



Validation Tooling: Reducing Risk Before Production Begins

How engineering validation protects production tooling investments, accelerates product launches, and reduces manufacturing surprises.

Executive Summary

Every production tool represents a significant commitment—not only financially, but in time, resources, and schedule. Once steel is cut, design changes become increasingly expensive, lead times grow longer, and every modification has the potential to delay product launches. Validation tooling exists to answer the critical questions before those commitments are made.

Successful organizations recognize validation tooling as an investment in confidence. By evaluating manufacturability, material performance, assembly, and functional requirements early in development, teams can identify issues while they remain relatively inexpensive to correct.

Validation tooling plays a critical role in reducing risk, improving decision-making, and helping organizations move from concept to production with greater confidence.

Executive Perspective

Proper validation tooling addresses real-world manufacturing challenges and constraints. Through thoughtful engineering and informed decision-making, Catalyst helps clients reduce risk, avoid costly revisions, and move to production with confidence.

—Jack Lawson, Catalyst President/CEO

1. The Cost of Getting it Wrong

Modern product development moves quickly, but production tooling is still one of the largest commitments made during the development process.

Once production tooling begins, even seemingly minor design changes can affect:

- tooling complexity
- production schedules
- production costs
- assembly process
- product quality
- launch timing

Validation tooling provides an opportunity to answer important engineering questions before those costs become embedded in production. Will the part fill completely? Is the venting sufficient? Are we seeing material flash? Does this design eject properly?

Rather than asking whether a design can simply be manufactured, validation tooling helps determine whether it should be manufactured exactly as currently designed.

2. What Validation Tooling Really Validates

Validation tooling is often misunderstood as “prototype tooling.”

While prototype tooling focuses primarily on producing sample parts, validation tooling is intended to generate knowledge.

Typical validation objectives include:

- verifying manufacturability
- evaluating resin behaviour
- confirming dimensional stability
- identifying cosmetic concerns
- validating assembly methods
- supporting functional testing
- gathering production data
- reducing uncertainty before production

Every successful validation program reduces assumptions and replaces them with measurable information.

Operations Perspective

The earlier uncertainty is eliminated, the more predictable the outcome. Validation tooling provides the knowledge needed to make better decisions before they become costly commitments, reducing rework, delays and ultimately unnecessary costs.

–Jason Andrews, Catalyst Managing Executive.

3. Where Problems Are Best Discovered

Every new product design eventually reveals its weaknesses; the only question is **when**. Discovering an issue during concept development may require only a design revision. Discovering the same issue after production tooling has been completed may require tool modifications, production delays, additional testing, and increased project cost.

Validation tooling shifts problem discovery earlier in the development cycle, where corrective actions are typically faster, less disruptive, and less expensive.

Typical validation objectives include:

- draft angle optimization
- gate location refinement
- wall thickness improvements
- assembly fit verification
- cosmetic enhancements
- material selection changes

4. Production Intent Matters

Not all prototype tools are created with production in mind. Effective validation tooling is designed to gather information that closely reflects future production conditions.

Typical validation objectives include:

- production-intent gating
- realistic processing conditions
- material performance
- cycle-time evaluation
- dimensional repeatability
- assembly verification

The objective is not simply to mold parts. The objective is to understand how those parts will behave in production.

Technical Perspective

Catalyst designs production-intent validation tooling that balances performance, speed, and cost. By optimizing tool design for manufacturability, cycle performance, and rapid execution, we deliver cost-effective solutions that are built for production from the outset.

–Ian Papineau, Catalyst VP of Operations

5. Quality is Designed Into the Process

Quality does not begin with inspection of molded parts; it begins during the early stages of product development. Every decision regarding geometry, tooling strategy, molding parameters, and validation influences long-term product quality.

A well-executed validation program helps establish confidence that production tooling will consistently produce parts meeting engineering requirements. This reduces variability while improving overall manufacturing readiness.

Quality Perspective

Validation transforms engineering assumptions into measurable manufacturing confidence. By proving process capability and repeatable performance, Catalyst reduces production risk while providing customers with documented assurance that quality objectives can be consistently achieved.

– Wayne Loynes, Director of QA / Advanced Manufacturing

6. The Bridge Between Prototype and Production

Many organizations are capable of creating product concepts and are equally capable of running full production. Between those two milestones lies an often-overlooked phase where engineering knowledge is converted into manufacturing confidence. This is where validation tooling provides its greatest value.

Rather than treating product development as a sequence of disconnected activities, validation tooling creates continuity between design, engineering, tooling, molding, testing, and manufacturing. The result is a smoother transition into production with fewer surprises and greater confidence.

Many organizations only require annual production runs of hundreds or a few thousand parts. In this case, Catalyst tooling is sufficient to satisfy the full production needs while reserving the ability to make ECN's to an existing mold.

7. When Does Validation Tooling Make Sense?

Validation tooling may be especially valuable when projects involve:

- significant production tooling investment
- complex molded geometries
- new resin selection
- demanding cosmetic requirements
- critical assembly interfaces
- regulatory testing
- aggressive launch schedules
- low tolerance for manufacturing risk

While validation tooling is not necessary for every project, the value comes from understanding where the investment outweighs the potential cost of late-stage design changes.

Beyond the Tool

Validation tooling is a structured opportunity to replace assumptions with evidence and transform uncertainty into confidence. It often serves to discover unforeseen problems while solutions remain practical.

At Catalyst, validation tooling is part of an integrated product development process that combines design, engineering, tooling, molding, quality, and manufacturing expertise to help clients make informed decisions before committing to production.

Products succeed not because every decision is perfect from the beginning, but because the right questions are asked before the wrong assumptions become expensive realities.

That philosophy has guided Catalyst's approach to product development for more than 26 years—and it continues to bridge the gap between promising concepts and successful production.