

7 Critical Tooling Challenges Injection Molders Face



A practical guide for engineers who want longer-lasting molds, fewer maintenance headaches, and consistent part quality.

(734) 459-8022
dynablue.com



INTRODUCTION

The Hidden Cost of Tool Wear

Every mold tells a story. Each cycle, each shot, wear mechanisms— over time, friction, heat, and chemical attack quietly eat away at performance. Most molders accept this as “normal wear.” But what if it wasn’t inevitable?

Tool wear costs manufacturers far more than steel and labor. It shows up in unexpected ways: rising scrap rates, dimensional drift, slower cycles, and mounting downtime. In competitive manufacturing environments, even a 1% drop in uptime can mean thousands in lost revenue every week.

The DYNA-BLUE & DYNA-BRTIE processes are proprietary wear-resistant coating systems engineered to combat those invisible costs. In this guide, we’ll outline the seven most common tooling challenges faced by injection molders — and show how Dynamic's technology addresses each one.



**ENGINEERS
KNOW: SMALL
CHANGES
IN SURFACE
PERFORMANCE
CAN DRIVE
MASSIVE GAINS IN
PRODUCTIVITY.**

CHALLENGE #1:

Abrasive Wear from Filled Resins

Hard materials are eating your tools alive.



Glass-filled, carbon-filled, and mineral-filled resins 70%+ offer strength — but at a cost. Those microscopic hard particles act like sandpaper on tool steel, eroding precision surfaces and rounding critical edges. Once the wear pattern begins, it accelerates with every shot.

- Diminished surface finish → visible part flaws
- Increased venting issues and flash
- Shortened tool life and higher maintenance frequency

**RESULT:
CONSISTENT
SURFACE FINISH,
REDUCED WEAR
DOWNTIME,
AND LONGER
MOLD LIFE.**

HOW THE DYNA-BLUE & DYNA-BRITE PROCESS SOLVES IT:

Our proprietary surface treatments create a dense, ultra-hard 75+ HRC surface that resists abrasion up to **ten times longer** than untreated steel. It's specifically engineered for high-glass resins and abrasive fillers, maintaining surface finish, gloss levels, and dimensional accuracy even through extended runs.

CHALLENGE #2:

Adhesive & Galling Wear

Friction is the enemy of consistency.



When molten polymers slide across steel, adhesive forces can cause microscopic welding — transferring material and roughening the surface. Over time, this “galling” increases ejector forces, damages part finish, and slows production cycles.

Real-World Symptom:

You feel it when parts stick to cavities or ejector pins leave drag marks.

Performance Result with DYNA-BLUE & DYNA-BRITE:

- Reduced ejection force
- Hard surface resists galling & wear
- Increased lubricity for slides and lifters

TIP:
TRACK EJECTION PRESSURE TRENDS. RISING FORCE IS AN EARLY INDICATOR OF ADHESIVE WEAR.

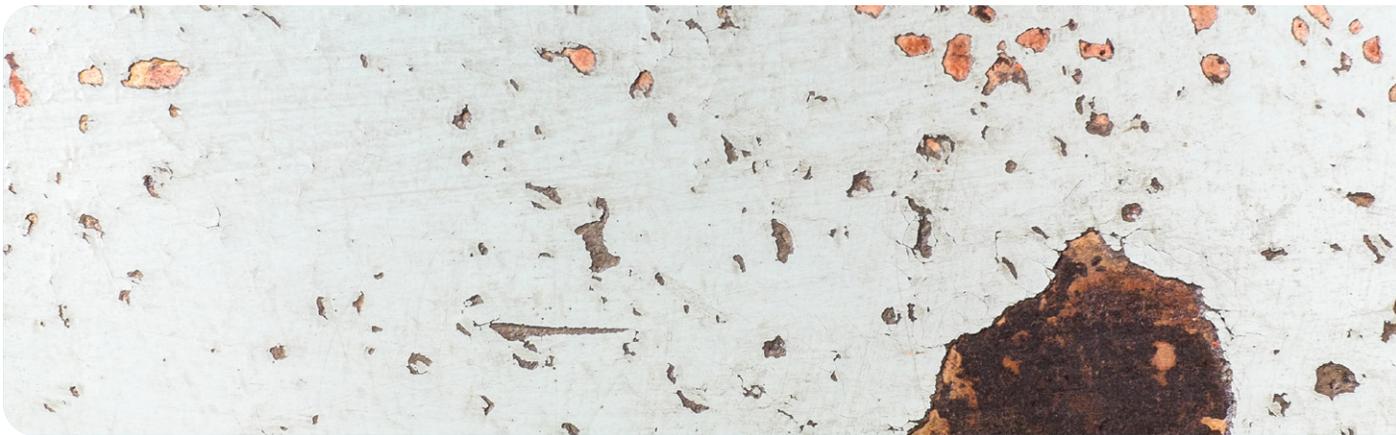
DYNA-BLUE & DYNA-BRITE ADVANTAGE:

Both DYNA-BLUE & DYNA-BRITE Processes form a smooth, low-friction barrier that minimizes adhesion and eliminates metal-to-polymer transfer. Molded parts release effortlessly, even in high-temperature or fiber-filled resins.

CHALLENGE #3:

Corrosive & Chemical Attack

Some resins quietly destroy steel by corrosive or galvanic attack.



PVC, flame-retardant, and halogen-containing resins can release corrosive byproducts that attack tool steel surfaces. Over time, this leads to pitting, rust staining, and dimensional loss — issues that standard benching or polishing can't fix.

Impact:

- Dull surface finish
- Rust contamination in parts
- Frequent maintenance or early replacement

**PROTECTION
THAT LASTS:
EVEN IN TOUGH
CHEMICAL
ENVIRONMENTS.**

HOW DYNA-BLUE PROTECTS AGAINST CORROSION:

Both DYNA-BLUE & DYNA-BRITE have compound layers that provide a continuous, corrosion-resistant shield. The compound layer also blocks chemical diffusion, even under high humidity or aggressive additives. In addition, DYNA-BLUE also has an oxide layer that resists corrosion and in lab tests prevented corrosion up to 60% longer than uncoated samples.

CHALLENGE #4:

Poor release— parts sticking

Deep ribs & low draft = potential for sticking



Surface wear & degradation as well as low draft on ribs and pockets can lead to parts sticking in the mold. Once parts start sticking, every cycle can make it worse. Mold release agents are not solving the issue and add cost to the operation.

Performance results with DYNA-BRITE:

- High surface hardness 75+ HRC prevents wear
- Better release properties due to compound layer preventing plastic from sticking to the mold surface
- Process penetrates deep ribs, pockets, holes.

**UP TO 2-3× LONGER INTERVALS BEFORE POLISHING
OR MAINTENANCE NEEDED.**

THE DYNA-BRITE DIFFERENCE:

DYNA-BRITE is not a coating that can flake or peel off such as Teflon, chrome, or nickel. The process forms a metallurgical bond – not a surface film – ensuring it won't peel or blister under cyclic loads.



CHALLENGE #5:

Downtime & Cost of Rebuilds

Every unscheduled teardown steals from your bottom line.



When a mold fails early, the cost is more than just repairs. It's downtime, missed orders, and rescheduling chaos. For many molders, maintenance accounts for 20–30% of total production cost.

Impact:

- Labor hours lost to polishing and teardown
- Delayed shipments and production bottlenecks
- Increased risk of emergency repair errors

ROI Snapshot:

Metric	Without Coating	With DYNA-BLUE or DYNA-BRITE
Average Tool Life	X cycles	2-10 X cycles
Maintenance Hours per Year	X hrs	2-5 X less hours
Annual Savings		2-10 times \$

HOW DYNA-BLUE & DYNA-BRITE SAVES TIME AND MONEY:

Because DYNA-BLUE & DYNA-BRITE surfaces resist wear, corrosion, and fatigue simultaneously, molds last longer before requiring service. Customers typically see 30–50% fewer rebuilds, saving weeks of production time each year.

CHALLENGE #6:

Maintaining Part Quality Over Time

Wear doesn't just cost you tools — it costs you reputation.



Surface degradation leads to flash, dimension drift, and flow defects. When parts begin to vary, customers notice. Consistency is what keeps long-term supply contracts intact.

Quality Payoff:

- Higher quality parts-gloss levels and surface finish maintained
- Reduced scrap and rework
- Predictable performance for critical components

“Our DYNA-BLUED cavity & core ran 2 million cycles with 30% glass filled nylon with no flash or polish touch-ups”

**PLANT ENGINEER,
AUTOMOTIVE MOLDER**

THE DYNA-BLUE & DYNA-BRITE IMPACT:

By preserving mold integrity, DYNA-BLUE & BYNA-BRITE ensure your first and millionth parts match. Mold surfaces retain texture, surface finish, and critical dimensions - enabling smooth material flow and crisp part definition.

CHALLENGE #7:

Integration & Engineering Change Concerns

How do I accomplish an EC with DYNA-BLUE or DYNA-BRITE?



It's a fair question — and one we hear often. Engineers worry about how to post-machine or weld after a DYNA-BLUE or DYNA-BRITE surface treatment.

Implementation Support:

Both DYNA-BLUE & DYNA-BRITE processes are machinable and weldable without stripping and they can both be easily reapplied to protect the newly repaired, welded, or ground surface.

Result:

A seamless EC or repair, fast turnaround, and measurable performance improvement.

THE GOOD NEWS:

DYNA-BLUE & DYNA-BRITE processes are designed for dimensional precision. Process penetration is controlled within microns, and a sample of the same steel is ran with the mold/die and checked metallurgically to insure quality. These processes are fully compatible with common steels, such as H13, P-20, S7, D-2, 4140, etc.



7784 Ronda Drive
Canton, MI 48187
Phone: 734-459-8022
Fax: 734-459-7863

Recommendations for Welding before & after DYNA-BLUE®/DYNA-BRITE

Good welding practices such as full die/mold preheating and stress relieving after welding (**full process weld**) makes all the difference in weld quality and preventing pin hole porosity and cracking during welding whether it's before or after DYNA-BLUE/DYNA-BRITE. Engineering changes and repairs can be accomplished on DYNA-BLUE/DYNA-BRITE treated surfaces by machining if needed with carbide cutters and welding per welding instructions below.

I. Die Preparation

We recommend that the die/mold be cleaned of all residuals (plastics, aluminum, etc) and oxides before welding. A successful method is:

1. Blast with Glass Bead or mixture of 220 Aluminum Oxide with 100% coverage at low pressure to maintain micro finish.
2. Bevel cut the area to be filled 90 degrees.

II. Welding Procedure

1. Preheat the die to minimum of 950°F. Use weld rod identical to the base material, such as H-13, P-20, etc.
2. Use proper rod and gap angle (rod angle 10-15°, arc gap angle equal to diameter of weld rod.)
3. For MIG welding use appropriate wire material (see #1 above) and the heaviest inert gas possible. For multiple pass welding start at the root of the bevel and make multiple passes, from left to right then the middle until the bevel is slightly overfilled.

III. Machine welded area

1. Machine /bench welded area to desired finish. If porosity is present there is a high probability that the shielding gas was disrupted. Die penetrant, magnetic particle inspection or acid etching can be used to verify integrity of the weld.

IV. Stress Relieve

Stress relieve/temper at a temperature of 50°F less than the original tempering temperature or at a minimum of 1000°F for DYNA-BLUE 6B or 8B, and 1050°F for DYNA-BLUE 5D or 8D. Hold for 1 hour per inch of thickness. This will temper the weld material and also relieve welding stresses.

Loren J. Epler
President/Metallurgist
lepler@dynablue.com

SUMMARY

Performance That Pays for Itself

Across thousands of injection-molding applications, both the DYNA-BLUE & DYNA-BRITE processes have proven to:

- **Extend tool life up to 10×**
- **Cut downtime by up to 60%**
- **Reduce maintenance and rebuilds by half**
- **Maintain dimensional consistency and surface finish**

Challenge	Typical Issue	DYNA-BLUE & DYNA-BRITE Results
Abrasive wear	Erosion from fillers	5× wear resistance
Galling	Sticking & drag	Smooth ejection
Corrosion	Chemical pitting	Long-term protection
Poor release	Parts sticking in mold	Better release
Downtime	Maintenance cost	30–50% fewer rebuilds
Quality drift	Flash, part rejection	Consistent quality
Integration & EG's	Machinability & Welding	Repairs & EC's made easy

REAL-WORLD PROOF

Automotive Housing Mold

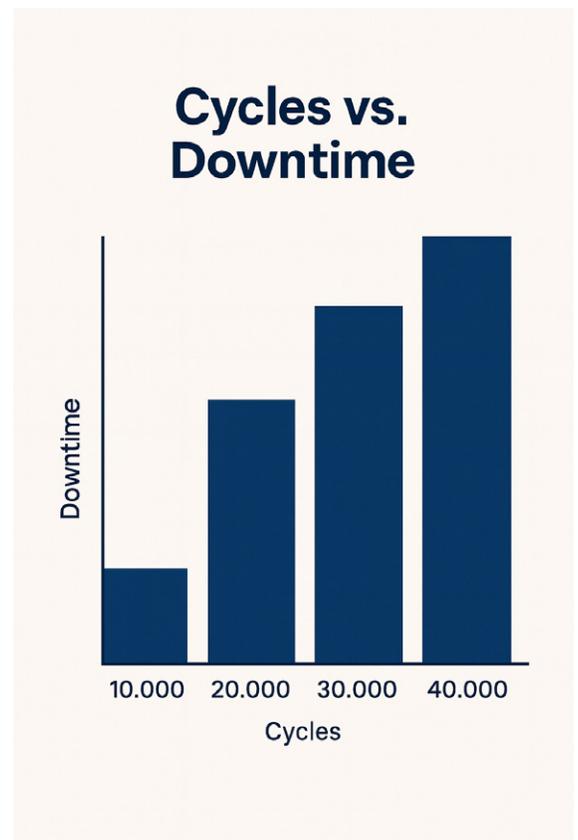
*Wear doesn't just cost you tools —
it costs you reputation.*

A Tier-1 supplier molding 30% glass-filled nylon housings typically experienced severe wear, erosion, and flash after 280,000 cycles. The DYNA-BLUE Process was applied to the core and cavity inserts.

Results:

- Life extended beyond **2 million cycles** without measurable wear
- Maintenance intervals reduced from monthly to quarterly
- 35% reduction in unscheduled downtime
- Improved surface gloss and reduced ejector sticking

*"We used to polish every 3 weeks.
After DynaBlue, that schedule
disappeared."*



Ready to Eliminate Tool Wear Headaches?

SCHEDULE A FREE TOOLING ASSESSMENT & CONSULTATION

Our application engineers will analyze your current tooling challenges and provide a custom improvement plan.

YOU'LL RECEIVE:

- **Steel selection recommendations**
- **Process designed for your specific application**
- **Quote for price & delivery**
- **Quality assurance**

It's not a sales pitch — it's an engineering conversation.

Discover what performance you're leaving on the table.

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ABOUT DYNAMIC SURFACE TECHNOLOGIES INTERNATIONAL

Precision Meets Protection

For more than three decades, Dynamic has helped manufacturers across North America extend tool life and improve product quality through advanced wear-resistant surface treatments.

DYNA-BLUE, DYNA-BRITE & DYNA-MAX processes combine proven surface engineering, controlled metallurgy, and precision application to deliver measureable results – cycle after cycle.

Whether you're molding, forming, forging, casting, or stamping, Dynamic's surface treatments protect the tools that keep your production running.

The Science of Longevity for Steel Tools.

Let's Engineer Your Tooling To Make It Last Longer.

**CONTACT US TO
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 (734) 459-8022

 DYNABLUE.COM

 INFO@DYNABLUE.COM

7784 RONDA DRIVE

CANTON, MI 48187

FAX: (734) 459-7863

