Operating instructions for the use of Xioneer VXL 70 Support Material

1. General information

The soluble support material **Xioneer VXL 70** was specifically developed for the use in additive manufacturing, namely *fused filament fabrication* (FFF). The FFF printer must be able to process several materials.

The material is **not** another PVA/PVOH/BVOH-type. Compared to these solely water-soluble support materials, our material is soluble in a mild alkaline solution. Thus, it is less sensitive to moisture, has increased shelf life and consistent print quality over time. This avoids failed prints through clogged nozzles and saves material. Our material has high melt stability and strong adhesion to model materials like TPU, PET(G) or PVB. Temperature resistance of **VXL 70** support materials is ideal for usage in heated build chambers.

As with any other material the best print results are obtained at minimal moisture content. Just use our dry storage cabinet **Xioneer DryBox EZ**.

Unlike when HIPS functions as the support material, to dissolve the support structure you do not need any foul-smelling, expensive solvent that must be disposed of as dangerous waste. Instead of this, **Xioneer VXL EX** and **Xioneer VXL solve,** our specially developed detergents, provide the opportunity to dissolve the **VXL 70** in water. Just use our heated and stirred washing bath **Xioneer VXL GO**. The detergent, dissolved in water, produces a mild alkaline which usually, together with the dissolved support material, can (in limited quantities) be disposed of via the wastewater. Please check your local regulations.

For making your entry into printing our material is as easy as possible, advice on processing is enclosed as follows.

2. Advice on processing the VXL 70 support material:

Handling and storage:

- Like almost every thermoplastic, the **VXL 70** support material slowly absorbs small amounts of moisture when it comes into contact with air. Therefore, it is in a welded aluminum composite bag on delivery. Depending on the spool size, several units of drying agent are enclosed, to keep the moisture level low in the bag. The maximum storage duration of the unopened sealed bag is one year.
- The aluminium composite bag has a pressure seal. Please return the filament spools to the bag after their use; then carefully seal the bag shut. In this way you effectively prevent unwanted absorption of moisture. If necessary, you can always regenerate the desiccant at 80 °C for four hours.
- Ideally you possess a storage box from which you feed the filament in a dry state. In this case you can also store the filament in the dry unit and, after use, you do not need to return it to the aluminium composite bag. We are happy to offer you our **DryBox EZ**, as a practical resource for filament storage, with an opportunity to feed a supply of product. We recommend using the **DryBox EZ** for your model materials as well.

Print parameters:
Parameter recommended for the use of a 0.4 mm nozzle

Print parameters	VXL 70
Nozzle temperatures	200 – 220 °C
Inactive nozzle temperatures	160 °C
Heated bed temperatures	50 – 70 °C
Build plate substrate	PI or PEI („Kapton" or „Ultem"), BuildTak, ABS, PC
Build chamber temperature	≤ 60 °C
Fan speed	0 – 100 %

Processing:

- The use of breakaway support frequently entails a laborious optimisation of parameters. The challenge is to achieve a surface as good as possible while maintaining a level of connection as low as possible. In many instances, provision is made for a fissure of air between the last support layer and the first model layer. In the case of soluble support materials this is **not** necessary; the result is that outstanding surfaces are possible at the connection points between support material and model material. The closer to the connection point the support material is printed, the better the surface becomes, i.e. the larger the actual contact area is.

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- If you have already found the ideal settings for printing PET(G) on your machine, you can use these settings as a basis for conducting first print tests with our **VXL 70** support material**.** Usually, except for the temperature, typical PET(G) parameters are also suitable for printing with **VXL 70**.
- As an example, here is a set of parameters for **VXL 70**:
  - o Nozzle diameter: 0.4 mm
  - o Thread width: 0.4 mm
  - o Layer thickness: 0.3 mm
  - o Printing speed: 50 mm/s or respectively 6mm³/s
  - o → Nozzle temperature: 220 °C
- The example given is solely for orientation purposes. The nozzle temperature depends to a large degree on the print speed, the track width, the layer thickness, and the temperature of the heated chamber/heated print bed. There are also other parameters such as *retraction* that depend on the printer set-up (*direct drive* vs. *Bowden*). If appropriate, change the parameters in accordance with your peripheral conditions and your preferred printer settings.
- The adhesion on various substrates is comparable with ABS types. Therefore, use a build plate which, based on what your own work indicates, achieves good adhesion characteristics for ABS. Build plates with PI ("Kapton") or PEI ("Ultem") are especially suitable as a substrate. If necessary/appropriate to do so, use an additional adhesion promoter. Ideally your printer has a heated build chamber with a temperature set up to 60 °C. If not, your heated bed temperature (= actual surface temperature) should be set between 50 – 70 °C.
- Generally, plastics have a defined dwell time in a heated extruder; if this is exceeded it can lead to thermal degradation. Make sure that, while it is inactive, the nozzle with the **VXL 70** support material is cooled down. Then, before the nozzle is put into operation, heat it to the desired print temperature. This prevents dripping of the material.

Dissolving the support material:
- The **VXL 70** support material shows very good adhesion to model materials like TPU, PET(G) or PVB. This is required to prevent delamination from the model material. You can use appropriate tools to remove parts of the support structure to reduce the time needed for dissolution. ***Wear protective gloves*** to avoid cuts and ***use tightly closing eye protection***. Do not remove any support material mechanically from delicate structures to avoid damage to the model. Therefore, always finish with a solvent bath to completely remove the supports.
- Only use our detergents **VXL EX** and **VXL solve** to dissolve **VXL 70** support material.
- The fastest way to dissolve the support material is in our heated and stirred washing bath **VXL GO**, which, depending on the model material, is at least 40 °C warm.
- ***IMPORTANT:*** Please follow the instructions of our detergents.

Safety data sheet:
Be sure to completely read and understand the Safety data sheet.

Material properties of VXL 70 support material:

Product properties	Unit	VXL 70
Colour		Natural
Net weight filament	**kg**	0.1; 0.5; 0.75; 1.00;
Spool dimension (Ø x height)	**mm**	200 x 55; 200 x 80; 300 x 102
Core hole diameter of the coil	**mm**	52
Filament properties		
Material		Proprietary acrylic copolymer
Transparency		Opaque
Diameter	**mm**	1.75; 2.85
Diameter tolerance	**mm**	±0,05
Glass transition temperature	**°C**	70
Circularity tolerance (max.)		±5 %
Density (21.5 °C)	**g/cm³**	1.1
Solubility in water		No
Solubility in **VXL EX**		Yes
Solubility in **VXL solve**		Yes
Minimum pH value for dissolution		>10

3. Contact details:

BellandTechnology AG
Kühlenfelser Str. 47
91278 Pottenstein
Germany

Website: www.xioneer.com
Email: wecanhelp@xioneer.com
Phone and Messenger: +49 (0) 171 220 006 7