CATALYST PRODUCTION-READINESS GUIDE

CAD COMPLETE. PRODUCTION AHEAD.

The gap between design intent and manufacturing reality.

CATALYST

DESIGN-COMPLETE IS NOT

PRODUCTION-READY.

A design can be complete in CAD and still not be ready for quoting, tooling, and production. That gap can become an expensive mistake.

A CAD model can look complete and function as intended while still containing features that create tooling complexity, quality issues, cost, or launch delays.

THE FOUR AREAS THAT MATTER

PART GEOMETRY

Will the part fill, cool, eject, and perform as intended?

TOOLING STRATEGY

Can the part be molded without unnecessary complexity?

MATERIAL BEHAVIOR

Does the selected material support the geometry, environment, appearance, and performance requirements?

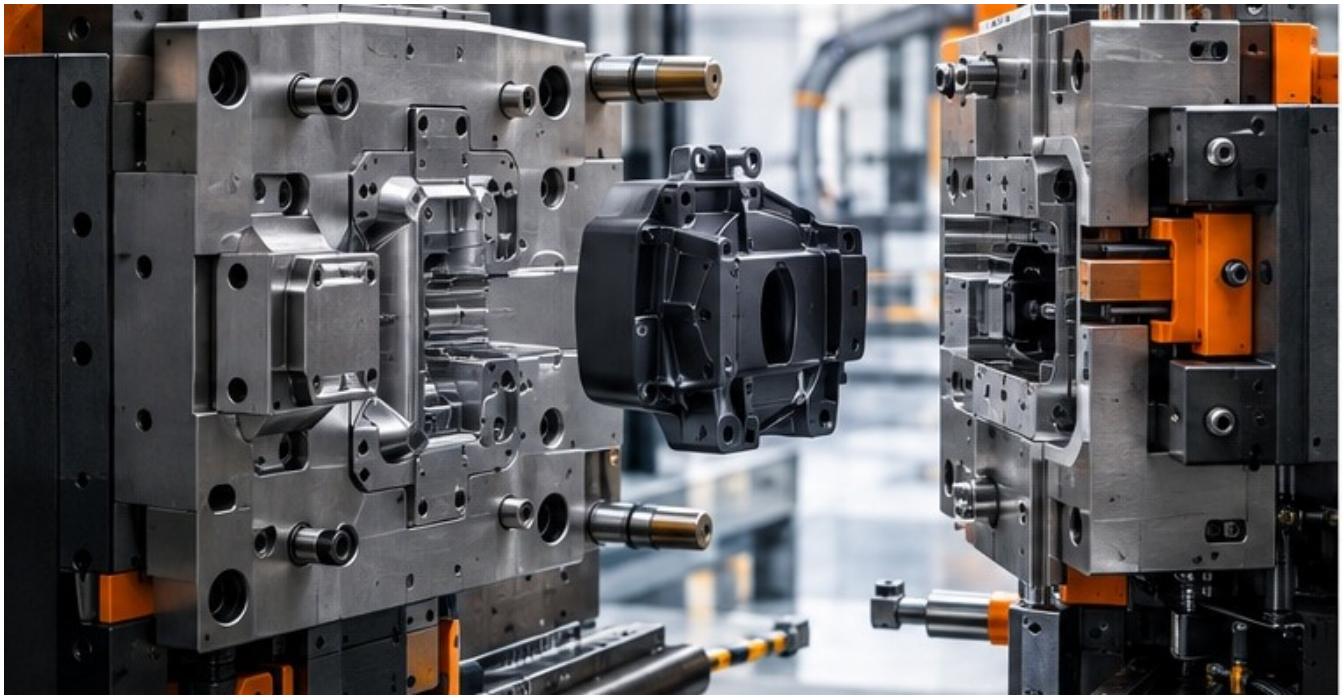
ASSEMBLY & PRODUCTION

Will components locate, retain, assemble, and scale efficiently?

>

A BETTER DEFINITION OF DONE

A product is closer to production-ready when design intent, molded geometry, material strategy, tooling approach, assembly, cosmetics, quality, and production assumptions are aligned.



WHERE PROBLEMS HIDE

THE DETAILS THAT CAD ALONE DOESN'T ALWAYS REVEAL.

A digital model does not reveal every challenge that may appear during tooling, molding, or assembly. A Production-Readiness Review helps identify them early.

01 PART GEOMETRY

SMALL DETAILS. BIG IMPACT.

Draft & Release

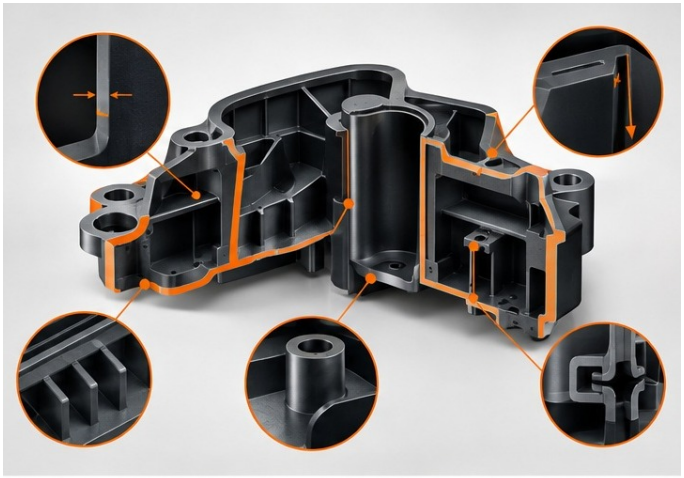
Features must be evaluated for how the part will separate from the mold. Draft requirements can vary depending on geometry, material, surface finish, texture, and tooling strategy.

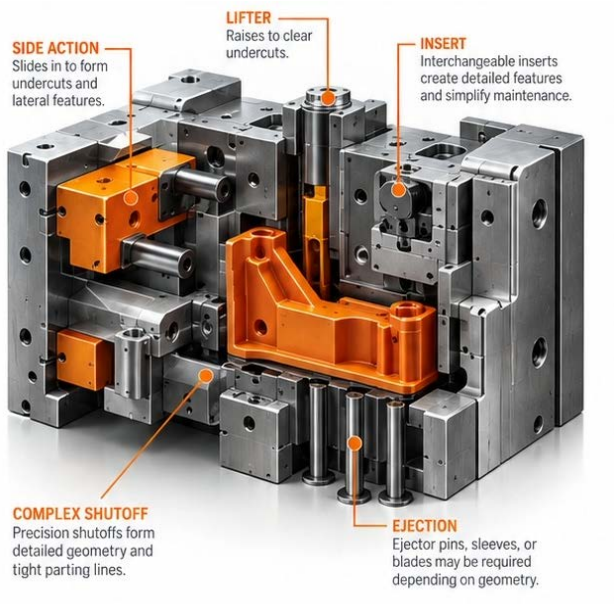
Wall Thickness

Wall sections should be evaluated for consistency and appropriate thickness relative to the selected material and part requirements. Large variations can contribute to differential cooling, sink, warpage, voids, and unnecessary cycle time.

Ribs, Bosses & Structural Features

Structural features can create cosmetic or processing challenges when they concentrate mass. Proper geometry can add stiffness without unnecessary thickness.





02 TOOLING COMPLEXITY

WHAT LOOKS SIMPLE MAY NOT BE.

Some features that appear simple in CAD may require additional tooling considerations. These can include:

- **Undercuts**
- **Side actions or lifters**
- **Inserts**
- **Complex shutoffs**
- **Difficult parting lines**
- **Special ejection requirements**
- **Secondary operations**

> **The goal is to understand whether the complexity adds enough value to justify its cost.**

MATERIALS AND PRODUCTION IMPACT

SMALL DESIGN DECISIONS CAN CREATE LARGE CONSEQUENCES.

The earlier a manufacturing challenge is identified, the more options are typically available to address it. Changes discovered after tooling begins are more expensive, can delay launch, and may affect every part produced.

EARLY DISCOVERY — LATE DISCOVERY

CAD CHANGE
Design is updated before tooling.

TOOLING CHANGE
May require steel modification.

FIRST SHOT
Can affect timing and validation.

PRODUCTION
Impacts cost, schedule, and supply commitments.

THE IMPACT GOES BEYOND TOOLING COST.

MATERIAL USE
Excess mass increases resin use. Material shrink affects dimensions, fit, and warpage.

CYCLE TIME
Geometry affects molding efficiency and cycle time.

LABOR & ASSEMBLY
Additional operations increase per-unit cost.

TOOL RELIABILITY
Complex features can increase maintenance.

LAUNCH RISK
Late changes can disrupt schedules and commitments.

PRODUCTION DECISIONS

DESIGN DECISIONS DON'T HAPPEN IN ISOLATION.

A decision made to solve one requirement can create consequences elsewhere in the production process. Part geometry, material behavior, tooling strategy, molding conditions, assembly, and quality are interconnected.

GEOMETRY | MATERIAL | TOOLING | PROCESS | ASSEMBLY | QUALITY

FOR EXAMPLE:

Increasing wall thickness may add stiffness, but it can also increase material use and cooling time while introducing greater potential for sink, shrink variation, or warpage.

> **THE EARLIER THESE RELATIONSHIPS ARE UNDERSTOOD, THE MORE OPTIONS THE TEAM HAS.**

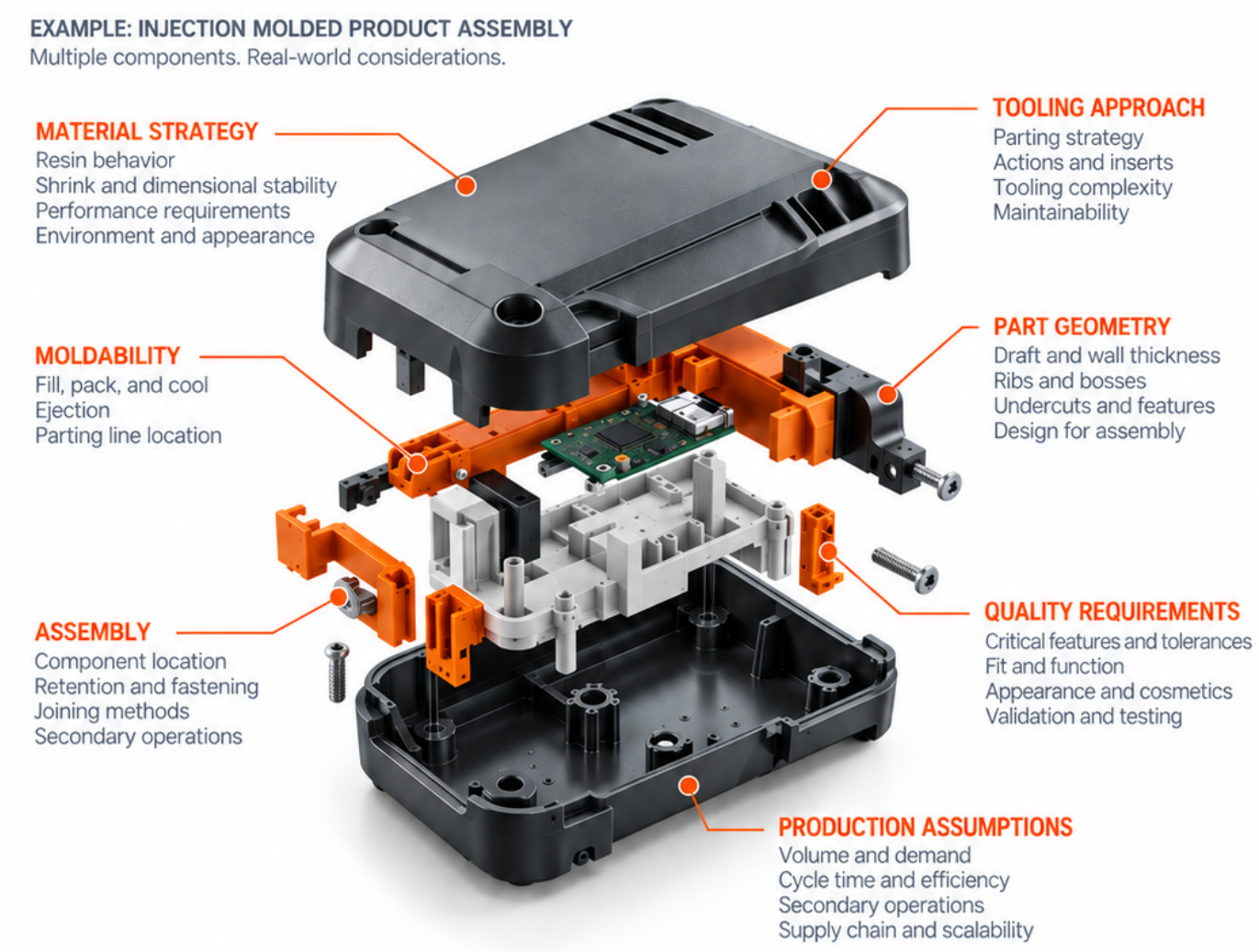
WHAT CATALYST REVIEWS

BEFORE TOOLING RELEASE, WE LOOK BEYOND THE CAD.

A production-readiness review evaluates key design, material, tooling, and production considerations to identify potential challenges, reduce risk, and help ensure a smoother transition to production.

03 PRODUCTION-READINESS REVIEW

A HOLISTIC LOOK AT WHAT IT TAKES TO MAKE IT REAL.



>

IDENTIFY QUESTIONS EARLY.
REDUCE SURPRISES LATER.

A production-readiness review evaluates these considerations together, based on the specific requirements of your product and manufacturing process.

WHY CATALYST

A MORE COMPLETE PATH TO PRODUCTION.

Catalyst bridges product intent and production reality by bringing tooling, molding, materials, assembly, and manufacturing considerations into the conversation early.

START WITH A PRODUCTION-READINESS REVIEW.

If your CAD is complete - or nearly complete - this may be the right time to ask the next question:

IS YOUR PRODUCT READY FOR WHAT COMES NEXT?

BRING US THE DESIGN.

WE'LL HELP YOU PREPARE IT FOR PRODUCTION.

Catalyst can review CAD, drawings, material assumptions, finish requirements, production volumes, quality requirements, and assembly needs before tooling decisions are finalized.

CATALYSTPDG.COM

CATALYST

Technical visuals are illustrative. Project-specific recommendations require review of final CAD, drawings, selected materials, finish, volume, quality requirements, and assembly expectations.