		Flat	Comp. Break
			On Edge	No Break
			Upright	Comp. Break

[2] Breaking may occurs at this bending percentage

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.

3ntr provides you with this information for your guidance to select the correct polymer and setup but user is responsible for determining that 3ntr material is safe, technically correct and legal for the selected application.

The values listed in this document are not meant for design specification or quality control guidelines: is it user responsibility to design parts with appropriate safety margins to comply with any material variation due part design, production, test conditions, use conditions.

The user has also the responsibility to assess the suitability of the product to the selected use, built with part(s) made with 3ntr materials and/or technologies.

3ntr is not responsible for any warranty about suitability, merchantability or fitness of any part manufactured with 3ntr materials and/or technologies.

3ntr is not responsible for any patent infringement from use of any part printed with 3ntr materials and/or technologies.

The user is responsible for proper use and disposal or recycling of the material(s) listed here according to local laws and regulations.