

Inkjet Castable Photopolymers and Waxes for Investment-Casting Patterns

Printer, pattern, investment, burnout and alloy validation with measurable casting acceptance criteria

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Highlights

- IJ Perfect Cast, Red Flexible Wax and Cyan Rigid Wax are candidate pattern routes subject to current product data.
- Jetting viscosity and temperature claims require method and printer-configuration traceability.
- Burnout profiles are established for pattern mass, investment/shell and furnace rather than treated as universal.
- Alloy and application preferences require comparative casting data or are labelled candidate uses.
- Casting-ready is defined by ash/residue, shell integrity, surface and dimensional acceptance.

Abstract

Inkjet photopolymer and wax patterns support investment-casting and sacrificial-mandrel workflows when the printer, pattern material, geometry, investment/shell, removal cycle and alloy are validated together.

Quantitative jetting, burnout and composition claims are retained only with current TDS/IFU or controlled reports. A grade is described as a candidate rather than preferred unless comparative evidence exists.

The pattern is a fabrication element and does not confer regulatory status on the final cast article. Casting acceptance is defined through measurable residue, shell, surface, dimensional and metallurgical criteria.

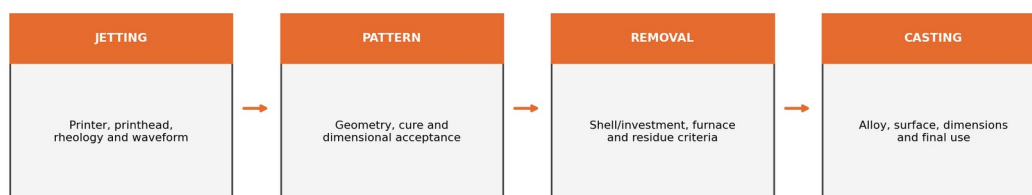
Keywords inkjet castable · investment casting · wax pattern · burnout · shell · sacrificial mandrel

Source use. Product evidence is controlled in [1]; casting and inkjet context in [2,4]; AM terminology and related workflow controls in [3,5–6].

1. Jetting and pattern control

The record identifies printer model, printhead, jetting temperature, viscosity method, waveform, cure, geometry, supports and pattern conditioning.

- Confirm exact product composition statements from SDS/TDS.
- Use photoaccelerant for Fine Tuner additives where applicable.
- Challenge thick and enclosed geometries.



Release requires traceable evidence at every gate; a catalogue label cannot bypass the chain.

Figure 1. WP-30 evidence gates from controlled material description to final acceptance.

2. Investment and burnout validation

The casting facility establishes the schedule for pattern mass, investment or shell system, furnace, atmosphere and ventilation. Generic gypsum, phosphate, ethyl-silicate or zircon mappings are candidate starting points only.

- Measure ash/residue and shell integrity.
- Control ramp, hold and cooling conditions.
- Record dimensional and surface results.

3. Alloy and final-article boundary

Titanium, stainless steel and other alloys remain facility- and process-specific candidates. The final article requires metallurgical, dimensional and application acceptance independent of the sacrificial pattern material.

4. Minimum controlled evidence before release

Control field	Required record	Release interpretation
Jetting	Printer, printhead, rheology and waveform	Catalogue description only until evidence is linked
Pattern	Geometry, cure and dimensional acceptance	Control process variables and change triggers
Removal	Shell/investment, furnace and residue criteria	Report method, result, uncertainty and limits
Casting	Alloy, surface, dimensions and final use	Apply final acceptance and responsibility boundary

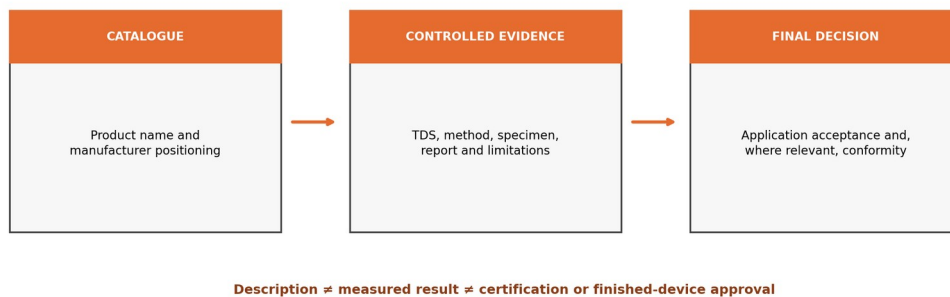


Figure 2. WP-30 separates catalogue positioning, measured evidence and final application decisions.

KEY INSIGHT

Precise product or application language is retained only when the exact formulation, method, processed specimen and controlled evidence can be traced.

5. Limitations

- No universal jetting viscosity or burnout profile is retained.
- Preferred requires comparative evidence.
- Casting-ready requires defined acceptance criteria.
- Alloy compatibility is facility- and process-specific.
- Patterns do not confer regulatory status on cast parts.

6. Conclusions

- IJ Perfect Cast, Red Flexible Wax and Cyan Rigid Wax are candidate pattern routes subject to current product data.
- Jetting viscosity and temperature claims require method and printer-configuration traceability.
- Casting-ready is defined by ash/residue, shell integrity, surface and dimensional acceptance.
- This corrected candidate remains local and on HOLD until series-wide scientific, metadata and visual release checks are complete.

Revision note

Version 5.3 converts unverified preferences and quantitative jetting/burnout claims into controlled evidence requirements, defines casting-ready acceptance and preserves the fabrication-element regulatory boundary.

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Disclosure. Dr. Juan Segurola is founder and Scientific Director of 3Dresyns by Resyner Technologies S.L., the supplier of the materials discussed.

References

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- [5] 3Dresyns WP-11. Perfect Cast Portfolio for SLA, DLP and LCD Investment-Casting Workflows, corrected local candidate.
- [6] 3Dresyns WP-06. Post-Processing Control for VPP Printed Parts, corrected local candidate.