ALTANA Cubic Ink®

3D-printed water-breakable Injection Molding Tools via One-Shot Molds

30. Fachtagung Rapid Prototyping

Lemgo, November 8th, 2025, Dr. Anne Asmacher

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Facts and figures
The ALTANA Group in 2024

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Sales	€3,169 m	**EBITDA**	€490 m
Employees	8,382	**EBITDA margin**	15.5 %

BYK	ECKART	ELANTAS	ACTEGA
Paint Additives Plastics Additives Industrial Applications Measuring and Testing Instruments	Coatings Graphic Industry Cosmetics and Personal Care Plastics Industry Functional Applications	Wire Enamels High Voltage Low Voltage Electronics Engineering Materials Composites	Flexible Packaging Metal Packaging Solutions Paper & Board
Sales in €m: 1,337	**Sales in €m:** 434	**Sales in €m:** 878	**Sales in €m:** 519
Employees: 2,592	**Employees:** 2,100	**Employees:** 2,041	**Employees:** 1,375

All figures relate to the fiscal year 2024.

ALTANA Is Present All Over the World

Global network – local presence

Headquartered in Germany – with a global presence:

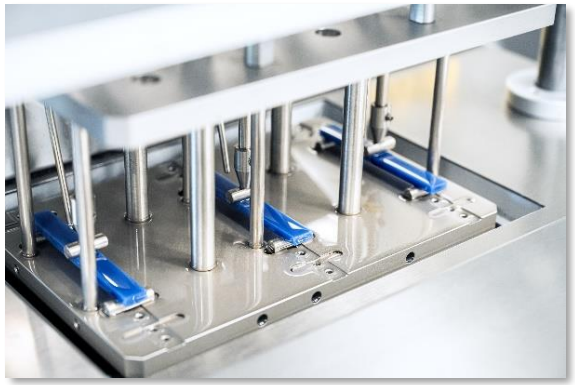
99 companies with 68 production sites and 71 laboratory centers ensure customer responsiveness and service quality.

ALTANA New Technologies GmbH
Business line Cubic Ink® at a glance

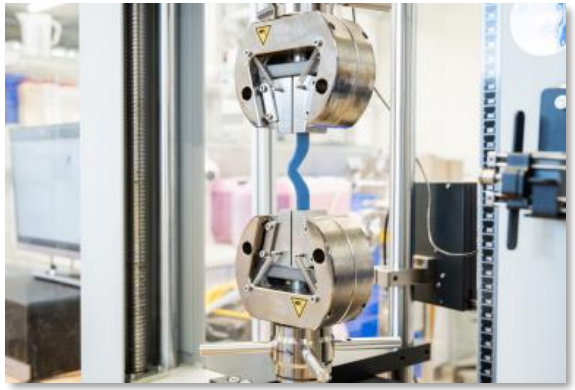
Innovations for industrial 3D printing: Manufacturer-independent and system-open Cubic Ink® UV printing materials

Formulation and Characterization of Fluids

3D-Printing



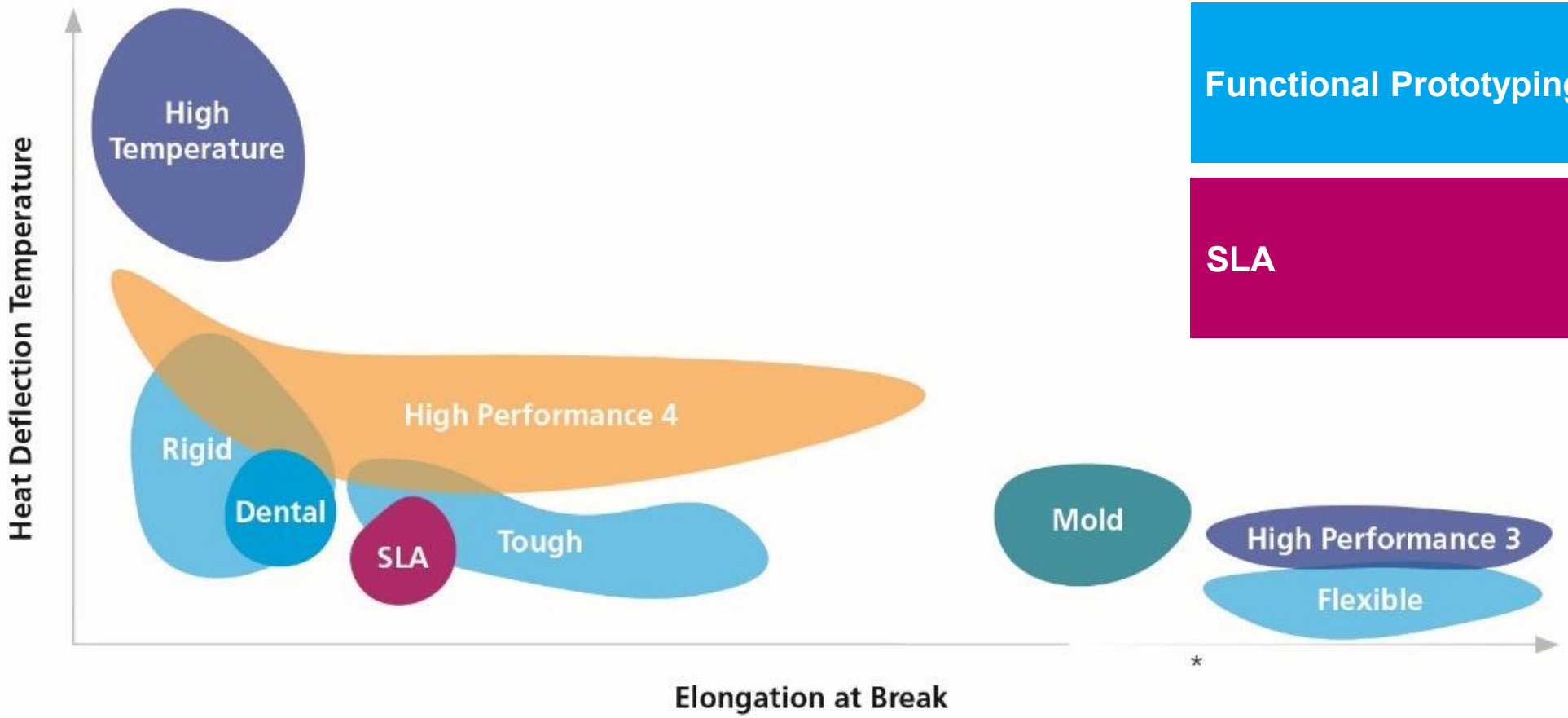
Material Characterization



Batch sizes: [kg] to [t] scale

Resin Portfolio (DLP, LCD, mSLA and SLA)

Water-breakable Tooling Equipment	High Impact & HDT
Functional Prototyping	Chemical Resistance & High Temperature
SLA	High Elasticity

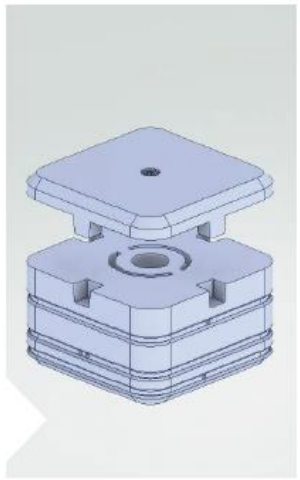


*Axis is shortened for this representation

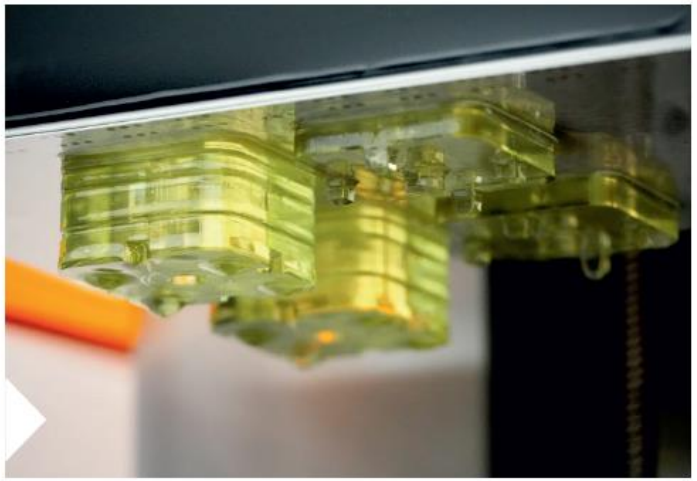
Use of 3D-Printing to prepare Mold- and Cast-Applications

Why printing a Mold (and not directly the final object)?

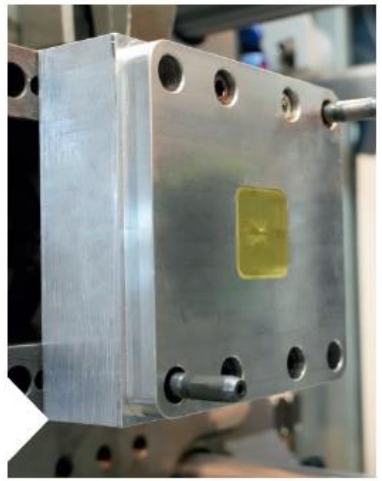
1. Production Part



2. Construction of Tool



3. 3D-Printing of Tool



4. Injection Molding

5. Finished Part

Performance

No “ABS/PP-like material”: Not every material with the desired properties is printable, general limitations of UV-cured materials

Made of the Original Material

The original thermoplast/filling material is used, critical requirement for:

- **First Prototyping**
- **Performance and Application Tests**
- **Certifications Tests**
- **Regulatory Properties and Compliances**

Process & Costs

Short Cycle Time, **very strong price and time advantage** compared to metal-shaped molds

- **Much broader prototyping feasible**
- Fast applicable changes, variations and corrections
- Fast customization

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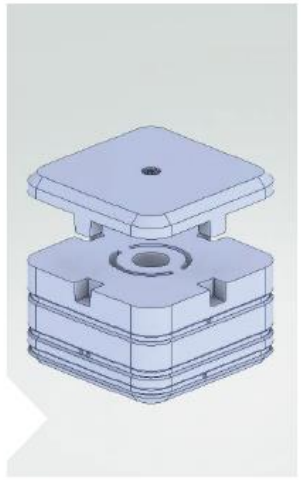

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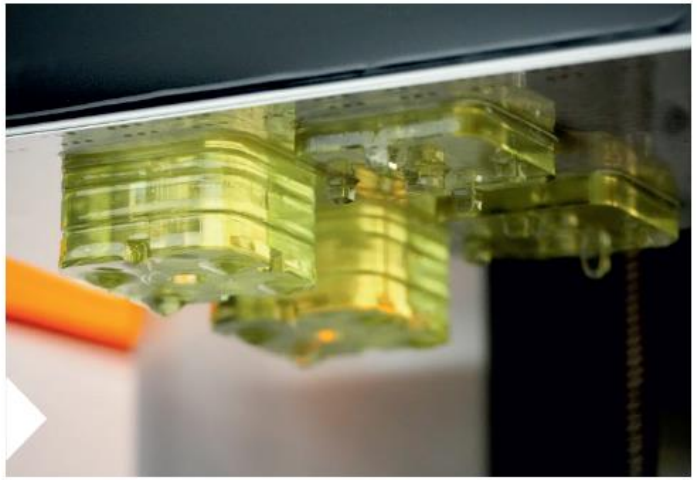

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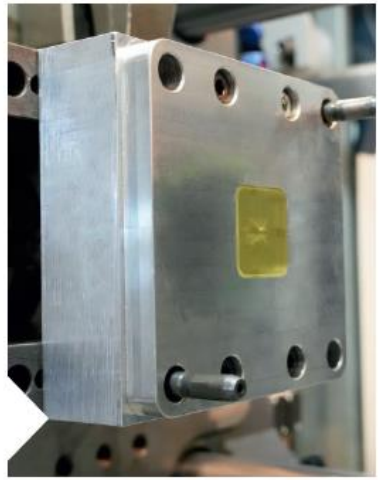

4. Injection Molding

5. Mold Removal via Water-Bath

6. Finished Part

Demolding Process

- Mold breaks away when exposed to water
- Easy and quick
- (Nearly) no manual steps
- **No damage of the material** (deformation or cracking caused by e.g. swelling)
- Allows for automatization
- User-friendly disposal

- User-friendly removal due to One-Shot Mold Technology

Water-Breakability as Key

The Cubic Ink® Mold Series
Mold Removal Process

Demolding Media vs Object Complexity

	Simple	Medium	Complex
H_2O, 23 °C			
H_2O, 50 °C			
Mold Remover 100, 23 °C			
Mold Remover 100, 50 °C			

Casting: 1 – 10 min
Injection Molding: 2 – 48 hours

Wash Water Analysis (TÜV Nord)

Chemical Oxygen Demand	**2.800 mg/L**
TOC	**730 mg/L**
Total Nitrogen bounded (TNb)	**70 mg/L**
GEi-Value (Fish)	**32**

Determined for 3 g Mold material in 100 g water.
Exposure time: 24 h

Mold Remover 100 as ready to use cleaning agent

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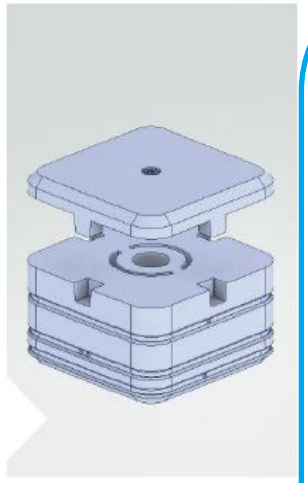

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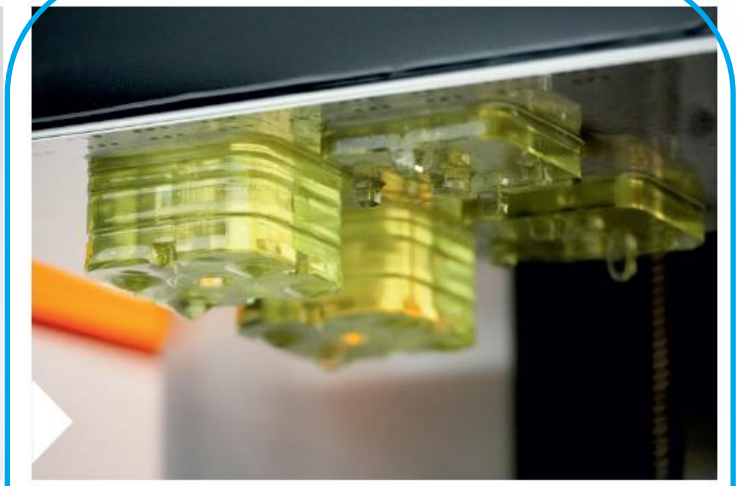
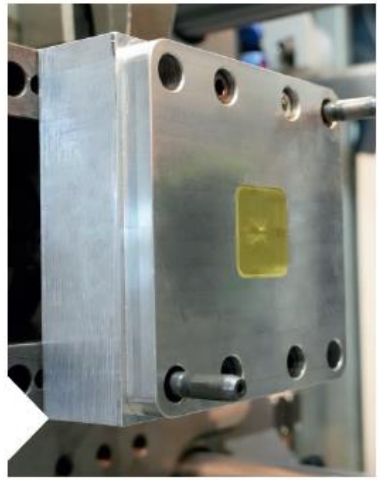


3. 3D-Printing of Tool

- User friendly design thinking due to highly versatile and complex structures

Printable on standard LCD/DLP printers with 385 or 405 nm



4. Injection Molding

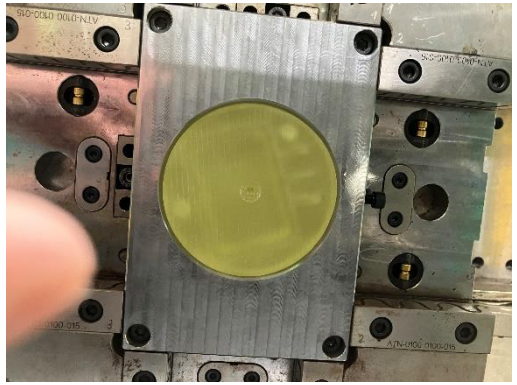
5. Mold Removal via Water-Bath

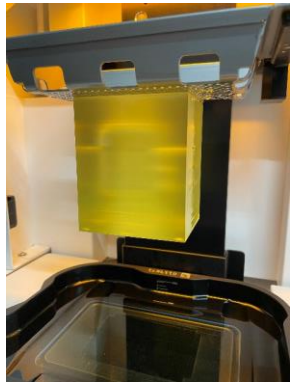
6. Finished Part

- Printability of hollow structures and thin walls
- **High accuracy in all dimensions** (after printing and injection, no “bow”)
- Easy removal of unreacted resin

- Compatible with filling material
- Compatible with the process conditions (temperature and pressure)
- Shrinkage of mold and filling material
- Different heat conductivity of a photopolymer vs metal

The Cubic Ink® Mold Series





Technical Data Mold 400 VP

Tensile Strength	**46 MPa**
Tensile Modulus	**1900 MPa**
Elongation at Break	**42%**
Shore Hardness	**80 D**
Viscosity @25 °C	**70 mPa·s**

Injection Mold Limits

Max. Temperature at nozzle	**380 °C**
Max. Injection Pressure	**1200 bar**
Min. Wall Thickness (Mold)	**200 µm**
Min. Thickness (Filling Material)	**100 µm**
Accuracy (xy/z)	**30/50 µm**

Material Compatibility

Successfully tested in various applications by customers

The compatibility between Mold and thermoplast strongly depends on the geometry

Injection Molding
Polyethylene
2-Polypropylene (with up to 36% GF)
PBT (with up to 40% GF)
Polyamide-6 (with up to 40% GF)
Polyamide-12
PVC
PEEK (up to 30% CF)
PPS (up to 80% CF)
Polycarbonate (up to 20% GF)
Compounds from recycled/renewable feedstock[1]

[1]Such as ARBOFILL®.

Casting
2K Silicones (RTV and LRS)[2]
2K Epoxides (incl. GF and other fillers)
2K Polyurethanes
2K Polyesters
Metal(-alloys) (m.p. <200 °C)

[2]Pot life up to 3.5 h. The list is continously expanded according to customer feedback. Potentially higher filling grades possible.

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Use of 3D-Printing to prepare Mold- and Cast-Applications

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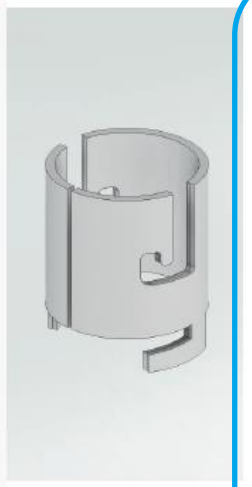

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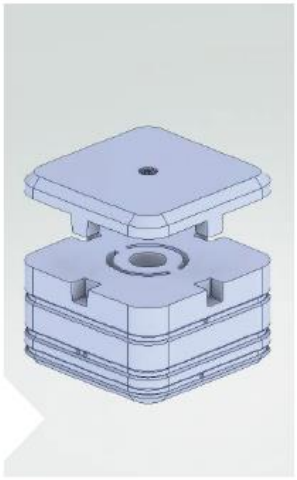
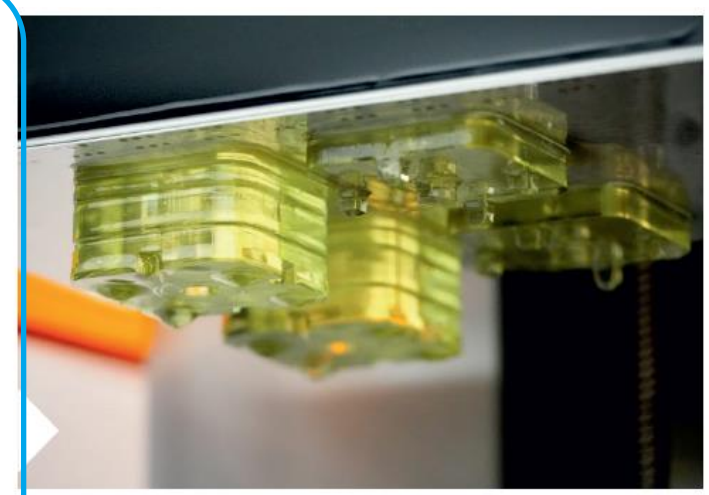


2. Construction of Tool

- ❖ Simplified Construction

Adaptivity for Mold Design



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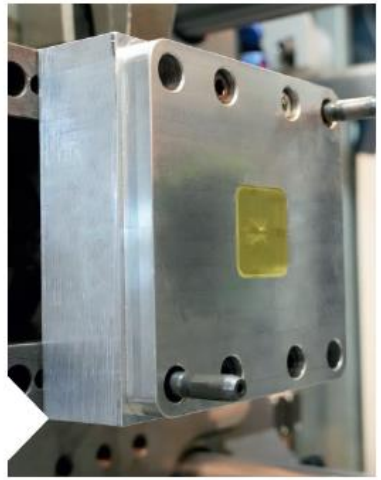


4. Injection Molding

5. Mold Removal via Water-Bath

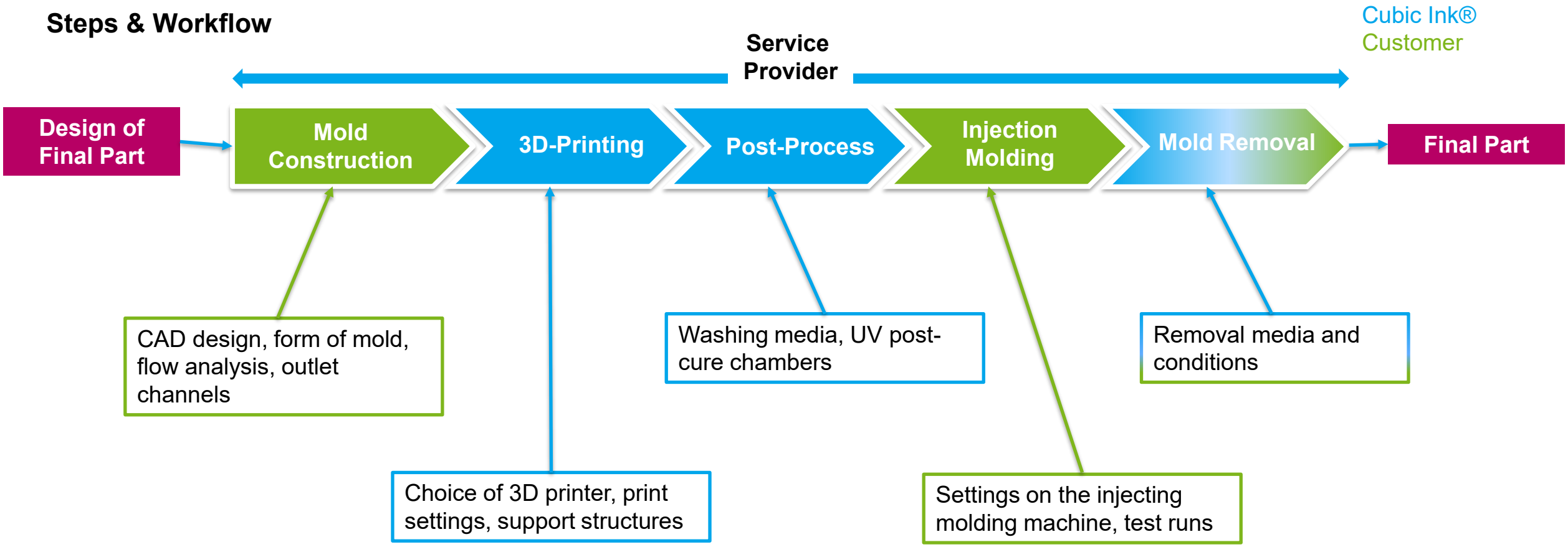
6. Finished Part

- ❖ **Undercuts are unproblematic**
- ❖ One-or two-piece mold suited for most geometries
- ❖ Channels and holes can be implemented

- ➢ Customers construction experience

Injecting Molding with Cubic Ink® Mold Series
From construction to the final part

Steps & Workflow



How can we assist you?

Full Flexibility during the whole process flow

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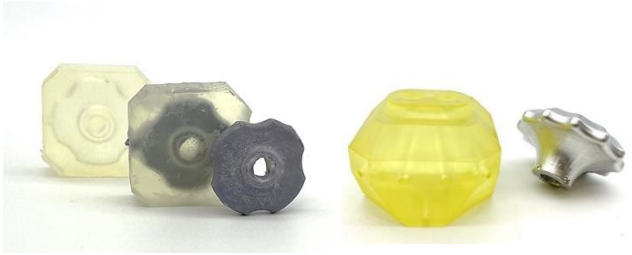
Cubic Ink® Mold Series
Summary & Outlook

Potential of Printed Molds for Industrial Applications

- **Printing the Unprintable**: Enabler for materials which (yet) cannot be prepared by AM with minimal investment costs
- **Keeping Regulations and Directives**: Re-Evaluation minimized or not necessary
- **Time- and Cost Efficiency**: Printed vs shaped molds

➢ See Harting®-Video

2K Filling Materials – Casting



- **Water-Breakable & Chemical Resistance**: Suitable for various 2K filling materials (without cast separator) and low-melting metals and allows
- **User-Friendly**: Preferred regulatory profile and uncomplicated removal of the washing water

Injection Molding

- **High-Temperature and Pressure Applications:** Resistant material designed for injection molding with thermoplastics (e.g. PA(+GF), PP, PC)
- **Object Removal:** Water-breakable material with minimal swelling
- **Flexibility:** Liquid resin, printed mold or final object

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Cubic Ink®
Key contact persons

NEED MORE INFORMATION?

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