

ASA, or acrylonitrile styrene acrylate, is a thermoplastic that combines mechanical strength, UV resistance and water resistance. It also has high dimensional stability and good chemical resistance, making it ideal for prototyping, outdoor applications and the automotive industry.

#### Pros

- Strong UV resistance
- High wear and impact resistance
- High glass transition temperature

#### Cons

- Exceptional ventilation due to potentially dangerous fumes
- High cost
- High extruder temperature

#### Uses

- Automotive exterior parts
- Outdoor components, including housing components
- Sporting goods
- Exterior signage

### 1. Identification of the material

Trade name	tm Filament ASA
Chemical name	Acrylonitrile Styrene Acrylate
Chemical family	Thermoplastic copolymer
Use	3D Printing
Origin	tm Filament

### 2. Material properties

Melt temperature	230	°C	ASTM D3418
Glass transition temperature	103	°C	ASTM D3418
Heat deflection (1.8 MPa, unannealed)	80	°C	ISO 75-2/A
Heat deflection (1.8 MPa, annealed)	97	°C	ISO 75-2/A
Vicat Softening Temperature	105	°C	ASTM D1525
Flame Rating (1.5 mm)	HB		UL 94
Met Flow Rate (220 C/10.0 kg)	23	g/10 min	ASTM D1238
Density	1.07	g/cm <sup>3</sup>	ASTM D792
Odor	odorless		
Water solubility	Insoluble		
Shrink rate	0.4-0.7 %		ASTM D955

### 3. Mechanical properties

Tensile Strength (yield, 6.0 mm/min)	43	MPa	ASTM D638
Tensile Stress (yield)	46	MPa	ISO 527-2/50
Tensile Stress (break)	33	MPa	ISO 527-2/50
Tensile elongation, (break, 6.0 mm/min)	55	%	ASTM D638
Flexural Modulus (2.8 mm/min)	2160	MPa	ASTM D790
Flexural Strength (2.8 mm/min)	63.3	MPa	ASTM D790
Flexural Stress (2.0 mm/min)	67	MPa	ISO 178
Rockwell hardness (R-scale)	105		ASTM D785

### Printer settings

Printer	Desktop FFF printer
Nozzle	0.4 mm A2 hardened
Layer height	0.2 mm
Infill	100%
Extrusion temperature	230 - 280 °C
Bed Temperature	90 - 100 °C
Cooling fan	yes 10%
Bed preparation	PEI sheet, Glue stick
Print speed	30-40 mm/s (higher speeds may need slightly hotter printing temp. up to 250°C)

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