ASA-GF 3D Printing Filament

Technical Data Sheet

Version: 2.0 **Issue Date:** 2025-06-18 **Status:** Released

1. Product Identification

Product Name	ASA-GF 3D Printing Filament
Material Type	Acrylonitrile Styrene Acrylate reinforced with Glass Fiber (ASA-GF)
Brand	SSSray

Product Introduction

ASA-GF 3D Printing Filament is a premium-grade glass fiber reinforced acrylonitrile styrene acrylate composite engineered for high-performance outdoor and demanding FFF (Fused Filament Fabrication) 3D printing applications. This advanced material combines the excellent UV resistance and weatherability of ASA with the enhanced stiffness and dimensional stability delivered by high-quality glass fiber reinforcement, resulting in a filament that offers superior performance for outdoor, automotive, and structural applications.

The glass fiber reinforcement significantly improves the material's tensile and flexural modulus while maintaining the excellent impact resistance and surface finish characteristics inherent to ASA. This formulation provides enhanced heat deflection temperature and reduced thermal expansion coefficients, enabling successful printing of functional parts that require long-term UV stability, thermal resistance, and dimensional precision in outdoor environments.

ASA-GF is specifically engineered for engineers, manufacturers, and professionals who require materials with excellent UV resistance, weatherability, and mechanical performance. The material demonstrates exceptional suitability for outdoor applications, automotive components, sporting equipment, and architectural elements where color stability and structural integrity under environmental exposure are critical requirements.

2. Core Features

Exceptional UV Resistance
Superior resistance to UV degradation and color fading for long-term outdoor applications.

Excellent Weatherability
Outstanding resistance to moisture, humidity, and temperature cycling without degradation.

High Stiffness & Dimensional Stability
Glass fiber reinforcement provides enhanced flexural modulus and reduced thermal expansion.

Superior Thermal Resistance

Enhanced heat deflection temperature for applications requiring elevated temperature performance.

Excellent Impact Resistance

Maintains ASA's superior toughness characteristics for durable, reliable components.

Good Post-Processing Capability

Excellent sanding, painting, and bonding characteristics for finishing operations.

Typical Application Scenarios

- ✓ Outdoor signage and display structures
- ✓ Marine and nautical applications
- ✓ Architectural models and facades
- ✓ UAV (Unmanned Aerial Vehicle) structural parts
- ✓ Industrial machinery components
- ✓ Automotive exterior and functional components
- ✓ Sporting equipment and protective gear
- ✓ Electrical enclosures for outdoor use
- ✓ Garden equipment and outdoor tools
- ✓ Outdoor lighting fixtures and housings

3. Printing Parameters

Parameter	Recommended Range	Optimal Value
Nozzle Temperature	240°C - 260°C	**250°C**
Hot Bed Temperature	100°C - 110°C	**105°C**
Print Speed	40 - 150 mm/s	
First Layer Speed	15 - 20 mm/s	
Layer Fan Speed	0 - 50 % (Recommended: Off for large parts)	
Chamber Temperature	Heated chamber recommended (50-60°C) for best results	
Nozzle Material	Hardened steel nozzle recommended (glass fiber is abrasive)	
Retraction Settings	Distance: 1-5mm | Speed: 25-40 mm/s	
Drying Conditions	80°C for 4-6 hours (if moisture absorbed)	

Note: *Optimal printing parameters may vary depending on specific printer model, nozzle size, and environmental conditions. The use of hardened steel nozzles is strongly recommended due to the abrasive nature of glass fiber. Printing in an enclosed chamber with elevated temperature significantly reduces warping and improves layer adhesion. Always perform calibration prints when changing materials or making significant parameter adjustments.*

4. Physical Properties

4.1 Physical Properties

Property	Typical Value	Test Standard	Unit
Net Weight	1 kg (Other specifications available upon request)	-	kg
Density	1.13	ISO 1183 / ASTM D792	g/cm³
Melt Flow Rate (MFR) (260°C /5kg)	10- 16	ISO 1133	g/10min
Filament Diameter	1.75 ± 0.03 / 2.85 ± 0.03	-	mm
Roundness Deviation	≤ 0.02	-	mm
Glass Fiber Content	10	-	%

4.2 Mechanical Properties

Property	Typical Value	Test Standard	Unit
Tensile Strength (XY)	47 ± 3	ISO 527-2 / ASTM D638	MPa
Tensile Modulus (XY)	3,350±100	ISO 527-2 / ASTM D638	MPa
Elongation at Break	3 - 6	ISO 527-2 / ASTM D638	%
Flexural Strength (XY)	75	ISO 178 / ASTM D790	MPa
Flexural Modulus (XY)	3,270±120	ISO 178 / ASTM D790	MPa
Izod Impact Strength (Notched)	15–20	ISO 180 / ASTM D256	kJ/m²
Charpy Impact Strength	17–23	ISO 179-1	kJ/m²
Shore D Hardness	85-90	ISO 868 / ASTM D2240	-

4.3 Thermal Properties

Property	Typical Value	Test Standard	Unit
Glass Transition Temperature (Tg)	108	ISO 11357-2 / ASTM D3418	°C
Heat Deflection Temperature (HDT @ 0.455 MPa)	96	ISO 75-2 / ASTM D648	°C

Heat Deflection Temperature (HDT @ 1.82 MPa)	88	ISO 75-2 / ASTM D648	°C
Vicat Softening Temperature	103	ISO 306 / ASTM D1525	°C
Processing temperature range	250 - 270	-	°C

4.4 Other Properties

Property	Typical Value	Test Standard	Unit
Water Absorption (24h)	0.15 - 0.20	ISO 62	%
Continuous Use Temperature	≤ 9 0	-	°C

Note: *All mechanical and thermal property values are based on 3D printed specimens printed under standard conditions (0.2mm layer height, 100% infill, XY plane orientation) unless otherwise specified. Actual performance may vary based on printing parameters, equipment calibration, and part design. The glass fiber reinforcement provides enhanced stiffness and thermal properties compared to standard ASA while maintaining excellent UV resistance and weatherability characteristics.*

5. Storage & Handling

Storage Environment

- Store in a cool, dry environment with relative humidity below 50%
- Recommended storage temperature: 15°C - 25°C (59°F - 77°F)
- Avoid exposure to direct sunlight or UV radiation
- Keep packaging sealed until ready for use

Packaging Requirements

- Vacuum-sealed packaging with desiccant moisture absorber
- Spool wound with consistent tension to prevent tangling
- Material lot number and production date clearly marked
- Moisture indicator included in packaging

Desiccant Storage Recommendations

- Reuse of original packaging desiccants is not recommended after opening
- For extended storage, use additional food-grade silica gel desiccant
- Store opened spools in airtight containers with fresh desiccant
- Filament dry boxes with integrated desiccant are recommended for active printers
- Monitor desiccant color indicators and replace as needed

Shelf Life

Under proper storage conditions, unopened ASA-GF filament maintains optimal performance for 12 months from production date. Once opened, material should be used within 6 months for best results. The glass fiber reinforcement provides some improvement in dimensional stability, but proper storage is essential for consistent print quality and performance.

Moisture Absorption Indicators

This product is shipped in sealed packaging with desiccant to ensure optimal condition upon delivery. After opening, exposure to humidity may occur. Signs of moisture absorption include:

- Excessive stringing or oozing during printing
- Popping or hissing sounds during extrusion
- Poor surface quality with bubbles or imperfections
- Inconsistent extrusion and reduced layer adhesion
- Increased brittleness of printed parts

Remediation: If moisture symptoms are observed, dry the filament at 80°C for 4-6 hours in a convection oven or use a dedicated filament dryer. Allow to cool to room temperature before loading into printer. Do not exceed recommended drying temperature or duration as this may degrade material properties.

6. Safety & Certifications

Certification	Status	Description
RoHS (Restriction of Hazardous Substances)	Compliant	Meets EU Directive 2015/863/EU on hazardous substance restrictions
CE Marking	Certified	Conforms to applicable EU safety and environmental directives
SDS (Safety Data Sheet)	Available	Detailed safety information available upon request
Third-Party Quality Verification	Available on Request	Independent testing reports provided as required (fees may apply)

Note: *This product is not certified for food-contact or medical applications. Please contact our technical team for information on materials suitable for specific compliance requirements. ASA materials emit minimal odors during printing compared to ABS, but adequate ventilation is still recommended.*

7. Product Positioning

7.1 Comparison with Industry Standard Materials

Property	ASA-GF	Standard ASA	ABS-GF
Density (g/cm³)	1.13	1.07	1.12
Tensile Strength (MPa)	47± 3	42 - 48	52 ± 3
Tensile Modulus (MPa)	3,350	2,200	3,100
Heat Resistance (HDT °C)	96	88 - 95	98
UV Resistance	Excellent	Excellent	Moderate
Print Difficulty	Moderate	Moderate	Moderate
Print Odor	Low	Low	Moderate
Weather Resistance	Excellent	Excellent	Good

7.2 Performance Rating

Performance Dimension	Rating	Description
Printability	★★★☆☆	Good - Requires heated chamber; hardened nozzle recommended for glass fiber
UV Resistance	★★★★★	Excellent - Superior outdoor durability and color stability
Heat Resistance	★★★★☆	Very Good - Enhanced thermal properties suitable for elevated temperature applications
Surface Quality	★★★☆☆	Good - Matte finish with visible fiber texture; excellent for painting and finishing
Impact Resistance	★★★★☆	Very Good - Maintains ASA's superior toughness with added stiffness from glass fiber

Target Applications: *ASA-GF is optimized for engineers and professionals requiring excellent UV resistance combined with superior mechanical properties. The glass fiber reinforcement makes it ideal for outdoor structural applications where both weatherability and strength are critical requirements.*

8. Troubleshooting Guide

Problem 1: Severe Warping / Layer Separation

Possible Causes: Bed temperature too low, insufficient enclosure heating, poor first layer adhesion, excessive cooling.

Solutions: Increase bed temperature to 110°C. Use heated chamber at 50-60°C. Apply adhesion aids (ABS slurry, PEI sheet). Reduce or disable layer fan. Consider using brim or raft for large parts.

Problem 2: Nozzle Clogging

Possible Causes: Glass fiber accumulation in nozzle, contaminated filament, excessive printing temperature, carbon buildup.

Solutions: Use hardened steel nozzles specifically designed for reinforced composites. Perform regular nozzle maintenance and cleaning. Adjust printing temperature within recommended range. Perform cold pulls to clear nozzle.

Problem 3: Poor Layer Adhesion

Possible Causes: Insufficient nozzle temperature, inadequate chamber temperature, excessive cooling, draft exposure.

Solutions: Increase nozzle temperature by 5-10°C. Enable heated chamber at 50-60°C. Reduce layer fan to 0-15%. Print in fully enclosed space away from air currents.

Problem 4: Excessive Wear on Brass Nozzles

Possible Causes: Using standard brass nozzles with glass fiber material, extended printing sessions, small diameter nozzles.

Solutions: Replace brass nozzles with hardened steel nozzles. Glass fibers in ASA-GF are highly abrasive and will rapidly wear standard brass nozzles. Consider keeping dedicated hardened nozzles for reinforced materials.

Problem 5: Stringing / Oozing Between Prints

Possible Causes: Temperature too high, insufficient retraction, moisture in filament.

Solutions: Reduce nozzle temperature by 5-10°C. Increase retraction distance (4-6mm) and speed (25-40 mm/s). Dry filament at 80°C for 4-6 hours if moisture suspected.

Problem 6: Surface Bubbles or Imperfections

Possible Causes: Moisture in filament, contamination, temperature too high causing degradation.

Solutions: Dry filament at 80°C for 4-6 hours before printing. Reduce print temperature by 5-10°C. Verify filament is free from dust or debris in extruder path. Ensure adequate ventilation during printing.

9. Disclaimer & Limitation of Liability

DISCLAIMER & LIMITATION OF LIABILITY

The typical values presented in this datasheet are intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. Actual values may vary significantly with printing conditions, equipment calibration, environmental factors, and part design.

End-use performance of printed parts depends not only on material properties, but also on part design, wall thickness, print orientation, environmental conditions, printing parameters, and post-processing methods. Users should conduct their own testing to verify suitability for specific applications.

Product specifications are subject to change without notice. SSSray reserves the right to modify formulations and specifications to improve product quality or performance.

Each user is responsible for determining the safety, lawfulness, technical suitability, and disposal/recycling practices of SSSray materials for the intended application. SSSray makes no warranty of any kind, unless announced separately, as to the fitness for any particular use or application. SSSray shall not be held liable for any damage, injury, or loss induced from the use of SSSray materials in any application.

This document does not constitute technical advice. For technical support or custom formulation inquiries, please contact our technical team.

10. Document Revision History

Version	Issue Date	Author	Description
v2.0	2025-06-18	SSSray Technical	Product iteration - Updated specifications and formatting
v1.0	2024-01-15	SSSray Technical	Initial release

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