

- ▶ Print-to-product workflow combining cleaning, surfacing and colouring
- ▶ Consistent and repeatable SLS dyeing
- ▶ Contract SLS colouring service



'Print-to-Product' workflow

Our automated cleaning, surfacing and colouring solution uses a combined three-step workflow that enables scaling from prototyping or small series to high-volume manufacturing.



Step 1 - B6 Cleaning

- ▶ Automated, highly efficient, damage-preventative part cleaning, reducing lead times.



Step 2 - S2 Surfacing

- ▶ Automated proprietary blasting process creates dirt- and scratch-resistant surfaces and improves the look, feel and colour quality.



Step 3 - D5 Colouring

- ▶ Automated colouring with almost unlimited colour options
- ▶ Long-lasting UV-stable colours.

Consistent and repeatable SLS dyeing

Our repeatable SLS dyeing service is run in-house. We use technology from Munich-based specialists DyeMansion, developers of the specialist, precision dyeing techniques.

For SLS rapid prototyping and additive manufacturing, high levels of repeatable colour quality for 3D-printed parts, across the industrial, consumer and medical sectors, are offered.



FINISH LEVEL CODE	B6	S2	D5
Step 1 - Cleaning	✓	✓	✓
Step 2 - Surfacing		✓	✓
Step 3 - Colouring			✓
	Standard	Optional	Optional

Influencing factors

As dyeing always includes the interaction between part material and dye, the final colour is highly influenced by the raw material and the dyeing conditions:

- ▶ **Material of the raw part:** Different polymers offer different affinity to the dyes used in the colouring process. Therefore, the RAL colour developed for the PA12 (PA2200) SLS parts cannot be reproduced on other materials without additional colour adjustment.
- ▶ **Colour of the raw SLS-part:** Dyeing allows only to change the L* to smaller values. Therefore, it is impossible to dye parts in lighter colours than the L* value of the raw part.
- ▶ **Surface roughness:** The dye molecules penetrate from the surface into the part. The more homogeneous the surface, the more homogeneous the dye absorption and thus the dyeing result. As the surface of the up- and down-skin differ, also the dyed part shows little colour deviation between up- and down-skin.
- ▶ **Surface contamination:** Fats, dust and blasting material residues slow down or prevent dye absorption and lead to an inhomogeneous dyeing.
- ▶ **Dyeing parameters:** Dye concentration, temperature, pressure and time influence the absolute amount of adsorbed dye and thus the final colour.

Standard colours

SLS parts for prototyping or additive manufacture can be precision dyed in virtually any required colour specification on a consistent and repeatable basis, for example to match exact corporate brand guidelines.

Black is our standard, in stock, colour and is run, in-house, every day. In addition to Black, a range of standard colours (shown below) is available upon request. Delivery of these additional standard dye colours from our supplier is typically eight to ten days.



RAL colour palette

An entire RAL classics palette has been developed for polyamide 12 (PA2200) parts produced by SLS. As our colouring system enables colourful parts by dyeing, not by painting or varnishing, the colour is abrasion and scratch resistant. As a result, the colour impression and measured colour values are influenced by the quality of the part's surface.

Please note: some colours cannot be achieved because the RAL colour scheme is based on industrial requirements and has not been developed specifically for dyeing. These RAL colours have metallic, neon, or extreme dark black shades.

Contract SLS colouring service

As well as colouring parts we have made for you, we also offer a contract colouring service for customers who have made the SLS parts themselves or had them made elsewhere. Contact us to discuss your requirements and ask us about pricing.