

Why Are Automakers Pursuing Tesla's 'Gigacasting' Innovation?



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Toyota Gigacasting Old (Left) vs New (Right)

In the rapidly evolving world of electric vehicles (EVs), one name stands out as a pioneer: Tesla. The automotive industry has taken notice of Tesla's groundbreaking technology called "Gigacasting" and is now in a frenzied pursuit to replicate its success. From Toyota to General Motors, Hyundai to Geely's affiliates, automakers worldwide are scrambling to adopt Gigacasting. In this blog post, we'll explore the concept of Gigacasting, its transformative impact on the industry, and the challenges faced by automakers on this exhilarating journey.

Decoding Gigacasting: A Revolution in Aluminum Die-Casting

At the heart of Tesla's Gigacasting lies the Giga Press, an aluminum die-casting machine deployed across Tesla's factories in the United States, China, and Germany. These

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colossal machines have shattered the limitations of traditional auto manufacturing by producing aluminum parts on an unprecedented scale.

The term "Gigacasting" pays homage to Tesla's Gigafactories, while some automakers have dubbed them "megapresses" for their sheer magnitude, albeit slightly smaller than Tesla's behemoths. The process is awe-inspiring: molten aluminum weighing over 80 kilograms (176 pounds) is injected into molds, quickly solidifying into a single part that is then released and rapidly cooled. Tesla's innovative aluminum alloy eliminates the need for conventional heat treatment, streamlining the entire production process.

The Power of Gigacasting: Streamlined Production and Cost Efficiency

Gigacasting offers automakers a plethora of advantages, chief among them being enhanced profitability. By consolidating numerous individually stamped metal parts into single components, Tesla has revolutionized the manufacturing process, leading to reduced costs, simplified production lines, and heightened efficiency.

Take, for instance, Tesla's Model Y, its flagship model. By employing a single component in the vehicle's rear construction, Tesla managed to slash related costs by a remarkable 40%. Similarly, the Model 3's innovative design, incorporating a single piece from the front and rear, eliminated the need for 600 assembly robots. Furthermore, Gigacasting has the potential to reduce vehicle weight, a crucial factor in EVs where the battery pack alone can weigh over 1,500 pounds. Additionally, this technology holds the promise of minimizing waste and greenhouse emissions during production.

The Gigacasting Landscape: Players and Pursuers

Tesla acquires its advanced Gigacasting machinery from IDRA, a reliable Italian company which has been part of LK Industries, China's major corporation since 2008. AlixPartners reports that the global aluminum die-casting market, worth a whopping \$73 billion in the previous year, is anticipated to encounter considerable expansion over the coming years and reach beyond \$126 billion by 2032. There are several prominent players in this competitive market such as Buhler Group (Europe), Ube & Shibaura Machine (Japan) and Yizumi & Haitian (China).

While Toyota has embarked on its Gigacasting journey, other prominent automakers such as General Motors, Hyundai Motor, and Geely's affiliates, including Volvo Cars, Polestar, and Zeekr, have either embraced the technology or have plans to integrate it

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into their manufacturing processes. Zeekr, for instance, has already incorporated massive aluminum die casts into its multi-purpose van sold in China and intends to extend their usage to other models. Likewise, Volvo announced a substantial investment of over \$900 million to upgrade its Swedish plant with megapress technology.

Navigating the Challenges: Counting the Cost

While the advantages of Gigacasting are clear, automakers face challenges on their path to implementation. Cost remains a significant factor, as Tesla's high sales volume of the Model 3 and Model Y provides

a stronger business case for investing in new production technology. Legacy automakers, with their intricate product lineups and existing machinery, must weigh the substantial investment required for adopting Gigacasting. The repair and associated costs of vehicles with integrated castings following accidents are also considerations that could affect the operational expenses of EVs.

The Road Ahead: A Gigacasting Revolution

Tesla's Gigacasting technology has disrupted the automotive industry, triggering a race among automakers to seize its transformative potential. As each manufacturer meticulously assesses the investment needed for Gigacasting integration, the industry is on the brink of a monumental transformation that will shape the future of electric mobility. With the promise of reduced costs, streamlined production, and sustainability, Gigacasting is paving the way for an electrifying future in the automotive world.