REVERSE PROCESSING: A SMARTER APPROACH TO RISK MITIGATION

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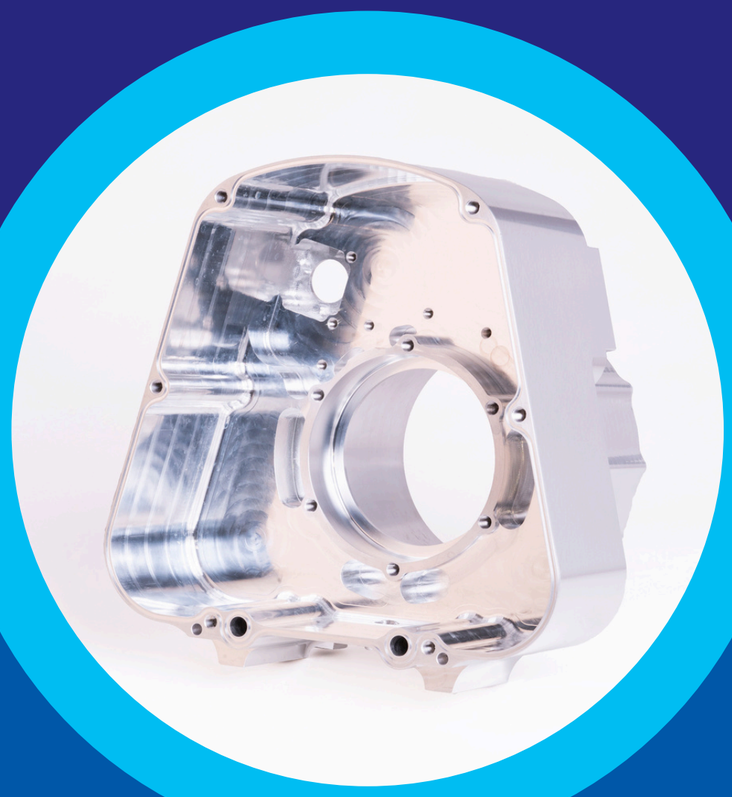
Engineering and Machine Works

In today's precision machining environment, parts are becoming more complex, tolerances are becoming tighter, quality standards are becoming more stringent, and finishing requirements are more demanding than ever. This especially rings true for manufacturers supporting complex industries, such as aerospace, semiconductor capital equipment, and medical machining, as managing surface treatments alongside tight dimensional requirements is a growing challenge.

At Reata, we address some of these challenges through a method we call reverse processing, a strategic approach that reduces risk and improves cosmetic and functional outcomes.

THE CHALLENGE:



MASKING, FINISHES, AND RISK

Many customers require selective surface treatments on aluminum components. These requirements often call for a combination of anodize, chem film, paint, or adhesive bonding, each applied only to specific features.

Traditional masking methods introduce several risks:

- Bleed-out, where finish material penetrates masked areas
- Fallout, where masking fails during plating or anodizing
- Scrap and rework, especially on cosmetic or tight-tolerance parts
- Unreliable conductivity, critical for grounding and electromagnetic protection

These risks can quickly compound for a precision machine shop.

THE LOGIC

WHY OUR CUSTOMERS MASK PARTS

Understanding why masking is required helps explain why reverse processing is so effective and essential.

Grounding and conductivity requirements
Many aerospace machining and semiconductor applications require bare aluminum surfaces for grounding. Chem film is often specified to maintain electrical conductivity between mating components. Even when masking appears successful, anodize can still penetrate the surface invisibly, compromising conductivity.

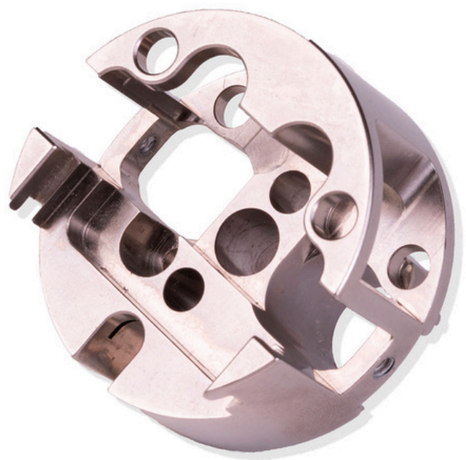
Reverse processing ensures that conductive features are machined after anodize, guaranteeing true electrical continuity.

Electromagnetic protection
In high-frequency or sensitive electronic environments, uncontrolled anodize buildup can interfere with electromagnetic shielding. For complex components or parts of assemblies, this can cause downstream performance issues that are not visible to the naked eye.

Threads, holes, slots, and mating features
Threads, slots, and mating surfaces are particularly vulnerable to finish buildup. Anodize and plating processes are not as tightly controllable as machining, making them risky for features with tolerances in the thousandths (or tighter).

For internal diameters, threaded holes, or critical mating features, reverse processing allows final machining to occur after anodize, delivering exact dimensions without risking interference or assembly issues.

THE DEFINITION



WHAT IS REVERSE PROCESSING?

Reverse processing is Reata's strategy for parts requiring complex or extensive masking.

Rather than relying on platers to mask selective features, we intentionally change the order of operations:

- Machine features intended to be anodized first
- Send the part out for anodize
- Return the part in-house at ~80% completion
- Precisely machine features requiring chem film or bare aluminum
- Send the part back out for final chem film processing

This approach eliminates the need for complex masking during plating and dramatically reduces the risk of bleed-out and fallout.

THE IDEAL FIT

WHY REVERSE PROCESSING FITS REATA

Advanced 5-axis capabilities
Much of our reverse processing work is performed in our 5-axis machine shop, using multi-axis machining centers with probing capabilities. Because masked features often exist on multiple sides of a part, 5-axis machining allows us to re-establish datums accurately and complete machining processes with confidence.

By probing off known features, we can add holes, face surfaces, or machine complex geometry after anodize, without compromising accuracy or cosmetics.

Reduced risk and scrap
Our quoting actively evaluates prints to identify where reverse processing is beneficial. In many cases, attempting traditional masking would result in high fallout rates, stripping and replating, or complete scrap.

We've seen lots with 30-40% fallout due to masking failures. By switching to reverse processing, those same parts now run consistently with minimal scrap and improved reliability.

Faster lead times through automation
Reverse processing is often automated using palletized five-axis systems. For high-volume parts, this approach reduces manual masking labor and speeds up throughput.

This efficiency supports faster delivery for customers relying on contract manufacturing services at scale.

THE AFFECT

HOW OUR CUSTOMERS BENEFIT FROM REVERSE PROCESSING

Reverse processing delivers measurable value across the board:

- Risk mitigation by eliminating masking failures
- Reduced scrap and rework
- Improved cosmetic quality
- Guaranteed conductivity for grounding and electromagnetic protection
- Faster lead times through automation
- Higher confidence in complex, tight-tolerance components

Reverse processing is a powerful example of how process innovation can outperform traditional methods. At Reata, we apply this approach through a combination of advanced machining methods, deep process knowledge, and a commitment to risk reduction.

For customers seeking a smarter approach to traditional masking methods, reverse processing offers a competitive advantage.

REQUEST A QUOTE TO PARTNER WITH REATA, AN EXPERT IN PRECISION MACHINING AND THE PROCESSES THAT SUPPORT IT.

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