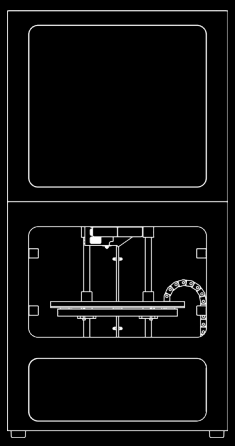
Bremar



Industry	Automotive
Application	Reverse Gear
Technology	Metal X
Materials	17-4PH Stainless Steel

Markforged

The Challenge

Melbourne's Bremar Automotion, a specialized engineering design company, showcases how its in-house metal 3D printing capabilities deliver lighter, stronger, and more efficient products. By leveraging advanced metal additive manufacturing, Bremar provides innovative solutions that outperform traditional methods, especially for complex, low-volume components.

To demonstrate its advanced skill set, Bremar's Engineering Manager, Tim Woods, took on the challenge of producing a custom reverse gear for a performance car powered by a Yamaha motorcycle engine.

The mid-engine design of the vehicle left very limited space, demanding an intricate and compact component.

> "We looked at similar gears produced in the UK, where these cars are popular. They were heavy, bulky, and quite crude in terms of accuracy."

— Tim Woods
Engineering Manager, Bremar

The team first explored traditional manufacturing to establish a baseline. "This would have involved a whole series of processes — EDM, followed by CNC machining and then heat-treating," Tim Woods explained. "We were quoted $1,200 per gear and faced minimum order quantity issues, as this is not a high-volume part." This conventional route proved to be too slow and expensive for such a niche component.







Showcased here is the 3D Printed Reverse Gear.

The Solution

Bremar Automotion turned to its in-house Markforged Metal X, a leading metal 3D printer, to solve the problem. The team designed the gear for a perfect fit and printed it using Markforged 17-4PH Stainless Steel. The metal 3D printing process consolidated multiple manufacturing steps into a single, automated workflow.

> "The Metal X technology solved our problem in a single process. We had a strong, light and precise gear, and it worked first time."
>
> — Tim Woods
> Engineering Manager, Bremar

This success has generated interest from the UK market. "We can offer them a fit-for-purpose gear that is lighter than anything currently available, the design allows for increased drivetrain flexibility and at a very attractive price. It's a classic example of what can be achieved with **metal additive manufacturing**," he said.

By using their metal 3D printer, Bremar unlocked benefits that were extremely difficult with conventional machining for this project. The 3D printed metal parts were superior in both performance and cost.

- **Significant Cost Savings:** Over 50% reduction in cost per part, saving more than $600 per item compared to the quoted price for traditional manufacturing.
- **Viable Short-Run Production:** The affordability of metal 3D printing makes low-volume production of niche products profitable.
- **Superior Performance and Design Freedom:** The final gear was lighter and more compact, with greater drivetrain flexibility—a direct result of the design freedom offered by the metal 3D printer.
- **Rapid Production Speed:** Bremar can now produce custom gears on-demand, quickly and efficiently, even when unique modifications are requested.

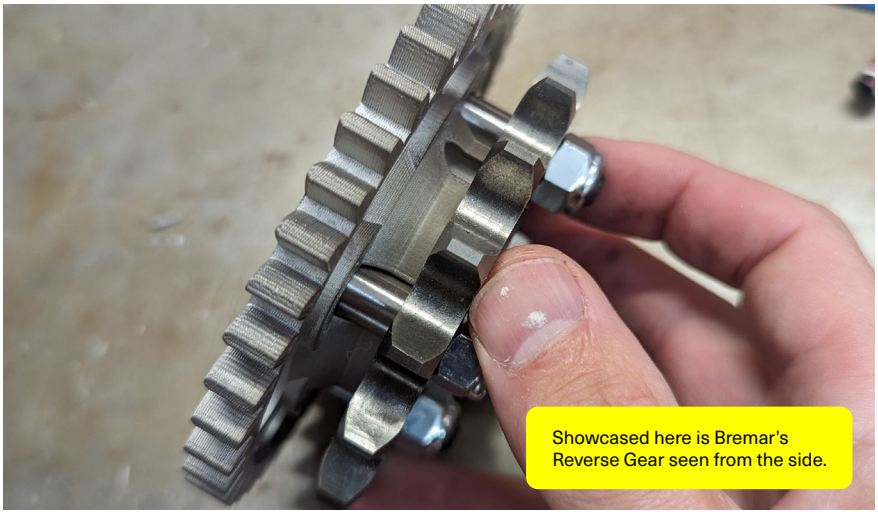
Bremar Automotion's success with the performance reverse gear is a powerful demonstration of how an in-house metal 3D printer can overcome the cost, complexity, and lead-time limitations of traditional manufacturing, turning challenging projects into profitable opportunities.

Cost Reduction Per Part

Over 50%

Saving Per Item

Over $600



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