

# Jewelry Manufacturing Solutions

Maximize Creativity, Quality, and Reliability with Digital Design and Manufacturing Workflows, Including Leading Solutions in 100% Wax 3D Printing



With over 20 years of jewelry manufacturing experience and the number one solution in 100% wax 3D printing, 3D Systems offers a competitive advantage in high-throughput and mass-custom jewelry production. Our 3D printing solutions ensure perfect quality and reduce time to market and cost, allowing innovative jewelry design and streamlining manufacturing workflows.



## Address Every Jewelry Design Challenge with 3D Printing

3D Systems manufacturing solutions provide quality, accuracy, and reliability for all jewelry styles and production challenges.

### Middle Eastern / Arabic

Deliver high-resolution for sharp, fine details in ornate designs with our 3D printing solutions for prototyping, casting, and rubber molding.



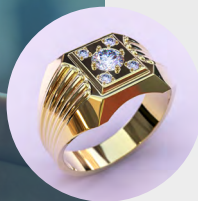
### Fusion

Direct casting from 3D printed castable plastic or 100% wax patterns enables the production of hollow, lightweight filigree and thin wire mesh shapes of complex designs.



### Pavé and Stone Setting

Accuracy and smooth surface finish allow for prototyping and stone setting validation, patterns for direct casting and rubber molding of single, multiple, and pavé stone designs, including micro-prongs.




### Western


Achieve a smooth surface finish to create prototypes and patterns for casting and rubber molding for large surface areas and heavier-weight designs.

# Key Solution Specifications

## Wax Multijet Printing for Jewelry Casting Patterns

VisiJet® Materials	Multijet Printer	<p><b>Build volume:</b> 294 x 211 x 144 mm</p> <p><b>Resolution / Vertical print speed (3 and 1 lane):</b>            UHD mode: 1200 x 1200 x 1000 DPI / 3.6 to 13.0 mm/hr            XHD mode: 1200 x 1200 x 1600 DPI / 2.3 to 8.1 mm/hr            ZHD mode: 1200 x 1200 x 3200 DPI / 1.1 to 4.0 mm/hr            QHDe mode: 2000 x 1800 x 2400 DPI / 0.7 to 1.3 mm/hr            QHD mode: 2000 x 1800 x 2900 DPI / 0.6 to 1.1 mm/hr</p>	<p><b>Layer thickness:</b> 8 to 25 µm</p> <p><b>Typical accuracy:</b> ±0.0508 mm / 25.4 mm of part dimension</p> <p><b>Supports type:</b> Dissolvable</p> <p><b>Printer weight/size:</b> 211 kg, 1120 x 740 x 1070 mm</p>	
	MJP 300W	<p><b>Description:</b> 100% wax</p> <p><b>Color:</b> Deep purple / Brilliant red / Dark red</p> <p><b>Melting point:</b> 61-66°C / 62-63°C / 61-63°C</p> <p><b>Softening point:</b> 40-48°C / 43-47°C / 45-47°C</p> <p><b>Volumetric shrinkage:</b> 1.6% / 1.7% / 1.5% (from 40°C to 23°C)</p>	<p><b>Linear shrinkage:</b> 0.52% / 0.58% / 0.50% (from 40°C to 23°C)</p> <p><b>Needle penetration hardness:</b> 12 / 14 / 12 (ASTM D1321)</p> <p><b>Ash content:</b> 0.05% / 0.00% / 0.00% (ASTM D5630-13A)</p>	

## Resin Multijet Printing for Jewelry Casting Patterns

VisiJet® Material	Multijet Printer	<p><b>Build volume:</b> 294 x 211 x 144 mm</p> <p><b>Resolution:</b> 1600 x 900 x 1600 DPI (XHD mode)</p> <p><b>Vertical print speed (3 and 1 lane):</b> 1.8 to 6.2 mm/hr (XHD mode)</p> <p><b>Layer thickness:</b> 16 µm</p>	<p><b>Typical accuracy:</b> ±0.0508 mm / 25.4 mm of part dimension</p> <p><b>Supports type:</b> Melttable</p> <p><b>Printer weight/size:</b> 211 kg, 1120 x 740 x 1070 mm</p>	
	ProJet® MJP 2500 Plus	<p><b>Description:</b> Castable resin</p> <p><b>Tensile strength:</b> 29 MPa (ASTM D638)</p> <p><b>Tensile modulus:</b> 1300 MPa (ASTM D638)</p> <p><b>Elongation at break:</b> 12.9% (ASTM D638)</p>	<p><b>Coefficient of thermal expansion:</b> 105 µm/°C (-25 to 40°C), 175 µm/°C (75 to 100°C)</p> <p><b>Water absorption:</b> 0.64% (ASTM D570)</p> <p><b>Ash content:</b> 0.026% (ASTM D5630)</p>	

## Figure 4 for Jewelry Casting Patterns, Master Patterns for Mold Making, and Prototyping

Figure 4®	Standalone Printer	<p><b>Build volume:</b> 124.8 x 70.2 x 196 mm</p> <p><b>Resolution:</b> 1920 x 1080 pixel</p> <p><b>Pixel pitch:</b> 65 µ (390.8 effective PPI)</p>	<p><b>Layer thickness:</b> 10 µm - 50 µm</p> <p><b>Supports type:</b> Fine tips MicroPoint™ support structures</p> <p><b>Printer weight/size:</b> 34.5 kg (76 lbs), 426 x 489 x 971 mm</p>	
	JCAST-GRN 20	<p><b>Description:</b> Castable resin</p> <p><b>Vertical print speed:</b> 15 mm/hr at 30 µm</p> <p><b>Tensile strength:</b> 9 MPa (ASTM D638)</p> <p><b>Tensile modulus:</b> 300 MPa (ASTM D638)</p>	<p><b>Elongation at break:</b> 15% (ASTM D638)</p> <p><b>Coefficient of thermal expansion:</b> 122 ppm/°C (-20 to 70°C)</p> <p><b>Water absorption:</b> 1.06% (ASTM D570)</p> <p><b>Ash content:</b> 0.16%</p>	
	JEWEL MASTER GRV	<p><b>Description:</b> Resin for prototypes and master patterns</p> <p><b>Vertical print speed:</b> 15 mm/hr (Master Pattern Mode); 45 mm/hr (Prototype Mode)</p> <p><b>Tensile strength:</b> 67 MPa (ASTM D638)</p> <p><b>Tensile modulus:</b> 3500 MPa (ASTM D638)</p>	<p><b>Elongation at break:</b> 2.5% (ASTM D638)</p> <p><b>Heat deflection temperature:</b> &gt;300°C at 0.455 MPa (ASTM D648)</p> <p><b>Coefficient of thermal expansion:</b> 80 ppm/°C (0-30°C); 146 ppm/°C (45-130°C)</p> <p><b>Biocompatible capable</b></p>	

Note: Not all products and materials are available in all countries – please consult your local sales representative for availability



# Models and Prototypes

## Quick-Turnaround Jewelry Prototypes Bring Designs to Life Faster



High Contrast Visualization



Try-Ons



Stone Setting

Reveal your creativity with accurate, finely detailed, high-fidelity prototypes. 3D Systems' Figure 4 jewelry solution provides a quick turnaround from designs to 3D printed models, for design iteration, validation, stone settings, and try-ons.

Explore more creations by producing fast, high quality 3D-printed prototypes.

- Faster design iteration and validation
- Increased customer confidence with quality models for try-ons
- Accurate reproductions with unlimited design freedom

### Figure 4 3D Printing Solution for Models and Prototypes

**30 prototypes in 39 minutes**

- Detailed, accurate, high-fidelity representations of digital creations with our proprietary build style, which can be painted or plated
- 3D print prototypes in minutes with 45 mm/hr build speed at 50 µm layer thickness
- Easy to remove MicroPoint™ ultra-fine tip support structures limit contacts for a smooth surface finish with minimized post-processing
- Snap-fit capability enables stone settings testing, including micro-pavé
- Safe for extended try-on testing and user fittings with biocompatibility for cytotoxicity





# Bring Digital Agility into Your Jewelry Manufacturing Workflows

## Unlimited Design Freedom

Elevate design complexity with dissolvable and meltable supports enabling limitless geometries with no impact to surface finish for reliability and creativity.

## Consistent Quality

Quality printed parts ensure fine details, accuracy, high fidelity, smooth surfaces, and repeatability for consistent results through your manufacturing workflow.

## Superior Materials Performance

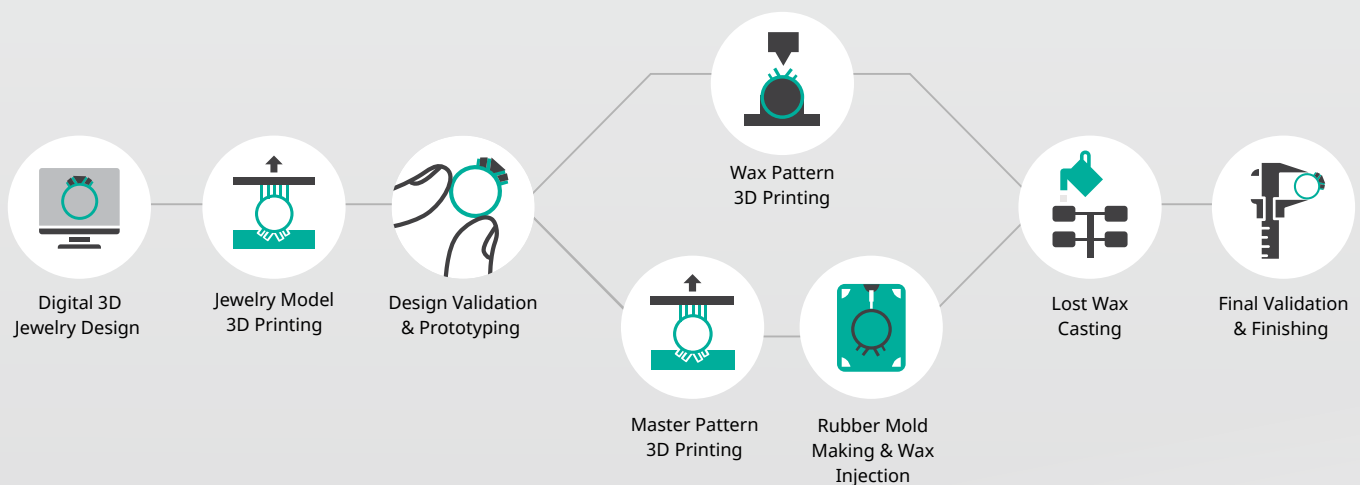
We offer 100% wax and castable plastics for lost wax casting, heat-resistant rigid plastic for master patterns, and high-contrast material for prototyping.

## Increased Manufacturing Scalability

From fast turnaround prototypes and mass custom manufacturing, to high-throughput production, gain unprecedented levels of agility with ease-of-use and quality at any scale.

## Proven System Reliability

Our reliable, industrial, end-to-end 3D printing solutions provide consistent uptime, low operating costs, and improved efficiency.



# Patterns for Lost Wax Casting

## Uncompromised Castability and Design Freedom at High Throughput



Design Freedom



100% Wax Castability



Efficiency of Ease-of-Use

Achieve high productivity and quality, and unleash creativity with 3D Systems' jewelry solutions. Our 3D printed casting patterns fit standard processes for reliable output while enabling maximum design freedom for high-volume and mass custom jewelry manufacturing.

### MJP Wax and Castable Resin 3D Printing

9,000+ ring wax patterns per month/printer

- 100% wax for uncompromised castability with standard casting processes
- Castable resin with clean burnout for extremely small and delicate feature details
- Quick turnaround and high throughput at factory scale
- Superior resolution and dissolvable/melttable supports allow reduced finishing labor and polishing of costly precious metals, and ultimate design freedom

### Figure 4 3D Printing

15 ring patterns in 2 hr 03 min

- Figure 4 JCAST-GRN 20 castable resin was specifically developed for easy jewelry casting with minimal ash and residue after burnout
- Ultra-fast turnaround – 15 mm/hr vertical build speed
- MicroPoint™ ultra-fine tip supports enable smooth surface finish, reduced post-processing labor, and accelerated production by minimizing polishing





# Master Patterns for Mold Making

## Reduce Labor, Increase Speed and Design Freedom



Heat Deflection  
Temperature  $>300^{\circ}\text{C}$



No Inhibition



Fine Details,  
Down to 0.2 mm

3D Systems provides compatibility with jewelry mold-making processes for high-volume manufacturing with ultra-high-detail, heat-resistant, high-quality, complex master patterns to create your rubber mold in a matter of hours.

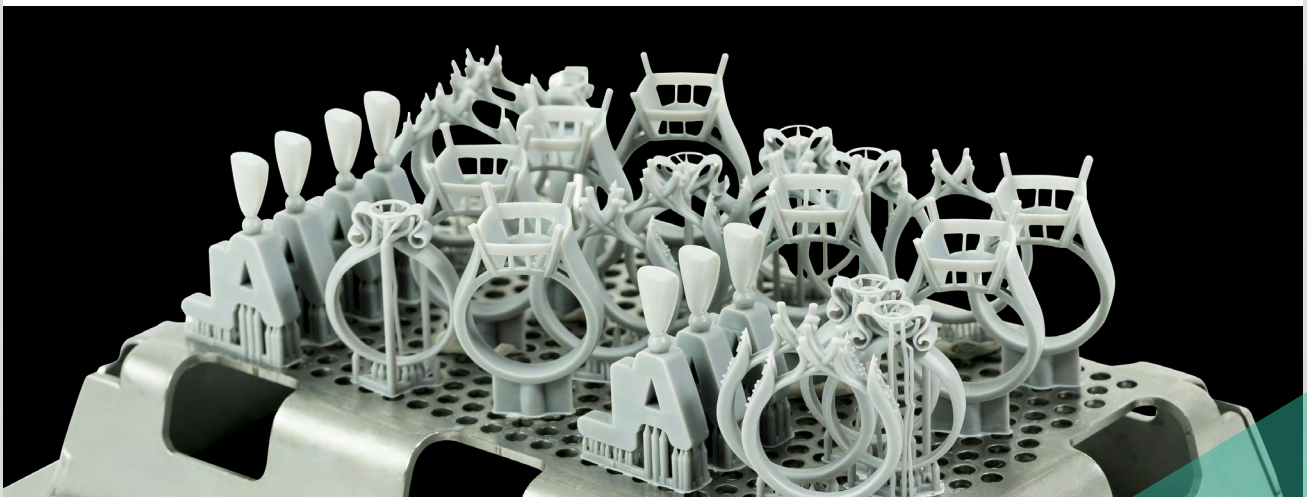
Our Figure 4 3D printing technology, material, and software solution for jewelry is a fast alternative to labor-intensive, design-limiting, multi-step processes.

- Fast pattern production enables design-to-rubber-mold in hours
- Reduce labor with accurate master patterns and superior surface finish
- Increase design freedom with thin, delicate geometries, fine mesh, and more

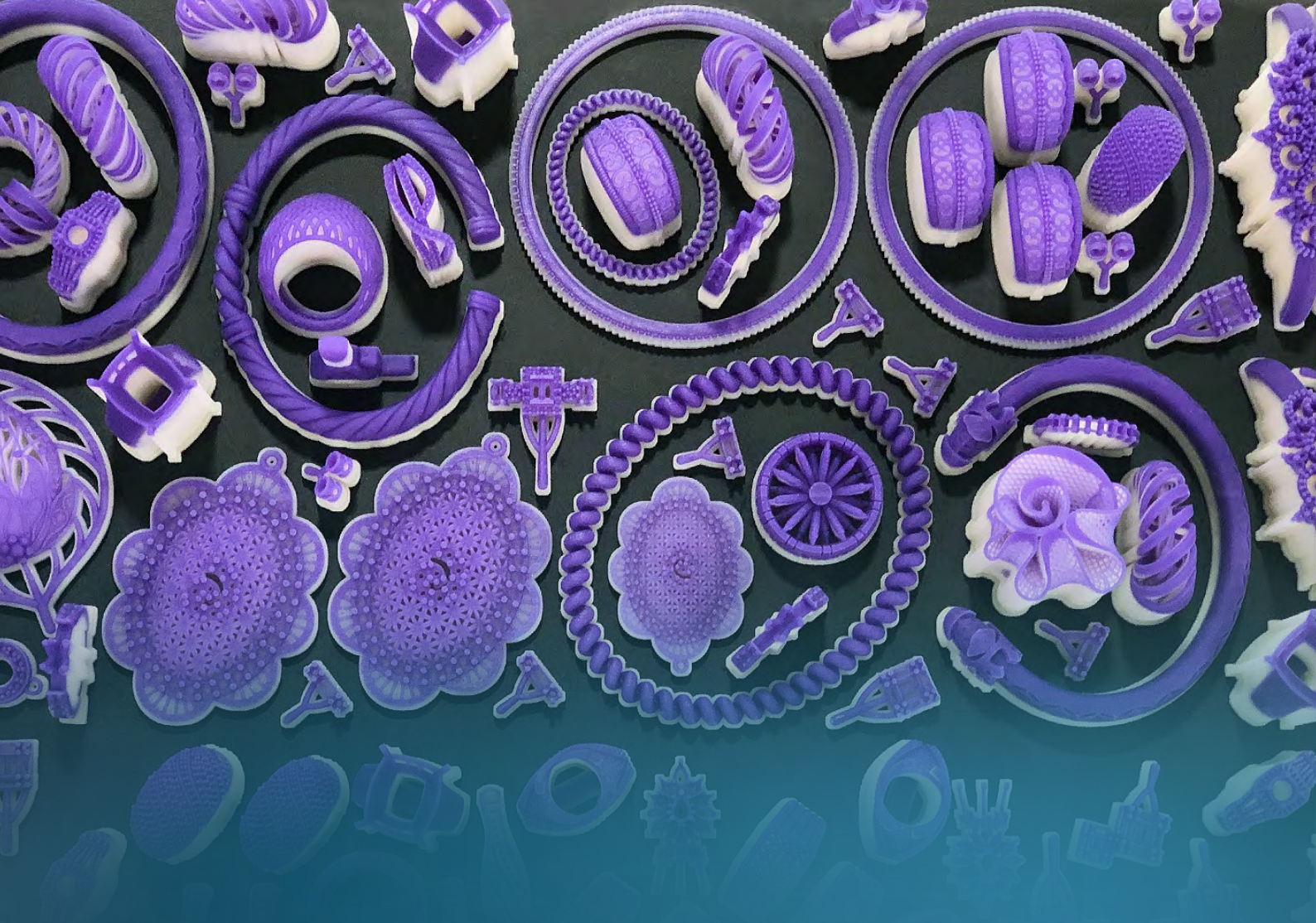
## Figure 4 3D Printing Solution for Master Patterns

**30 master patterns in 2 hr 02 min**

- Ultra-high detail resolution with our proprietary build style
- 15 mm/hr build speed at 30  $\mu\text{m}$  layer thickness
- Easy to remove MicroPoint™ ultra-fine tip support structures limit contacts for a smooth surface finish with minimized post-processing
- High heat deflection temperature (over  $300^{\circ}\text{C}$ ) of Figure 4 JEWEL MASTER GRY material is compatible with various silicone types and vulcanization temperatures without inhibition
- High material rigidity for prevention of pattern distortion







# Bring Digital Agility into Your Standard Jewelry Manufacturing Workflows

Learn more: [www.3dsystems.com/jewelry](http://www.3dsystems.com/jewelry)