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MATERIAL DATA SHEET
POLYJET

PolyJet ToughONE™

PolyJet™ Material For Functional and Visual Prototypings

The information presented are typical values intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes.





Overview

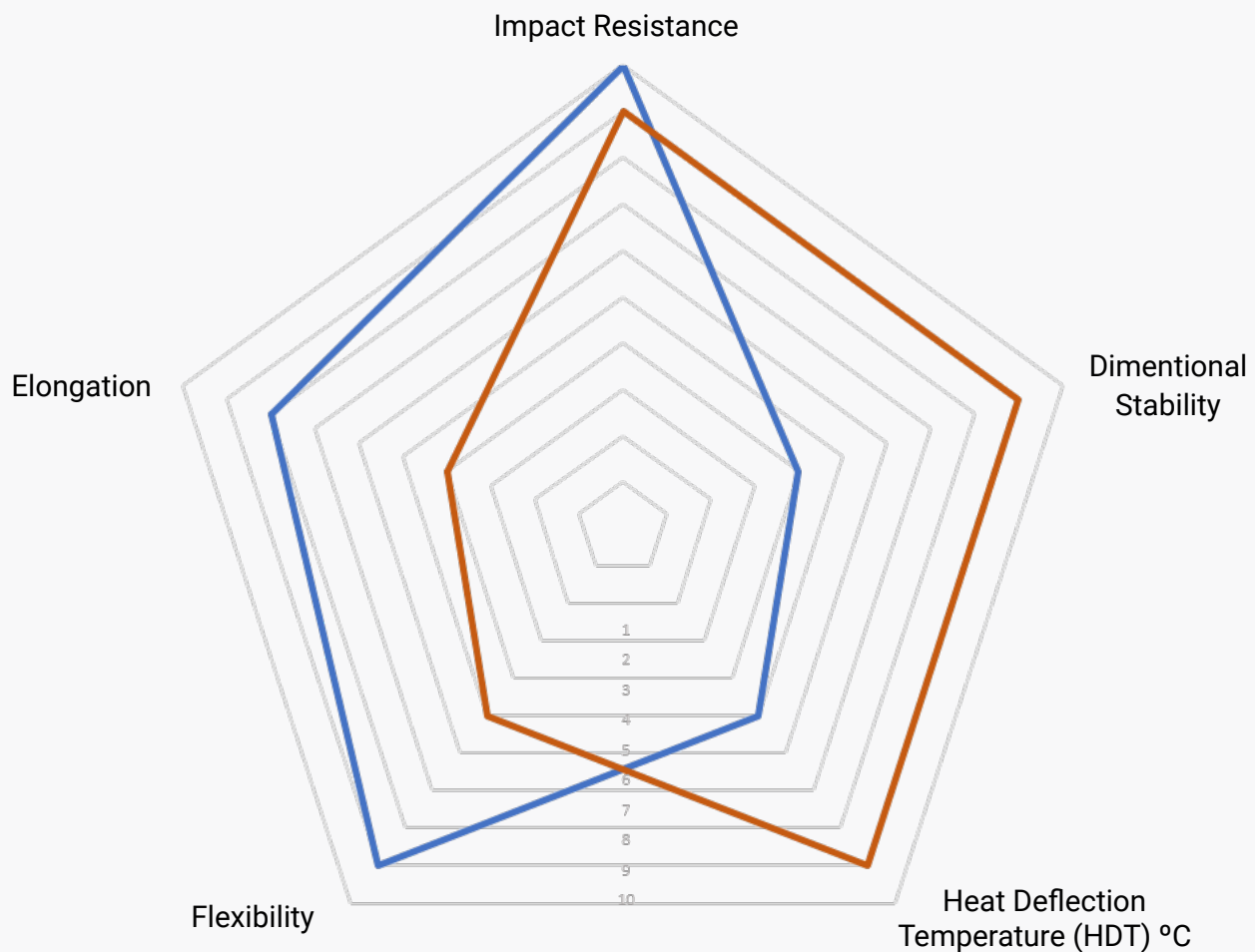
PolyJet ToughONE™ is a rigid photopolymer engineered to deliver high-fidelity appearance models with real functional performance.

PolyJet ToughONE can be used as a standalone material or reinforced with RGD531S. Its pure form offers excellent elongation and flexibility, whereas the reinforced material provides enhanced stiffness, HDT up to ~81°C, and improved dimensional stability. This tunable behavior makes it possible to match different prototype requirements with the same PolyJet ecosystem.

Parts printed in PolyJet ToughONE can accommodate snap-fit joints, self-tapping screws, thin walls, and even living hinges, alongside reliable impact resistance and very fine details.

PolyJet ToughONE combines PolyJet's unique strengths of multi-material, multicolor, and premium surface finish capabilities with an expanded range of what can be validated at the prototype stage and in many cases even end-use parts.

Typical applications include consumer electronics housing, automotive components, jigs and fixtures, power tool enclosures, and functional appearance models that must withstand handling, assembly tests, and moderate thermal loads.





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Ordering Information

Table 1: Printer and Support Material Compatibility

Printer	Compatible Versions of PolyJet ToughONE	Compatible Versions of Support Material
J826™ Prime J850 Digital Anatomy™	• PolyJet ToughONE White • RGD531S (Reinforcer)	• SUP705™/SUP705B™ (waterjet removable) • SUP706™/SUP706B™ (soluble)
J835™ J850™ Prime J850 Pro	• PolyJet ToughONE White • PolyJet ToughONE Black • RGD531S (Reinforcer)	• SUP705/SUP705B (waterjet removable) • SUP706/SUP706B (soluble)
J850 Core	• PolyJet ToughONE White • PolyJet ToughONE Black • RGD531S (Reinforcer)	• SUP705/SUP705B (waterjet removable)
J35™ Pro J55™ Prime J5 MediJet® J5 Digital Anatomy™	• PolyJet ToughONE WhiteS • RGD531S™ (Reinforcer)	• SUP710S™ (waterjet removable)

Build Size

Table 2: Printable area varies by printer system

Printer	Build Envelope
J850 Core/Pro/Prime/ Digital Anatomy	490 x 390 x 200 mm (19.3 x 15.35 x 7.9 in.)
J835 Prime	350 x 350 x 200 mm (13.8 x 13.8 x 7.8 in.)
J826 Prime	255 x 252 x 200 mm (10.0 x 9.9 x 7.8 in.)
J55 Prime/J5 MediJet	Round print tray with up to 1,174 cm ² (182 in. ²) Print height: 158 mm (6.22 in.) Maximum model height: 155 mm (6.1 in.)
J35 Pro	Round print tray with up to 1,174 cm ² (182 in. ²) Print height: 190 mm (7.48 in.) Maximum model height: 187 mm (7.36 in.)



Ordering Info

Table 3: PolyJet ToughONE Ordering Information

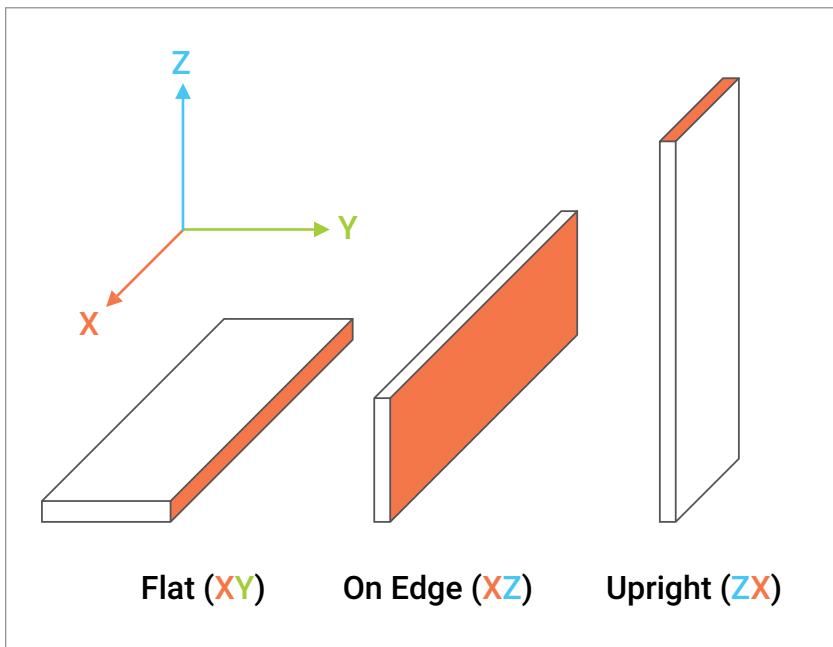
Part Number	Description	System Compatibility
Material Consumables		
4 kg Canister		
TFF811	PolyJet ToughONE White	• Stratasys J826 Prime • Stratasys J835 • Stratasys J850 Prime • Stratasys J850 Pro • Stratasys J850 Core • Stratasys J850 Digital Anatomy
TFF812	PolyJet ToughONE Black	• Stratasys J835 • Stratasys J850 Prime • Stratasys J850 Pro • Stratasys J850 Core
RGD531S	PolyJet 531S Reinforcer	• Stratasys J826 Prime • Stratasys J835 • Stratasys J850 Prime • Stratasys J850 Pro • Stratasys J850 Core • Stratasys J850 Digital Anatomy
1.1 kg Canister		
TFF881	PolyJet ToughONE WhiteS	• J35 Pro • J55 Prime • J5 MediJet • J5 Digital Anatomy
RGD531S	PolyJet 531S Reinforcer	• J35 Pro • J55 Prime • J5 MediJet • J5 Digital Anatomy



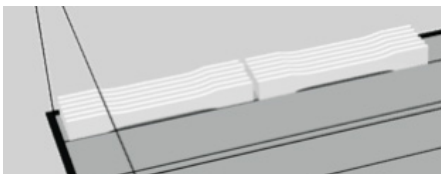
Material Test Procedure

Print Orientation: PolyJet ToughONE White and PolyJet ToughONE Black for J8 Series Printers

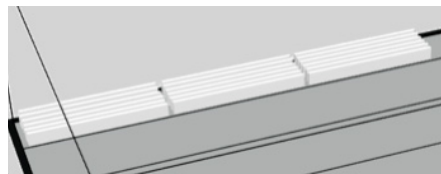
Below is a reference of the different orientations used to characterize the material.



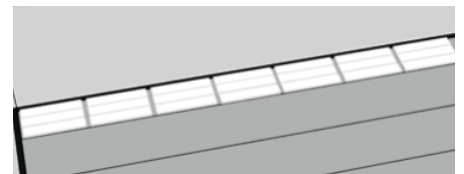
Tensile dog bones and flexural bars were printed glossy in the XZ orientation, in one pass.
Izod impact bars were printed glossy in the XY orientation, in one pass:



Dogbones, glossy XZ



Flexural bars, glossy XZ

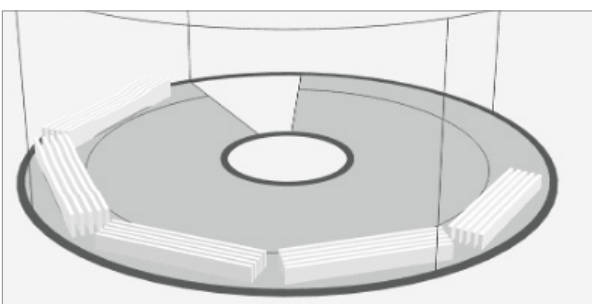


Izod impact bars, glossy XY

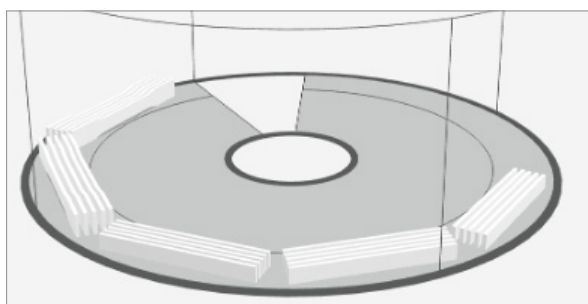


Print Orientation: PolyJet ToughONE WhiteS for J3 and J5 Series Printers

Tensile dog bones, flexural bars, and Izod impact specimens were printed glossy in the θ orientation, outer swat:



Dog bones and flexural bars, glossy θ orientation



Izod impact bars, glossy θ orientation

Test Specimen Preparation and Procedures

The values in this datasheet were obtained using the procedures below.

All specimens were measured within 24 hours of printing or post-processing. Supports were removed mechanically, without waterjet cleaning.

Tensile testing Tensile mechanical tests were performed according to ASTM D638-04, using Type I dog bone specimens and a crosshead speed of 5 mm/min.	Flexural testing Flexural mechanical tests were performed according to ASTM D790-04.
Izod notched impact testing Izod notched impact tests were performed according to ASTM D256-06, using specimens with a thickness of 3.2 mm (0.125 in.). The notch was incorporated during printing.	Izod unnotched impact testing Izod unnotched impact tests were performed according to ASTM D4812, using specimens with a thickness of 3.2 mm (0.125 in.).



Best Practices and Workflow

Validated workflows must be followed to achieve the properties as stated in the material datasheet. The post-processing steps below apply to PolyJet ToughONE parts printed on J3/J5 and J8 series printers. Users should defer to the relevant Best Practice Guide for full configuration and printing details.

Support Removal

PolyJet ToughONE requires support removal to achieve specified part properties and dimensional accuracy. Due to the material's high water absorption, immersion in water or cleaning solution is not recommended, as it can cause excessive softening and geometric deformation.

Table 4: Post processing instructions for PolyJet ToughONE

Post Process Step	Method	Max Pressure	Additional Info
Support removal	Waterjet	80 bar	Avoid immersion; do not soak parts
Dry	Ambient / compressed air	n.a.	Ensure parts are fully dry before use

Surface Finish (Optional)

Parts printed with PolyJet ToughONE display reduced surface shine compared to Vero® material parts. Surface smoothing can be applied to improve finish quality. Wet sandblasting with ProSurface™ or equivalent is recommended for additional enhancement.

Note (J8 series only): Matte and glossy finishes are both supported. Glossy finish is disabled when printing in High Quality print mode.

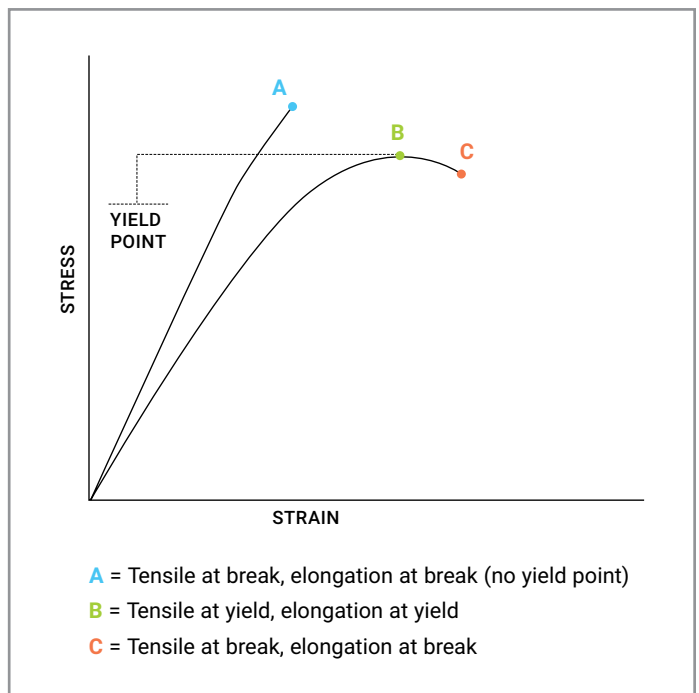
Physical and Mechanical Properties

Tensile curves

Tensile testing measures how a material responds as it is pulled until it yields or breaks. The resulting stress-strain curve shows key mechanical properties, including tensile strength and elongation.

Different materials can produce different curve shapes. Some break before reaching a clear yield point, while others yield first and continue stretching before failure. The points below show how to interpret the reported values.

Values are measured as printed on the J850 with a 27-micron (0.001 in.) layer height.





PolyJet ToughONE White for J8 Series Printers: Mechanical and Physical Properties

Table 5: PolyJet ToughONE White for J8 Series Printers: Mechanical and Physical Properties

Values in parentheses are standard deviations.

Property	Units	PolyJet ToughONE™ White Pure	PolyJet ToughONE™ White Reinforced (With RGD531S)
Tensile Properties: ASTM D638			
Yield Strength	MPa	40 (2)	51 (1)
	ksi	5.8 (0.3)	7.4 (0.1)
Elongation at Break	%	55 (4)	46 (7)
Modulus (Elastic)	MPa	2,433 (185)	2,518 (109)
	ksi	353 (27)	365 (16)
Flexural Properties: ASTM D790			
Strength at Break	MPa	59 (4)	65 (2)
	ksi	8.6 (0.6)	9.4 (0.3)
Modulus	MPa	1,713 (106)	1,836 (46)
	ksi	248 (15)	266 (7)
Impact Properties: ASTM D256, ASTM D4812			
Izod, Notched	J/m	47 (4)	94 (5)
	ft•lb/in	0.88 (0.08)	1.76 (0.09)
Izod, Unnotched	J/m	1,160 (150)	1,108 (28)
	ft•lb/in	21.7 (2.8)	20.7 (0.5)
Physical Properties			
HDT @ 0.45 MPa: ASTM D-648-06	°C	49 (2)	53 (1)
	°F	120.2 (3.6)	127.4 (1.8)
HDT @ 1.82 MPa: ASTM D-648-06	°C	No data	46 (1)
	°F	No data	114.8 (1.8)
Tg: DMA, E''	°C	51	60
	°F	123.8	140.0
Shore Hardness	Scale D	81 (1)	82 (1)



PolyJet ToughONE Black for J8 Series Printers: Mechanical and Physical Properties

Table 6: PolyJet ToughONE Black for J8 Series Printers: Mechanical and Physical Properties

Values in parentheses are standard deviations.

Property	Units	PolyJet ToughONE™ Black Pure	PolyJet ToughONE™ Black Reinforced (With RGD531S)
Tensile Properties: ASTM D638			
Yield Strength	MPa	46 (4.5)	54 (8)
	ksi	6.7 (0.7)	7.8 (1.2)
Elongation at Break	%	43 (8)	30 (4)
Modulus (Elastic)	MPa	2,788 (186)	2,968 (378)
	ksi	404 (27)	430 (55)
Flexural Properties: ASTM D790			
Strength at Break	MPa	67 (5)	86 (5)
	ksi	9.7 (0.7)	12.5 (0.7)
Modulus	MPa	2,152 (106)	2,483 (151)
	ksi	312 (15)	360 (22)
Impact Properties: ASTM D256, ASTM D4812			
Izod, Notched	J/m	45 (2)	100 (3)
	ft•lb/in	0.84 (0.3)	1.9 (0.6)
Izod, Unnotched	J/m	1,087 (80)	1,019 (160)
	ft•lb/in	20.3 (1.1)	19.1 (3)
Physical Properties			
HDT @ 0.45 MPa: ASTM D-648-06	°C	49 (1)	59 (3)
	°F	120 (1.8)	138.2 (5.4)
Tg: DMA, E''	°C	52 (1)	56 (1)
	°F	126 (1.8)	132.8 (1.8)
Shore Hardness	Scale D	73 (1)	75 (1)



PolyJet ToughONE WhiteS for J3 and J5 Series Printers: Mechanical and Physical Properties

Table 7: PolyJet ToughONE WhiteS for J3 and J5 Series Printers: Mechanical and Physical Properties

Values in parentheses are standard deviations.

Property	Units	PolyJet ToughONE™ WhiteS Pure	PolyJet ToughONE™ WhiteS Reinforced (With RGD531S)
Tensile Properties: ASTM D638			
Yield Strength	MPa	39 (3)	49 (2)
	ksi	5.6 (0.4)	7.1 (0.3)
Elongation at Break	%	40 (10)	38 (5)
Modulus (Elastic)	MPa	2,229 (151)	2,596 (170)
	ksi	323 (22)	376 (25)
Flexural Properties: ASTM D790			
Strength at Break	MPa	57 (7)	67 (4)
	ksi	8.3 (1)	9.7 (0.6)
Modulus	MPa	1,772 (278)	1,864 (142)
	ksi	257 (40)	270 (21)
Impact Properties: ASTM D256, ASTM D4812			
Izod, Notched	J/m	45 (4)	71 (4)
	ft•lb/in	0.84 (0.08)	1.33 (0.08)
Izod, Unnotched	J/m	1,285 (61)	961 (66)
	ft•lb/in	24.0 (1.1)	18.0 (1.2)
Physical Properties			
HDT @ 0.45 MPa: ASTM D-648-06	°C	46 (2)	52 (2)
	°F	114.8 (3.6)	125.6 (3.6)
Tg: DMA, E''	°C	60 (1)	63 (1)
	°F	140.0 (3.6)	145.4 (3.6)
Shore Hardness	Scale D	74 (1)	74 (1)



Appendix A: Optional Post Curing

PolyJet ToughONE™ can be used freely without curing, as shown above. However, for certain applications which require high dimensional stability and thermal resistance, a 12-hour post cure cycle can further improve material properties.

Table 8: PolyJet ToughONE White Pure for J8 Series Printers: Mechanical and Physical Properties

Values in parentheses are standard deviations.

Property	Units	Out of Printer	12 hr. Post-Cure @ 45 °C
Tensile Properties: ASTM D638			
Yield Strength	MPa	40 (2)	50 (2)
	ksi	5.8 (0.3)	7.3 (0.3)
Elongation at Break	%	55 (4)	53 (5)
Modulus (Elastic)	MPa	2,433 (185)	2,457 (87)
	ksi	353 (27)	356 (13)
Flexural Properties: ASTM D790			
Strength at Break	MPa	59 (4)	82 (5)
	ksi	8.6 (0.6)	11.9 (0.7)
Modulus	MPa	1,713 (106)	2,284 (157)
	ksi	248 (15)	331 (23)
Impact Properties: ASTM D256, ASTM D4812			
Izod, Notched	J/m	47 (4)	47 (4)
	ft•lb/in	0.88 (0.08)	0.88 (0.08)
Izod, Unnotched	J/m	1,160 (150)	1,131 (126)
	ft•lb/in	21.7 (2.8)	21.2 (2.4)
Physical Properties			
HDT @ 0.45 MPa: ASTM D-648-06	°C	49 (2)	61 (2)
	°F	120.2 (3.6)	141.8 (3.6)
Tg: DMA, E"	°C	51	74
	°F	123.8	165.2
Shore Hardness	Scale D	81 (1)	82 (1)

Table 9: PolyJet ToughONE White Reinforced for J8 Series Printers: Mechanical and Physical Properties

Values in parentheses are standard deviations.

Property	Units	Out of Printer	12 hr. Post-Cure @ 45 °C	12 hr. Post-Cure @ 80 °C
Tensile Properties: ASTM D638				
Yield Strength	MPa	51 (1)	58 (2)	62 (1)
	ksi	7.4 (0.1)	8.4 (0.3)	9.0 (0.1)
Elongation at Break	%	46 (7)	31 (9)	24 (3)
Modulus (Elastic)	MPa	2,518 (109)	2,661 (86)	2,873 (61)
	ksi	365 (16)	386 (12)	417 (9)
Flexural Properties: ASTM D790				
Strength at Break	MPa	65 (2)	87 (6)	87 (4)
	ksi	9.4 (0.3)	12.6 (0.9)	12.6 (0.6)
Modulus	MPa	1,836 (46)	2,345 (120)	2,295 (93)
	ksi	266 (7)	340 (17)	333 (13)
Impact Properties: ASTM D256, ASTM D4812				
Izod, Notched	J/m	94 (5)	96 (4)	105 (7)
	ft•lb/in	1.76 (0.09)	1.80 (0.08)	1.96 (0.13)
Izod, Unnotched	J/m	1,108 (28)	1,042 (127)	928 (131)
	ft•lb/in	20.7 (0.5)	19.5 (2.4)	17.4 (2.5)
Physical Properties				
HDT @ 0.45 MPa: ASTM D-648-06	°C	53 (1)	65 (1)	79 (1)
	°F	127.4 (1.8)	149.0 (1.8)	174.2 (1.8)
HDT @ 1.82 MPa: ASTM D-648-06	°C	46 (1)	57 (1)	61 (1)
	°F	114.8 (1.8)	134.6 (1.8)	141.8 (1.8)
Tg: DMA, E"	°C	60	74	79
	°F	140.0	165.2	174.2
Shore Hardness	Scale D	82 (1)	82 (2)	84 (2)



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