forward am
run by Mass Additive Manufacturing

Ultrafuse® ABS

Strong | impact resistant | rigid

Extended TDS

Complete Technical Documentation and Testing Summary

Version 1.2

Contents

Are you looking for an updated TDS version? Check out the latest online version here.

Technical Data Sheet

Product description (one sentence).

Filament Properties		
Filament Diameter	1.75 mm	2.85 mm
Diameter Tolerance	±0.050 mm	±0.1 mm
Average ovality	<0.050 mm	<0.050 mm
Available Spool size	750 g	750 g
Available colors	natural white, black, blue, red	

Spool Properties				
Spool size	750 g	2.0 kg	4.0 kg	8.0 kg
Outer diameter	200 mm	300 mm	350 mm	355 mm
Inner diameter	50.5 mm	51.5 mm	51.7 mm	36 mm
Width	55 mm	103 mm	103 mm	167 mm

Recommended 3D-Print processing parameters		Used for test specimens
Printer	FFF printer	Ultimaker 3
Nozzle Temperature[1)]	240 – 260 °C / 464 – 500 °F	260 °C / 500 °F
Build Chamber Temperature	-	Closed chamber, passively heated
Bed Temperature	90 – 110 °C / 194 – 230 °F	100 °C / 212 °F
Bed Material	Tape, spray, glue	Glass+3DLac
Nozzle Diameter	≥ 0.4 mm	0.4 mm
Print Speed	40 - 80 mm/s	40 mm/s
Max Volumetric Speed[2)]	22 mm^3/s	//

Please check your standard and/or high speed print profile availability for an easy start at www.forward-am.com.

[1] Fast printing might require an additional increase of the nozzle temperature; the stated printing speed is based on current validations. As equipment and technology continues to evolve, it is possible that even higher printing speeds may be attainable in the future.
[2] Based on Bambu Lab X1C with a nozzle diameter of 0.4 mm

Further Recommendations	
Drying recommendations to ensure printability and best mechanical properties[3]	60 °C in a hot air dryer or vacuum oven for 4 to 16 hours
Support material compatibility	Single material breakaway

General Properties	Standard	Average Values
Filament Density[4]	ISO 1183-1	1037 kg/m³

Tensile Properties[5]	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction
Tensile strength[6]	ISO 527	36.3 MPa	-	21.3 MPa
Elongation at Break[6]	ISO 527	7.4 %	-	1.8 %
Young's Modulus[7]	ISO 527	1958 MPa	-	1608 MPa

Flexural Properties[6] [8]	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction
Flexural Strength	ISO 178	56.6 MPa	58.3 MPa	38.6 MPa
Flexural Modulus	ISO 178	1833 MPa	1767 MPa	1586 MPa
Flexural Elongation at Break	ISO 178	5.3 %	5.0 %	3.1 %

[3] Please note: To ensure constant material properties the material should always be kept dry.
[4] measured on filament

[5] Samples were conditioned in standard climate (23°C, 50% RH 72h)
[6] Testing speed: 5 / 200 mm/min
[7] Testing speed: 1 mm/min
[8] Testing speed: 2 mm/min
Measured on milled specimens

Impact Properties[6]	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction
Impact Strength Charpy (notched)	ISO 179-2	16 kJ/m²	17.4 kJ/m²	2.8 kJ/m²
Impact Strength Charpy (unnotched)	ISO 179-2	36.4 kJ/m²	42.2 kJ/m²	6.8 kJ/m²
Impact Strength Izod (notched)	ISO 180	18.8 kJ/m²	18.9 kJ/m²	3.5 kJ/m²
Impact Strength Izod (unnotched)	ISO 180	40 kJ/m²	35.7 kJ/m²	7.2 kJ/m²

For the diagrams on mechanical properties see Chapter: Mechanical Properties Diagrams

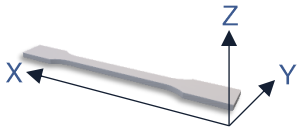
Thermal Properties[6]	Standard	Average Values
HDT A at 1.8 MPa	ISO 75-2	90 °C
HDT B at 0.45 MPa	ISO 75-2	96 °C
Vicat softening point at 50 N	ISO 306	94 °C
Vicat softening point at 10 N	ISO 306	102 °C
Glass Transition Temperature	ISO 11357-2	104 °C
Melt Volume-Flow Rate (MVR)	ISO 1133	24 cm³/10 min (260 °C, 5 kg)

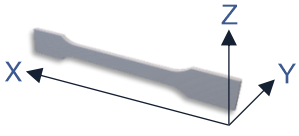
For the diagrams on thermal properties see Chapter: Thermal Properties Diagrams.

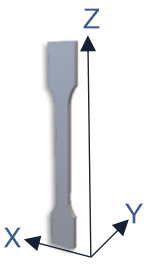
Hardness and Abrasion	Standard	Typical Values
Shore Hardness D (15s)	DIN ISO 7619-1	71

Print direction explanation

The orientation of the 3D printed part in the printer is always aligned with the longest axis first. The print direction is consistently along the Z-axis.

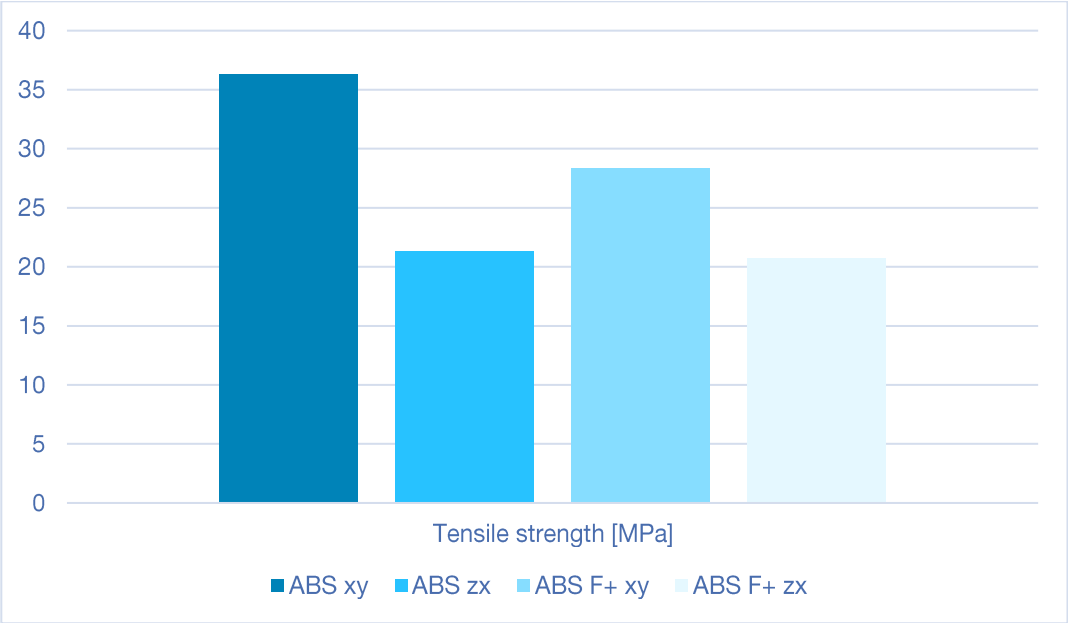




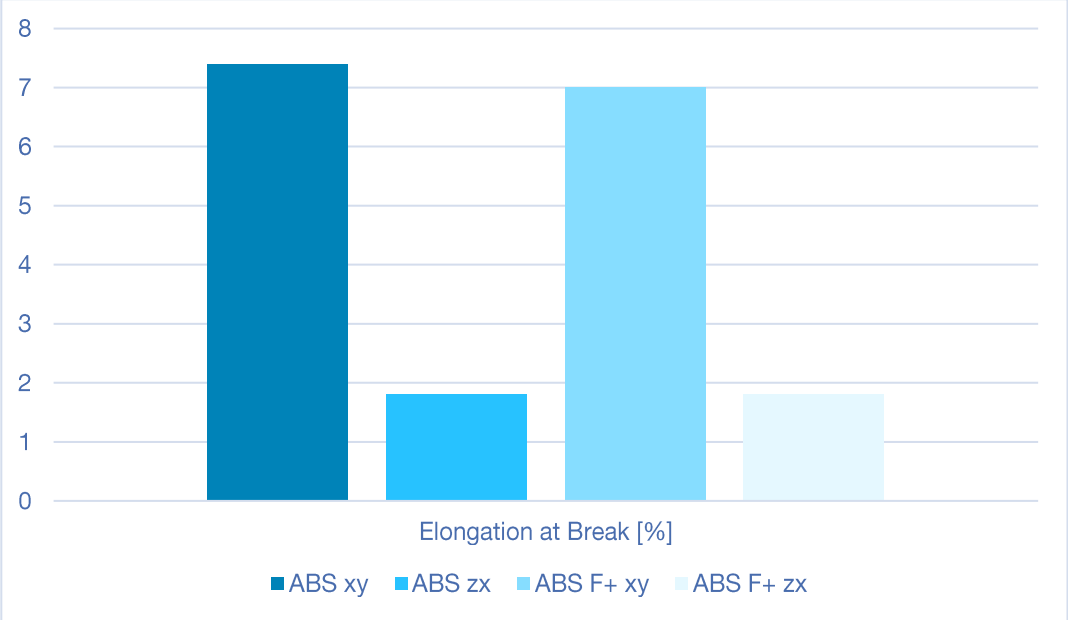


Mechanical Propertie Diagrams

Comparison Ultrafuse® ABS and Ultrafuse® ABS Fusion+



Tensile strength comparison Ultrafuse® ABS and Ultrafuse® ABS F+



Elongation at Break comparison Ultrafuse® ABS and Ultrafuse® ABS F+

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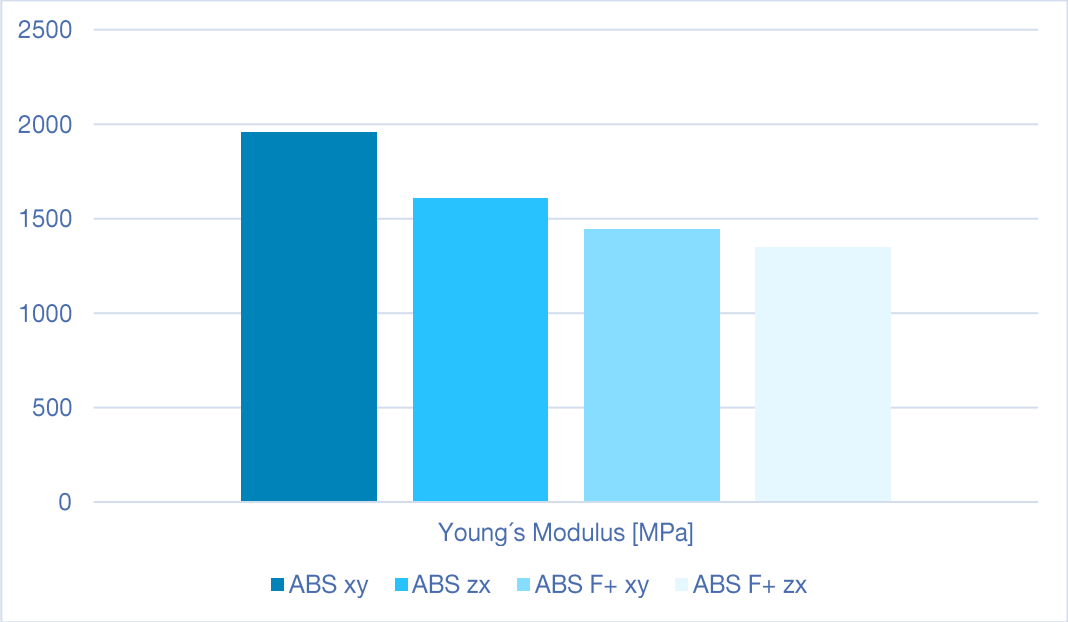
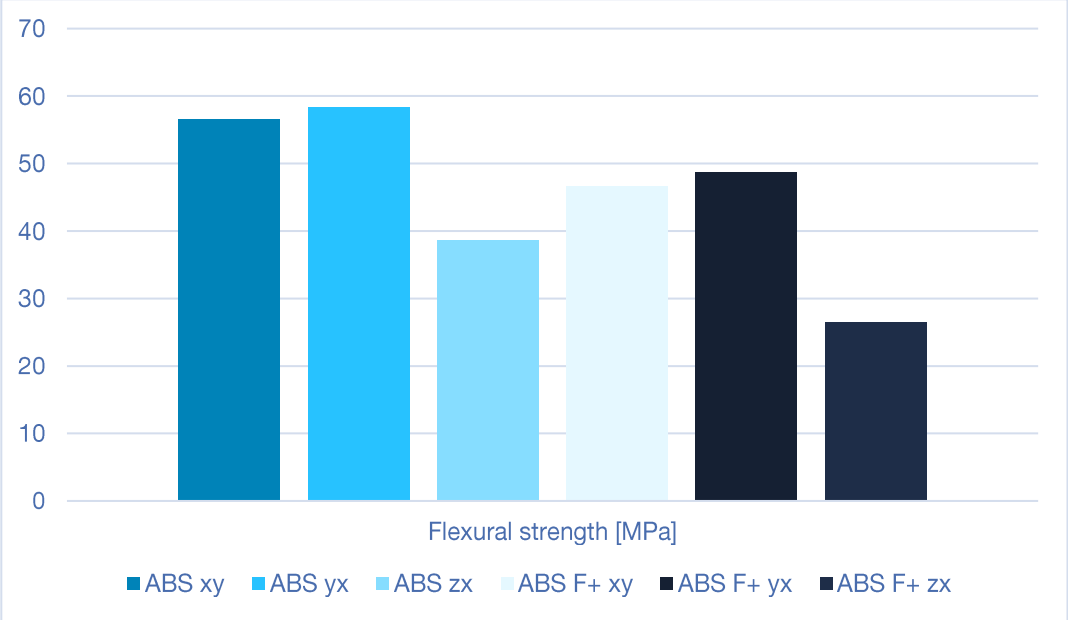
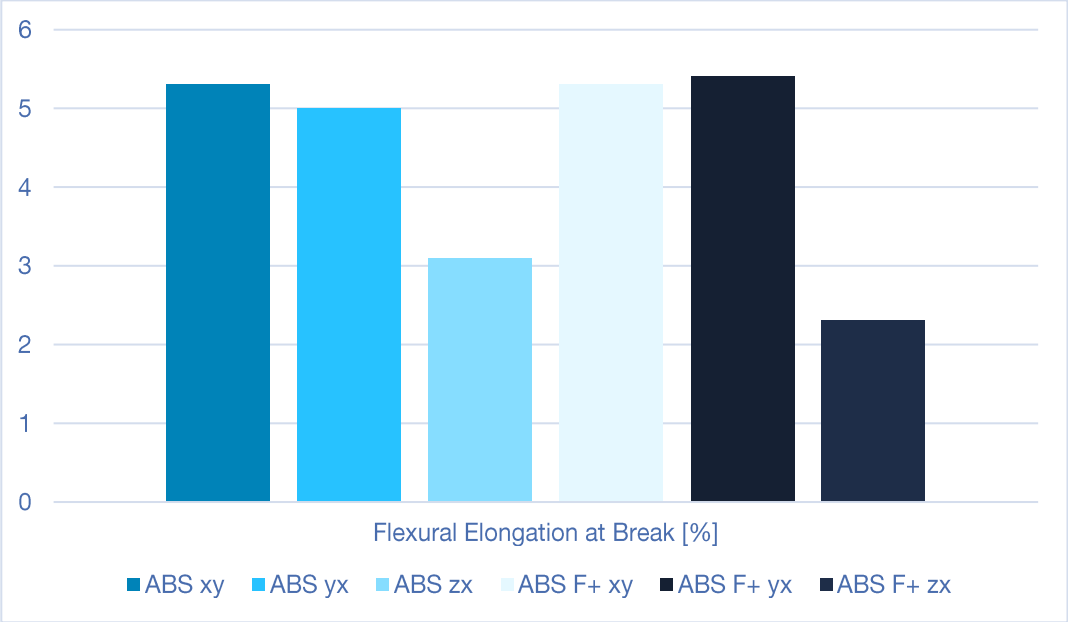


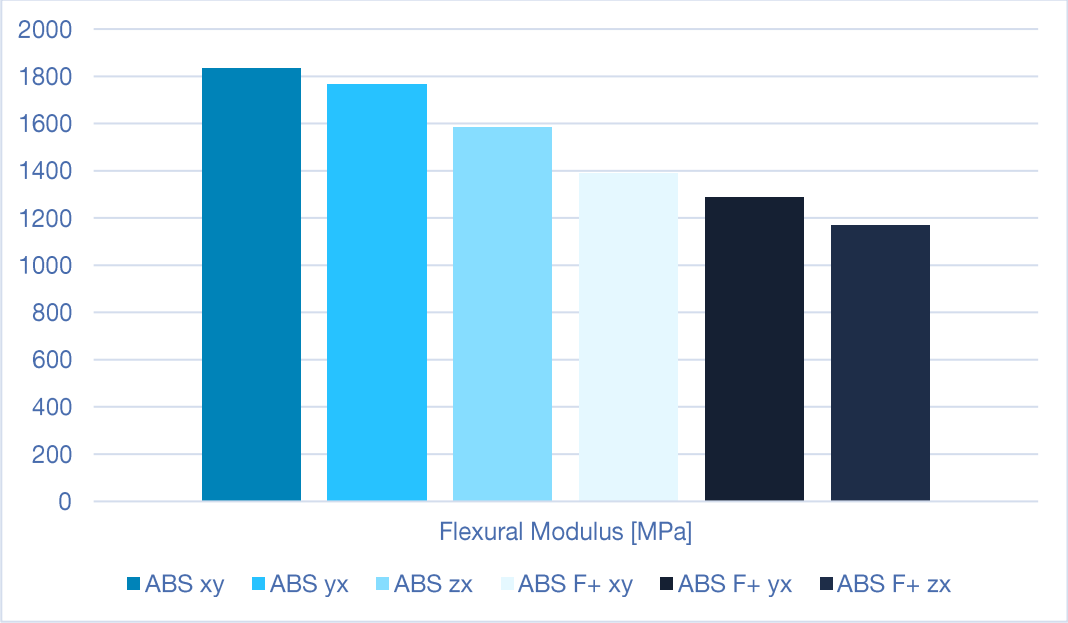
Young´s modulus comparison Ultrafuse® ABS and Ultrafuse® ABS F+



Flexural strength comparison Ultrafuse® ABS and Ultrafuse® ABS F+



Flexural Elongation at Break comparison Ultrafuse® ABS and Ultrafuse® ABS F+



Flexural Modulus comparison Ultrafuse® ABS and Ultrafuse® ABS F+

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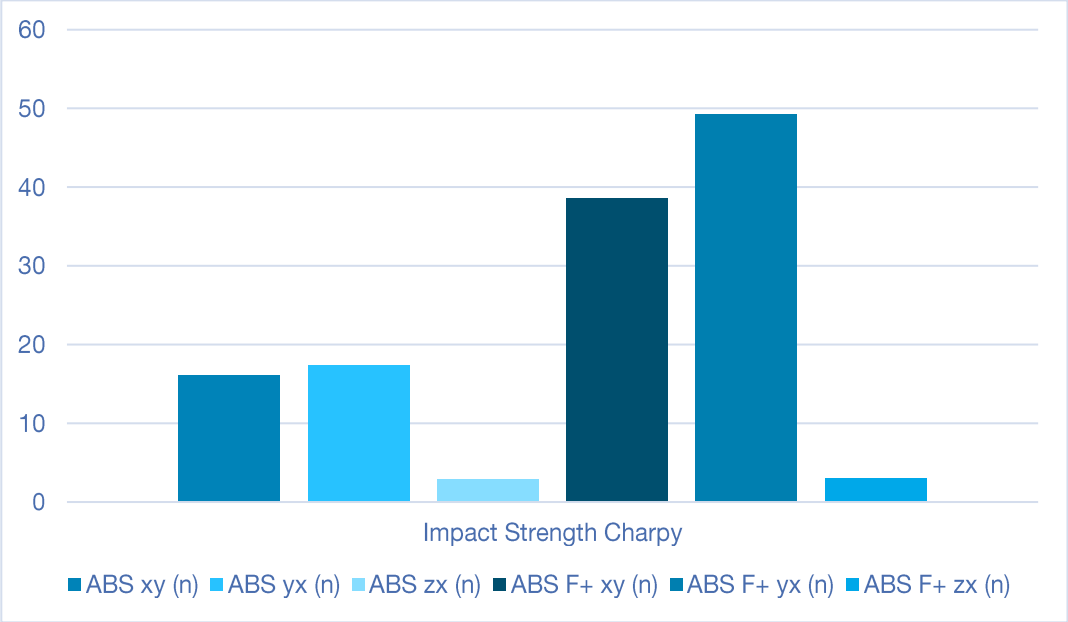
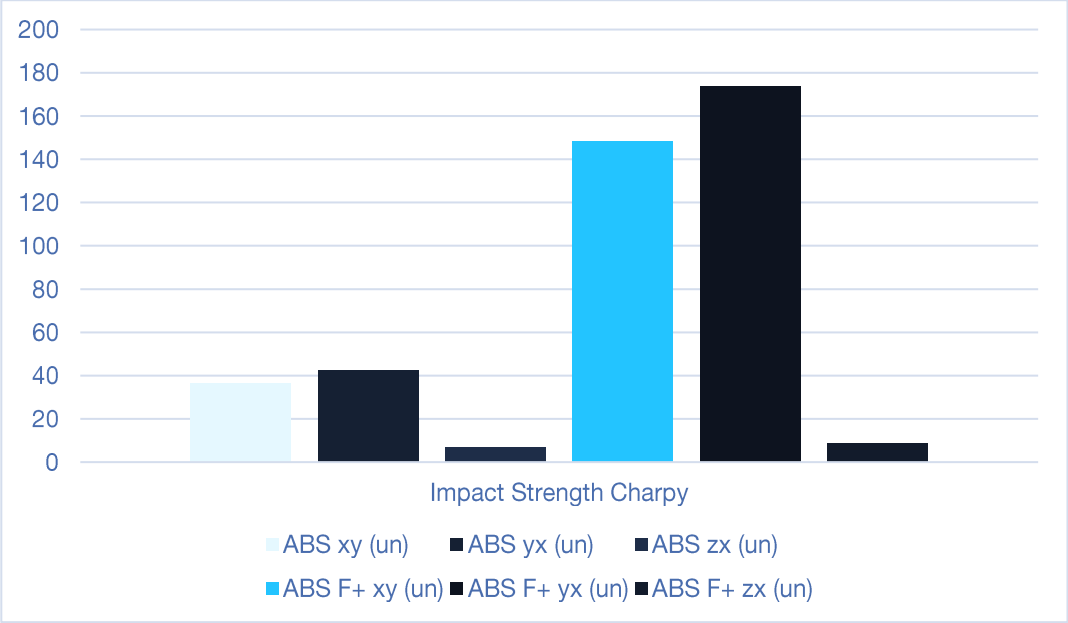


Impact Strength Charpy notched comparison Ultrafuse® ABS and Ultrafuse® ABS F+



Impact Strength Charpy unnotched comparison Ultrafuse® ABS and Ultrafuse® ABS F+

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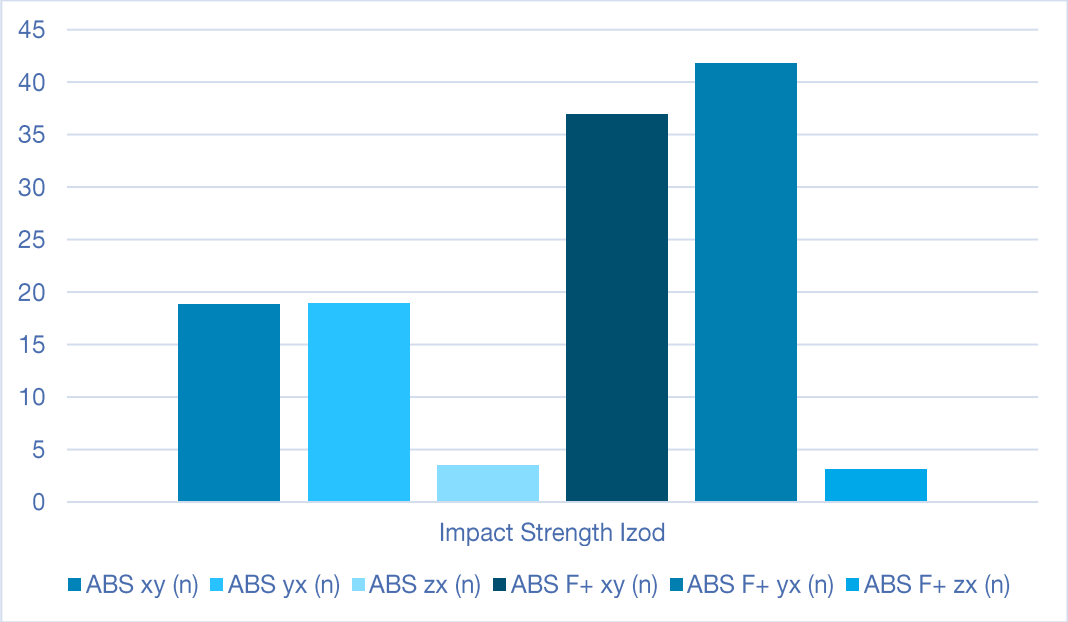
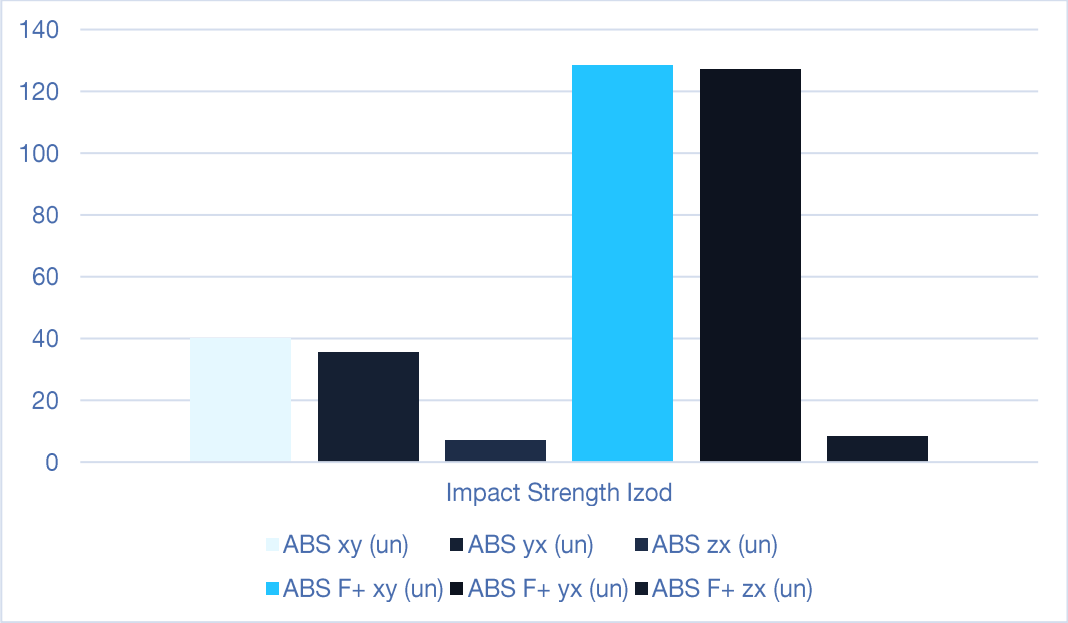


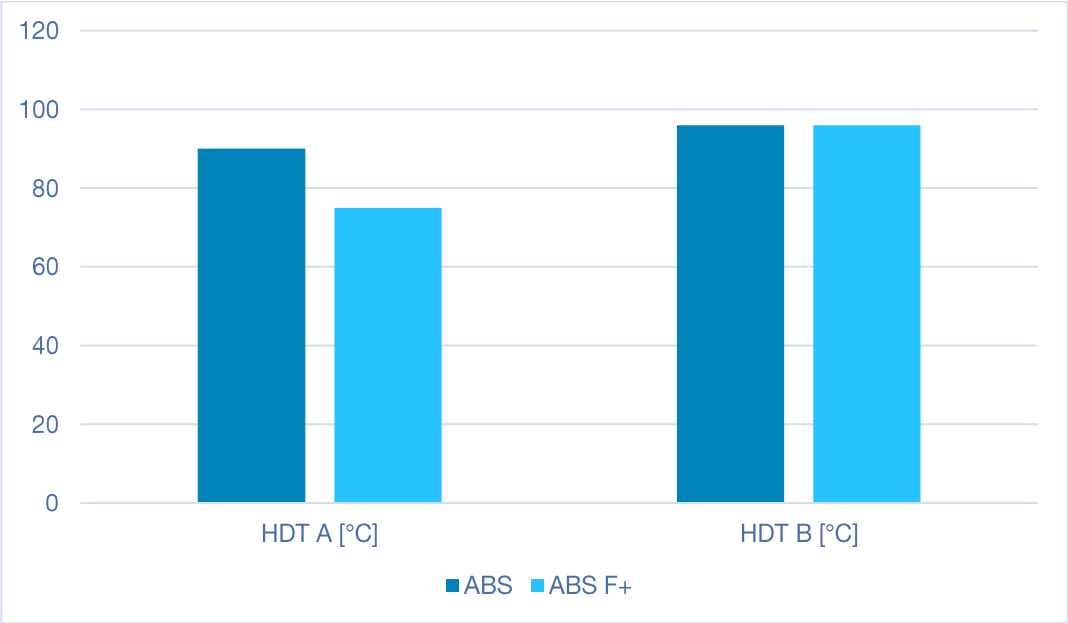
Impact Strength Izod notched comparison Ultrafuse® ABS and Ultrafuse® ABS F+



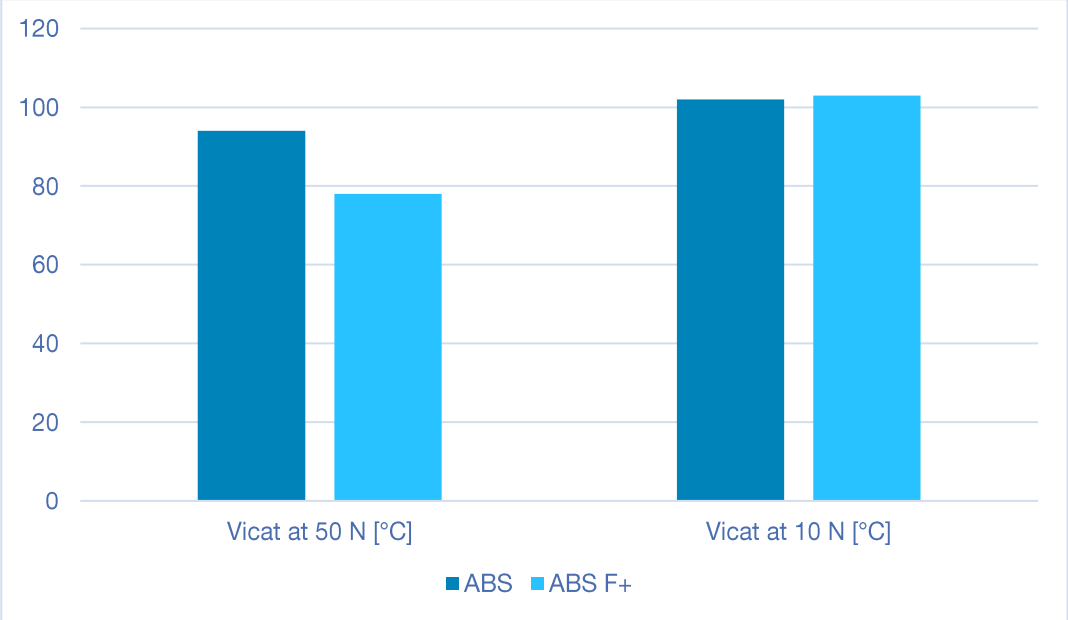
Impact Strength Izod unnotched comparison Ultrafuse® ABS and Ultrafuse® ABS F+

Thermal Properties Diagrams

Comparison Ultrafuse® ABS and Ultrafuse® ABS F+



HDT comparison Ultrafuse® ABS and Ultrafuse® ABS F+



Vicat comparison Ultrafuse® ABS and Ultrafuse® ABS F+