LUX MPS Process Description

With the LUX MPS process, thermoplastic components from various AM processes such as SLS, MJF, HSS, SAF, AKF and FDM can be smoothed and finished in an environmentally friendly and cost-efficient manner. The patented process enables various smoothing processes, depending on the desired surface quality. A distinction is made between degrees and types of smoothing, which are described schematically in the following overview.

Degrees of smoothing: Standard / Strong
Types of smoothing: External / Internal

Smoothing	Standard		Strong	
External	**Result** + Sealed surface + Watertight + Gas-tight > Stair steps remain visible	**Applications** + Geometry independent + Thin walls & fine details + Moving elements + PA und TPU	**Result** + Sealed surface + Watertight + Gas-tight > Stair steps are smoothed	**Applications** + Wall thickness above 1 mm + Homogeneous appearance of visible surfaces + Design/Function requires smooth surfaces + PA
Internal	**Result** + Sealed surface + Watertight + Gas-tight > Smoothing of internal surfaces	**Applications** + Pipes, channels, containers etc. + Diameter above 2 mm + Smoothing of large and short channels same as Standard-External + PA und TPU	**Result** + Sealed surface + Watertight + Gas-tight > Smoothing of hard-to-reach areas	**Applications** + Components with long, thin or branched ducts + Function (e.g. flow) requires smooth surfaces + PA

Table 1: LUX MPS smoothing matrix

The transition from Standard to Strong described in Table 1 should be regarded as fluid. Depending on the requirements of the individual application, the degree of smoothing can be fine-tuned.

In the process chamber, the system operator can implement different holding options for the components as required. In many cases, holes or other structures are already present that serve as holding points.

If there are no suitable holding points on the components, additional brackets are attached, which can be easily removed after the LUX MPS process. Alternatively, a hole can be drilled at a stable point on the component or an existing opening (e.g. a screw hole) can be used.

The following bracket is recommended:

The file is available as STP and STL file for download on our website.

For heavier components (> 500g) several brackets should be provided.

Other factors influencing the result of smoothing in the LUX MPS process:

(1) Surface quality before the LUX MPS process

Defects on the surfaces, resulting from coating errors, scanner defects, soiling, etc., are more clearly visible with standard smoothing. Standard smoothing can therefore also be used for quality control of 3D printed components, as the defects in the raw part are often concealed by the rough surface. With strong smoothing, such defects can be healed in individual cases.

(2) Material used

Suitable materials are polyamides (PA12, PA11, PA6 etc.), also glass or carbon-filled, as well as TPU materials from various manufacturers. Components from binder jetting processes (MJF, HSS etc.), which have a medium grey color as a raw part, become almost black with the LUX MPS process. This means that an additional coloring step is not necessary in many cases. If a deep black color is desired, or to eliminate any color differences between up-skin and down-skin surfaces, the components can be dyed after the smoothing process. Unwanted impurities in the "feedstock" are made visible by the smoothing process. Here too, the LUX MPS process can make an important contribution to quality control.

(3) Geometry of components

With external smoothing, the internal surfaces are only smoothed automatically if the openings are large and not too deep. If internal smoothing is required and you would like to have the components smoothed by us or one of our service partners as a service, please inform us accordingly when placing the order. For internal smoothing, it is necessary to convert the LUX PRO system so that the solvent is directed specifically to the internal surfaces to be smoothed.

Possible undesirable effects of the LUX MPS process:

(1) Warpage of thin-walled, filigree and soft components

In the case of very thin-walled components (< 1 mm) or soft materials (TPU), strong smoothing can lead to the complete softening of individual details. For this reason, a cautious approach and exploring the limits of the possible degree of smoothing is recommended for such components.

(2) Contamination of the components is permanently incorporated into the surface

The components to be smoothed must be completely cleaned of dirt and loose powder particles, as these will otherwise be permanently incorporated into the surface. This also applies to any blasting material in concealed areas that has become embedded during the pre-cleaning process.

(3) Surface structures are leveled if they are smoothed too much

Defined surface structures that come directly from 3D printing or were subsequently created by blasting or grinding processes can be leveled if they are smoothed too much. A close exchange between user and service provider is required at this point in order to determine the best possible degree of smoothing.