AMERALABS

XVN-50

VERSATILE ENGINEERING 3D PRINTER RESIN

MB Labsamera
Company No. 304522059
VAT reg. No. LT100011574412
Address: Draugystes st. 14,
51259 Kaunas, Lithuania

Contacts:
+370 602 42 209
sales@ameralabs.com
https://ameralabs.com
https://fb.com/Ameralabs

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MATERIAL PROPERTIES

- TOUGH. 3D prints have a perfect balance of flexibility and tensile strength and are ideal for engineering parts.
- HARD SURFACE. The surface is glossy and hard (82 Shore D), allowing it to capture the model's accurate dimensions. After post-cure, it does not feel sticky or tacky and is pleasant to touch and use.
- ACCURATE. Resin produces dimensionally accurate and stable engineering parts. Printed models do not crack or deform because of shrinkage.
- LOW ODOR. It makes working with this resin more comfortable.
- NO PIGMENT SETTLING. Stabilized pigment dispersion enables extremely long vertical 3D printing sessions. There is no significant pigment settling for days.
- MEDIUM VISCOSITY. No heating is required. It is easy to clean your parts before post-curing and maintain all original model features.
- CONVENIENT PACKAGE. Comes in 250 ml, 500 ml, 1 L, or 5 L containers.

TECHNICAL DATA

Tensile Properties	**Standard**	**Value**
Modulus of Elasticity	ISO 527-5A	2.03 GPa
Stress at Yield	ISO 527-5A	43.4 MPa
Strain at Yield	ISO 527-5A	4.8 %
Stress at Break	ISO 527-5A	37.5 MPa
Strain at Break	ISO 527-5A	51.2 %
Flexural Properties	**Standard**	**Value**
Modulus of Elasticity	ISO 178	1.82 GPa
Stress at Yield	ISO 178	62.3 MPa
Strain at Yield	ISO 178	6.7 %
Strain at Break	ISO 178	>10 %
Compression Properties	**Standard**	**Value**
Modulus of Elasticity	ASTM D695	1.52 GPa

Other Properties	**Standard**	**Value**
Impact resistance (notched)	ASTM D256	5.9 $kJ \cdot m^{-2}$
Vicat softening temperature (50 N, 50 °C min^{-1})	ASTM D1525	65.2 °C
Heat deflection temperature (0.45 MPa)	ISO 75	62.8 °C
Heat deflection temperature (1.8 MPa)	ISO 75	52.1 °C
Heat deflection temperature (8 MPa)	ISO 75	42.1 °C
Density (liquid)	ISO 2811-1	1.095 $g \cdot cm^{-3}$
Density (solid)	ISO 1183-1	1.213 $g \cdot cm^{-3}$
Viscosity at 25 °C	ISO 2555	560 mPa·s
Hardness	ASTM D2240	82 D
Water Absorption (24 h)	ASTM D570	3.12 %
Critical Dose	WCM[1]	1.216 $mJ \cdot cm^{-2}$
Penetration Depth	WCM[1]	119 µm

Tensile Properties	**Standard**	**Non post cured[2]**	**After 24 h of drying at 50 °C[3]**	**After 24 h in water[3]**	**4 weeks in darkness[3]**	**4 weeks in sunlight[3]**
Modulus of Elasticity	ISO 527-5A	0.9 GPa	1.87 GPa	0.82 GPa	2.15 GPa	2.08 GPa
Stress at Yield	ISO 527-5A	18.2 MPa	50.5 MPa	15.4 MPa	47.1 MPa	47.6 MPa
Strain at Yield	ISO 527-5A	4.8 %	5.2 %	5 %	4.3 %	4.75 %
Stress at Break	ISO 527-5A	24.8 MPa	40 MPa	22.4 MPa	37.4 MPa	38.8 MPa
Strain at Break	ISO 527-5A	72.7 %	29.9 %	59.1 %	46.1%	35.6 %

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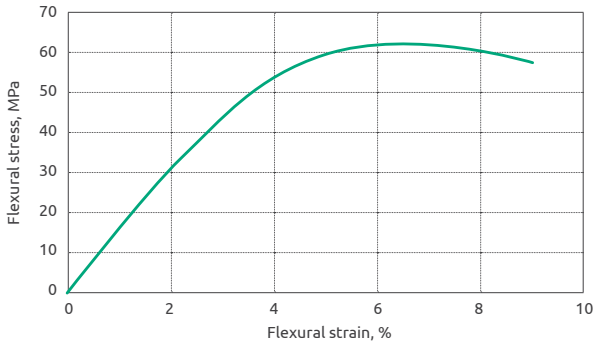
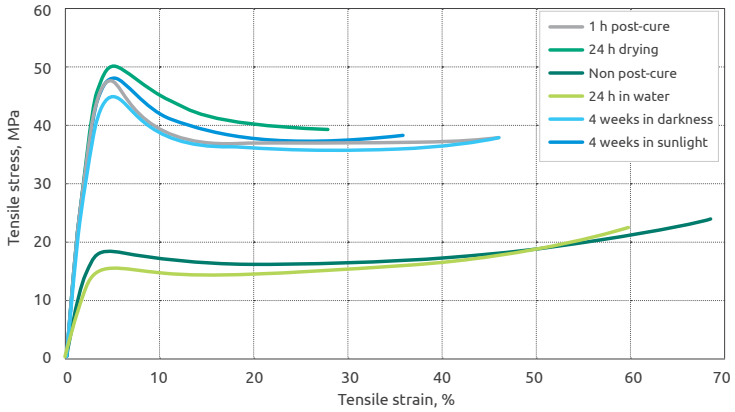
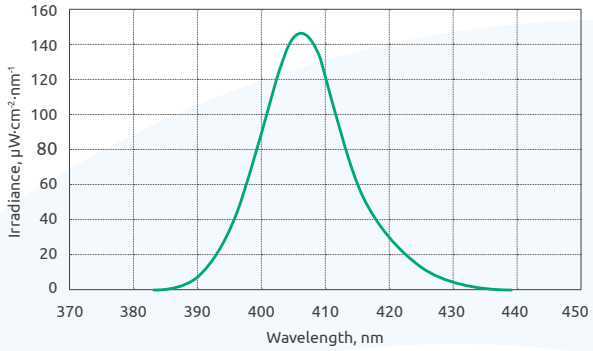
Flexural stress strain diagram of XVN-50



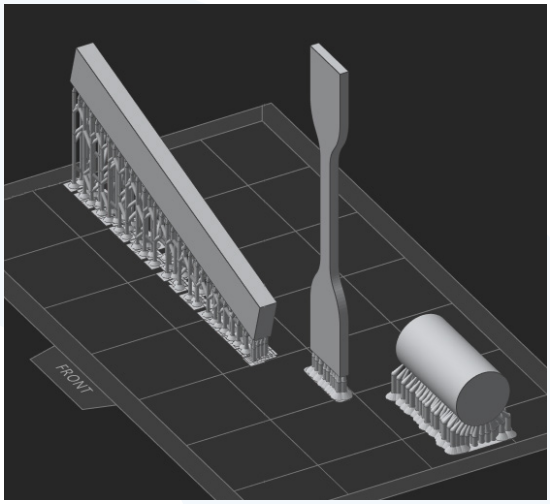
Tensile stress strain diagram of XVN-50 at various conditions



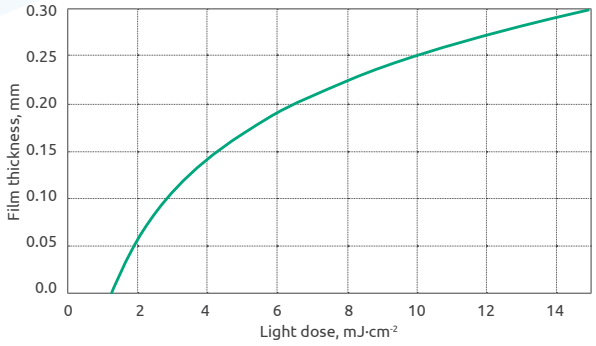
The spectrum of the DLP printer used for specimen preparation



Tensile, Flex and Compression specimen orientation



Working curve measurement of XVN-50 resin



All specimens for various tests were printed using a DLP printer with 2.62 mW·cm^{-2} light intensity and a UV spectrum peak of 406.3 nm. A layer height of 50 μm was used to print the specimens, and the exposure was set at 1.8 s. After printing, the specimens were washed with isopropanol for 14 min in a wash and cure station. Specimens were dried in the air for 30 min and then post-cured for 1 h in a UV chamber with 3 light sources of 365 nm (35 W), 380 nm (28 W) and 395 nm (92 W).

[1]P. F. Jacobs, Rapid Prototyping and Manufacturing: Fundamentals of StereoLithography, McGraw-Hill, Inc., New York, NY, USA, 1993.

[2]These properties were measured right after printing, before post-curing.

[3]After post-curing, specimens were exposed to the specified conditions, and only then their properties were measured.

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COMPATIBILITY

Designed to work on MSLA 3D printers with monochrome LCD and DLP technologies: Anycubic, Phrozen, Elegoo, Epax, Longer, Prusa, and similar 3D printers. A list of initial 3D printing settings can be found here: https://ameralabs.com/3d-printing-settings/

XVN-50 should not be used with PDMS-based resin trays because it is too reactive and can damage your PDMS silicon layer. We strongly recommend using it only with FEP, NFEP, PFA, or ACF film-based resin trays.

3D PRINTING

For a successful first print, we recommend:

- Level your build plate.
- If it's your first print with this resin, print something small first. We recommend this model: https://ameralabs.com/blog/town-calibration-part/
- Find initial printing settings here: https://ameralabs.com/3d-printing-settings/
- Use a support column thickness of 1.5-2 mm and support tip thickness of 0.3-0.5 mm.
- Use the attachment layer.
- Hollow your models.
- Use slower lift speeds: 5 mm/min for bottom layers 40-60 mm/min for normal layers.

Let us know if you have any trouble. We are here to help: support@ameralabs.com

CLEANING

XVN-50 material has a bit higher viscosity than most 3D printing resins. This 3D material should not be left submerged in solvents for extended periods of time. By all means, do not leave submerged in IPA or any other liquid for more than 1 hour. Doing so might ruin your models and affect the final properties of the polymer material.

If you use a Wash and Cure station, submerge the printed object in IPA for 15 minutes. Depending on the results, you can repeat this step and wash for 10 more minutes.

If you prefer cleaning with ordinary IPA baths, here is our easy 4 steps cleaning procedure:

1. After taking your printed object off the build plate, submerge it in the IPA bath for 10 minutes.
2. Swirl the IPA bath with our part in it actively for another 1 minute.
3. Leave it still but fully submerged for another 10 minutes after swirling. At this point, it would be wise to change IPA to a clean one.
4. Finally, swirl the bath actively again for 1 minute.

Evaluate cleaning results and repeat this procedure only once (if needed).
If you prefer cleaning with an ultrasonic cleaner, we recommend putting a printed part into the container with IPA, closing it well, and putting the container into the ultrasonic cleaner filled with water for 10 minutes. Leave it for no more than 20 minutes. No additional heating is necessary.

After washing the specimens, they should be left to dry for at least 30 minutes. You can fasten the process by blowing with a cold fan or using compressed air.

POST CURING

It is easier to remove supports before post-curing. However, you can also post-cure a print with supports and remove them later. Depending on the model, this can help to obtain better geometries if you have such a goal. Post-curing time depends on your curing station. It can vary from 5 minutes to 1 hour (until the surface of your 3D print becomes non-sticky). You should post-cure immediately after cleaning and drying. After the proper post-curing surface of XVN-50 printed objects should be completely non-sticky and very hard to scratch.

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SAFETY

Consult the relevant Safety Data Sheet (https://ameralabs.com/msds/) for appropriate handling procedures and protective equipment before using this or any other material referred to in this bulletin. See Safety Data Sheet for emergency and first aid procedures.

This resin is not meant for contact with food, drinks, or medical use on or in a human body. Always read the material safety data sheet thoroughly.

Resins are classified as dangerous chemicals, and it is necessary to dispose of them properly in designated containers.

Resin bottles (empty or full) must never be disposed of or poured into the general waste.

Store resin at room temperature away from direct sunlight.

Use protective gloves and glasses at all times when handling chemical products.

Provide adequate ventilation. This should be achieved using local exhaust ventilation and good general extraction where reasonably practicable. If these are insufficient to maintain concentrations of particulates and solvent vapors below the OEL, suitable respiratory protection must be worn.

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