

**FASTER CYCLES, SMARTER
DESIGN, BETTER PARTS.**

DISCOVER THE FUTURE OF SUPERPLASTIC FORMING



It's Time to Move On from Traditional SPF

How Much Time Are You Losing to Your Forming Method?

Legacy Superplastic Forming (SPF) often looks advanced on paper. But in practice, it's slow, unpredictable and costly.

Forming cycles can range wildly, from two minutes to two hours, and the high-energy ovens required quietly cut into your bottom line. Even more concerning: non-uniform part thickness isn't just an engineering headache. It's a structural liability.

Anything below this level of precision and repeatability undercuts your ability to meet deadlines, budgets and performance targets.

Is it your team? Your design? Or is it time to question whether this process still serves your goals?





In manufacturing, the most expensive problems are often the ones you've learned to live with. That's the real issue with traditional Superplastic Forming. It's not that it's broken. It's that it's quietly inefficient in ways that rarely show up on a single line item.

But start adding it all up, and the impact is impossible to ignore:

Time You Didn't Know You Were Losing

Two-hour cycle times don't just slow production. They bottleneck everything. Prototyping slows down. Design iterations stretch out. Launch timelines drift. Before long, your team is stuck reacting to delays instead of building momentum.

Tooling That Eats Budgets

Traditional SPF often requires complex, oversized tooling, especially when you're working with intricate geometries or small production runs. That means higher upfront costs, longer lead times, and more time lost on rework and revalidation when something changes. It's not just expensive. It's rigid. And rigidity kills agility.

Designs That Keep Getting Watered Down

If you've ever had to simplify a part just to make it "formable," you're not alone. SPF has real limits on part geometry, and they show up at exactly the wrong time: when you're trying to do something innovative. The result? Compromised designs, added welds, extra assembly steps, and increased risk of failure down the line.

Risk You Can't Always See

It's easy to overlook the cost of non-uniform thickness or inconsistent part quality — until a failure happens. SPF's reliance on high temperatures and slow strain rates makes it difficult to maintain ideal flow across complex shapes. Over time, those tolerances add up. And not in your favor.

What if you could keep all the upside of SPF—strength, precision, flexibility—without it throwing your schedule off? Imagine a path that achieves high-quality parts at consistent speed, sheds unnecessary energy and material waste, and stops forcing your team to adapt to an outdated timeline.

The good news? That path exists.

Early engineering trials are showing promising results—speed, control, repeatability—that start to tackle every one of the issues above.

Let's explore what's next.



A Smarter Approach to Superplastic Forming

Like many engineers working with Superplastic Forming, Eugene Ryzer spent years running up against the same wall: the process wasn't evolving fast enough.

"For 25 years, I was involved in superplastic forming," he explains. "But what I noticed was that the technology wasn't being developed properly."

So he reimagined it. **Gas Oscillation Superplastic Forming (GO-SPF) emerged as the result.** Not an upgrade, but a reset.

Instead of static gas pressure, it uses oscillating flow — essentially "massaging" the material as it forms. This constant, dynamic pressure reduces internal stress while improving flow and forming speed.

After a decade of R&D and successful trials on aluminum and other SPF alloys, GO-SPF has proven itself, delivering better parts, faster, without the legacy tradeoffs.

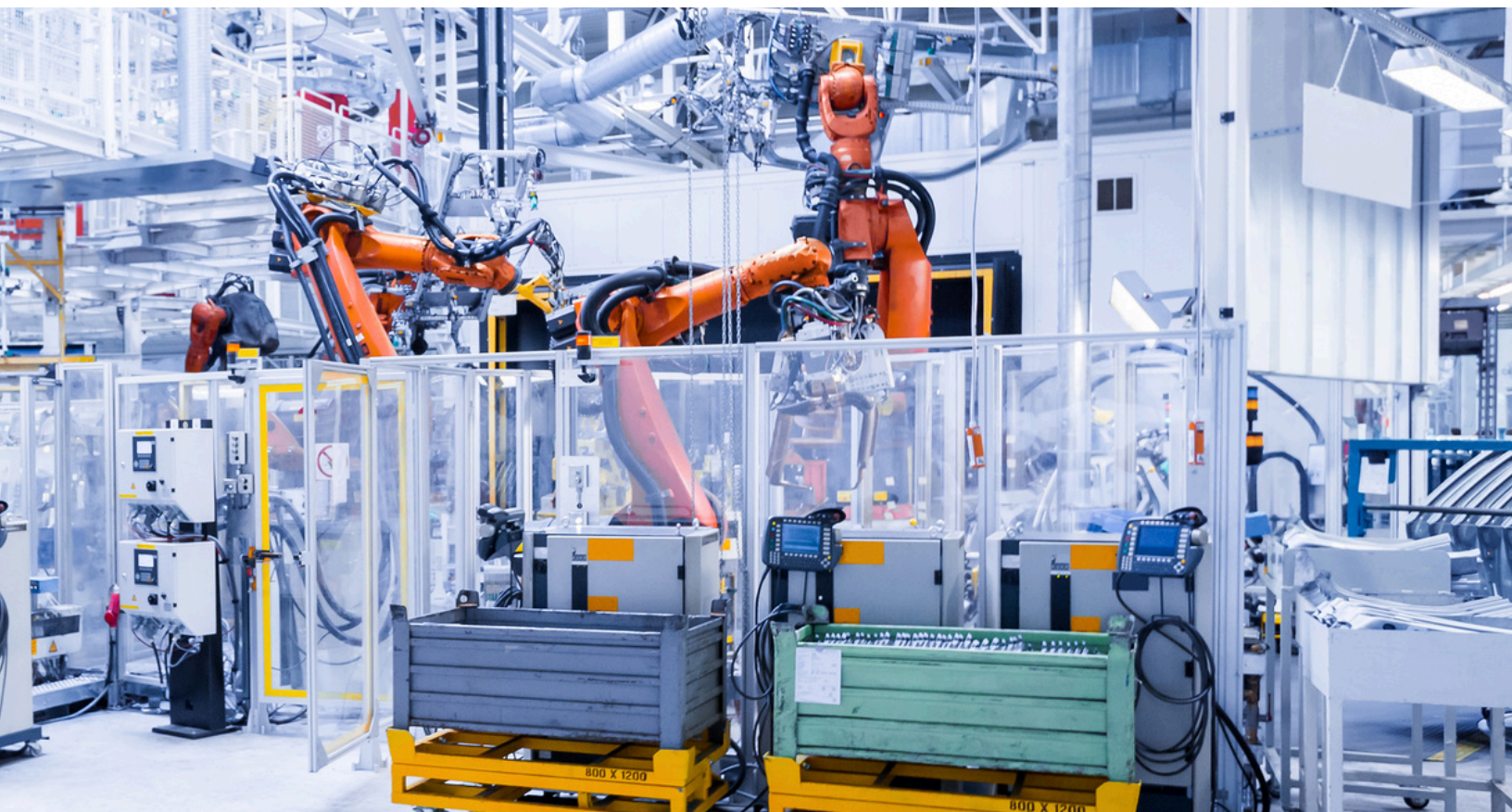


This isn't an iteration. It's a revolution.

This isn't Hypothetical. Here's What's Happening on the Shop Floor.

After years of development and trials, GO-SPF has reached a point where major aerospace manufacturers are taking notice, and quietly shifting through everything they've been told about forming methods. It may not be everywhere yet, but this emerging process is building real credibility and opening conversations with engineers who've spent decades navigating SPF limitations.

Let's explore what makes it so intriguing and why it matters to you.



The Benefits of GO-SPF at a Glance

Improved Part Quality

GO-SPF enhances grain structure through better grain boundary sliding, reducing localized and residual stresses—so your parts come off the line more consistent and ready for real-world performance.

Supports Complex Geometries

GO-SPF dramatically increases elongation and maintains uniform thickness, allowing you to form parts with complex shapes that traditional SPF simply cannot. Engineers are now able to push deeper draws with no compromise in quality, opening doors to designs that were previously off-limits

Material Savings

GO-SPF can start with thinner stock, reducing upfront material use. Even better, it delivers high-quality results using standard-grade materials. This eliminates the need for expensive fine-grain alloys and unlocks cost efficiencies without compromising performance.

Significantly Faster Forming

GO-SPF delivers monumental speed improvements—200% to 1,000% faster cycle times compared to traditional SPF—by leveraging minor gas oscillations that serve as in-process dynamic stress relief. This higher strain-rate capability not only speeds up forming, but also enables more parts per shift with fewer presses, maximizing throughput and reducing capital requirements.

Lower Forming Temperatures

GO-SPF runs at significantly lower temperatures than traditional SPF, which brings two major advantages:

- Longer platen and tool life: Cooler operating temperatures reduce wear on dies and platens, extending equipment longevity and cutting maintenance costs.
- Reduced energy consumption: Less heat means lower energy usage per cycle, making your process leaner, greener and more cost-effective.



Real Trials. Real Data. **Real Results.**

GO-SPF Isn't Just Faster. It's a Leap Forward in Efficiency.

During trials using 1.40 mm thick aluminum alloy 5083 at 450°C, GO-SPF consistently produced fully formed parts in just 90 seconds. This is more than five times faster than conventional SPF methods.

And it didn't just speed things up, it simplified them. The process required only half the usual amount of boron nitride coating, likely due to reduced friction from the oscillating gas flow.

The result? A faster, cleaner, and more repeatable forming process, part after part.

"The technology is transformative both technically and commercially. It pushes the boundaries of advanced manufacturing and allows early adopters to steal market share with new opportunities."

Jeffrey Walsh
Director of Business Development at Macrodyne



Results of First Three Trials Using **Traditional SPF:**



Traditional SPF was **not able** to repeatably manufacture good parts in less than nine minutes.

Results of First Three Trials Using **GO-SPF:**



GO-SPF delivered fully formed, production-ready parts in just **90 seconds** — not once, but repeatably. And it did so using only half the boron nitride coating, likely thanks to reduced friction from its oscillating gas flow.

Simulation-Backed Results That Speak for Themselves

When evaluating any new forming technology, real-world data matters. To understand the benefits of GO-SPF, we simulated multiple forming scenarios using AA5083 aluminum at 1.4 mm thickness, which is a common material in aerospace and defense applications.

See the next page for more.



Higher Strain Rates, Lower Stress

Conventional SPF Limit: ~ 0.05 /s strain rate

GO-SPF Operating Range: Up to 0.20 /s strain rate

GO-SPF Advantage:

Faster forming at higher strain rates with lower peak stresses:

- GO-SPF: 74 MPa (approx. 10.7 ksi)
- Conventional SPF: 83 MPa (approx. 12.0 ksi)

Stress Distribution is More Even

FEA visualizations show GO-SPF results in less localized stress, helping extend tool life and improve part consistency.

GO-SPF Dramatically Reduces Forming Time

- Conventional SPF: 300 seconds per part
- GO-SPF: 16 seconds per part
 - That's nearly 2,000% faster.

Faster Forming Doesn't Sacrifice Quality

- Conventional SPF at 240 seconds: 54% thickness reduction → Part fails
- GO-SPF at 16 seconds: 43% thickness reduction → Successful part
 - GO-SPF forms faster without pushing the material past failure thresholds.

Better Thickness Uniformity

GO-SPF parts maintain a more consistent wall thickness across complex geometries, reducing the risk of weak spots or failure during inspection.



Aerospace and Automotive Sectors Need GO-SPF **Now**

Outdated Processes Can't Meet Tomorrow's Demand.

In aerospace, Boeing forecasts demand for over 44,000 new commercial aircraft by 2043, while suppliers report 12+ month lead times for structural parts. Forming efficiency isn't optional. It's a requirement.

In automotive, Tier 1 and Tier 2 suppliers are expected to produce millions of parts a year on increasingly compressed cycles.

GO-SPF is targeting under-one-minute forming times. That's a massive leap from the 10 minutes typical in traditional SPF.



"Our goal is to form automotive parts in a minute or less as opposed to 10 minutes or more."

— Eugene Ryzer, Creator of the GO-SPF Process

Rethink the Process. Reclaim the Advantage.

Every manufacturer claims innovation. But true innovation means evolving your core processes.

Superplastic Forming hasn't meaningfully changed in decades, even as broader U.S. manufacturing slipped—from annual growth of 3.4% per hour (1987–2007) to a decline of –0.5% (2010–2022).

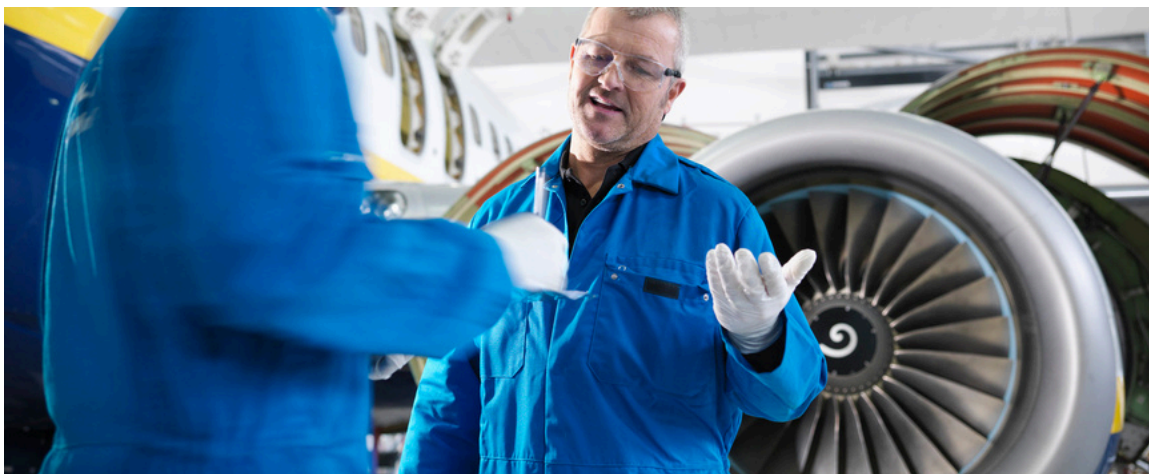
In other words, tools got shinier, but SPF stayed stuck. And that stagnation is costing you.

If your forming method is still plagued by slow cycles, rigid tooling, high energy use, and design compromises, it might not be your team. It might be your process.

And if you're ready to demand something better, you're not alone. That's where GO-SPF begins to matter.

This isn't empty hype. It's a signal that **the next era of forming is taking shape**. GO-SPF is a disruptive new tech engineered to overcome the very constraints that have held you back: speed, energy, tooling and flexibility. It's for those unwilling to accept the old limits as permanent. Want to explore how it could work for your next program or part?

We're ready when you are.



"Nothing like GO-SPF exists in the market. This patented technology will become the new standard for SPF."

— Eugene Rzyer, Creator of the GO-SPF Process



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IF YOUR FORMING PROCESS IS HOLDING YOU BACK, IT'S TIME TO REPLACE IT.

WE ARE READY TO ASSIST YOU

Let's talk about how GO-SPF can speed up your production, cut your tooling costs, and finally give your team the flexibility it's been asking for.



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