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China Automotive Magnesium Alloy Die Casting Industry Report, 2021

Oct. 2021

Abstract

Under the general trend of automobile lightweight, the CAGR of magnesium alloy market demand reached 13.2%

The vast majority of automotive magnesium alloy parts are die casting parts, which are mainly used in housings and brackets. Magnesium alloy is a good substitute for steel and aluminum alloy, and can reduce the product weight by 25%-75%. However, the current application ratio of magnesium alloy in automobiles is much lower than that of aluminum alloy.

Magnesium alloy facilitates lightweight vehicles

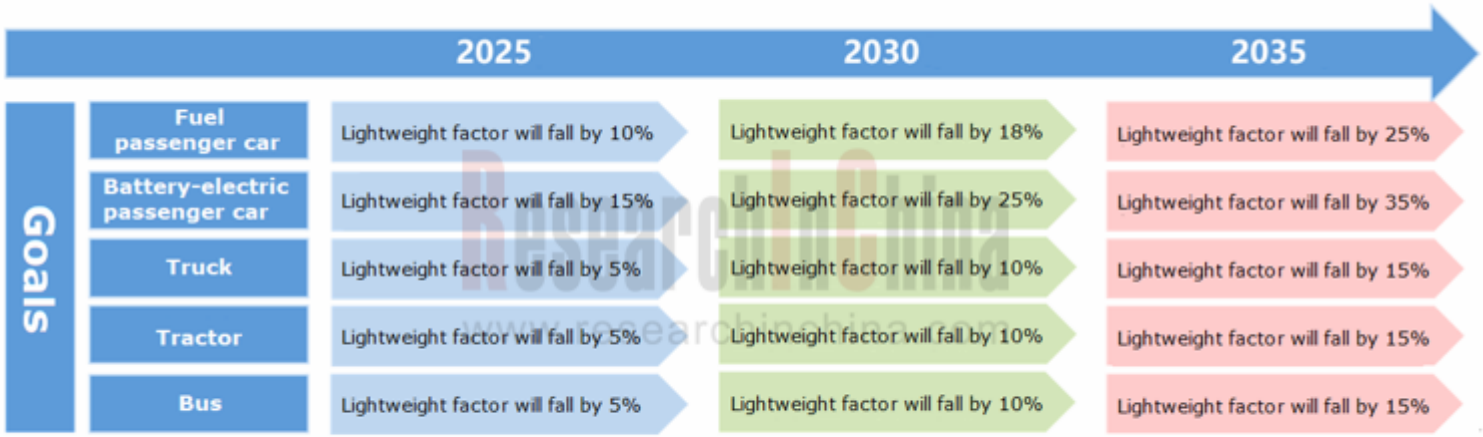
Given energy saving, environmental protection and performance, lightweight vehicles have become one of the important directions for the development of the global automotive industry. In 2020, China released ***Energy-saving and New Energy Vehicle Technology Roadmap 2.0***, putting forward lightweight requirements for all types of vehicles. In addition, major automakers have proposed goals of promoting the development of lightweight vehicles.

Weight Reduction Rate of Lightweight Materials

Lightweight Materials	Replaced Materials	Weight Reduction Rate
High-strength steel	Steel	10%
Aluminum alloy	Steel, cast iron	40%-60%
Magnesium alloy	Steel, cast iron	60%-75%
Magnesium alloy	Aluminum alloy	25%-35%

Source: Sinyuan ZM; ResearchInChina

China's Lightweight Vehicle Technology Roadmap



Source: *Energy-saving and New Energy Vehicle Technology Roadmap 2.0*; ResearchInChina

Abstract

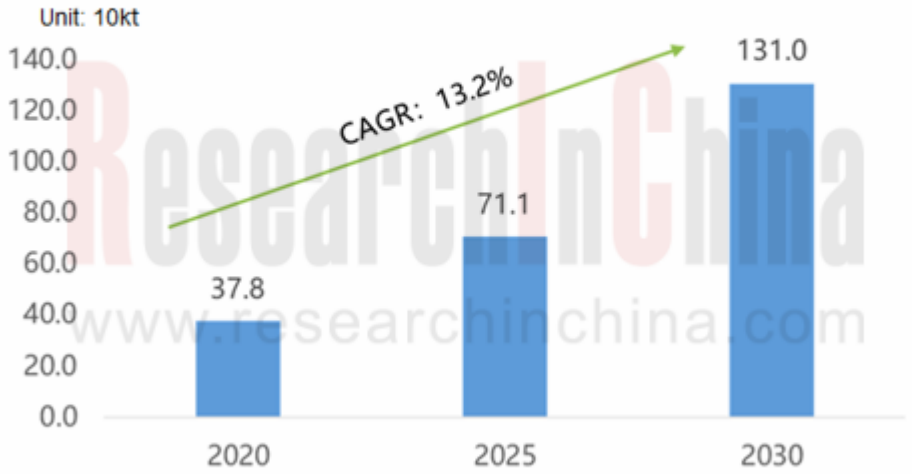
At present, lightweight vehicle technology is mainly divided into three types: lightweight material technology, lightweight advanced process technology, and lightweight structure optimization technology. Lightweight materials are the key to lightweight vehicles.

Magnesium alloy features low density, high strength, good heat dissipation, strong vibration resistance, noise reduction, excellent die casting performance, and outstanding cutting performance, as an ideal lightweight material. Under the trend of lightweight vehicles, the market demand for magnesium alloy will grow rapidly.

In 2015, a single car in China only used about 1.5kg of magnesium, which was far lower than the level in Europe, America, Japan and other regions. However, with the rapid development of new energy vehicles and the acceleration of the lightweight vehicle process, the amount of magnesium used in a single vehicle in China has grown rapidly, and it is estimated to reach 15kg in 2020.

As per Energy-saving and New Energy Vehicle Technology Roadmap 2.0, a single car in China will use 45kg of magnesium alloy, which will account for 4% of the total vehicle weight by 2030 when the Chinese automobile market will demand 1.31 million tons of magnesium alloy die casting parts with a CAGR of 13.2% in 2020-2030.

Market Demand for Automotive Magnesium Alloy Die Casting Parts in China, 2020-2030E



Source: ResearchInChina

Abstract

Magnesium alloy boosts lightweight new energy vehicles

For every 10% reduction in the weight of new energy vehicles, the average cruising range can increase by 5%-8%. Therefore, the demand for lightweight new energy vehicles is urgent. The density of magnesium alloy is 2/3 that of aluminum and 1/4 that of steel, so it is much lighter than the latter two, which means that magnesium alloy is the best choice for lightweight new energy vehicles.

New energy vehicle battery packs account for more than 20% of the vehicle weight, thus lightweight new energy vehicles partly hinge on lightweight battery packs.

Lightweight battery packs can make outer casings, bottom trays, and inner end/side panels lighter. For example, Tesla MODEL S mainly uses aluminum alloy for the battery pack shell which weighs up to 125 kg; if it uses magnesium alloy, the weight will be reduced by about 60 kg or nearly 50%.

At present, Wanfeng Meridian, Qianhe Magnesium, RSM Group, Eontec, Ka Shui Group, etc. have made layout in the field of magnesium alloy casting for battery pack shells of new energy vehicles.

As the world's leading supplier of new energy vehicle batteries, CATL has also deployed magnesium alloy die casting for battery packs. In November 2020, CATL, Sanxiang Advanced Materials, Vansun Group, and Zhuhai Hengqin Yinmei Technology jointly established Ningde Wenda Magnesium-Aluminum Technology Co., Ltd. to build a magnesium-aluminum alloy project with a total investment of RMB800 million. The products include die casting structural parts for battery casings.

Abstract

Wanfeng Auto Wheel leads the market amid low market concentration

At present, the global automotive magnesium alloy die casting market is highly fragmented with low market concentration The relatively large-scale companies mainly include Georg Fisher, DGS, STIHL, Wanfeng Meridian, SUNDARAM CLAYTON, Gibbs, PACE, etc.

In the short history of China's automotive magnesium alloy die casting market, there are only a few companies of a certain size, mainly including Wanfeng Auto Wheel, RSM Group, Sinyuan ZM, Eontec, Ka Shui Group, etc.

Wanfeng Auto Wheel has become a leader in the automotive magnesium alloy die casting market in China and even in the world through the acquisition of Wanfeng Meridian which was granted the Automotive Casting Excellence Award by The International Magnesium Association (IMA) for two consecutive years. Wanfeng Meridian serves not only Tesla, NIO and other new energy vehicle companies, but also traditional automakers such as Porsche, Audi, Mercedes-Benz, BMW and Volvo.

Major Orders Received by Wanfeng Auto Wheel for Automotive Magnesium Alloy Die Casting

Time	Major Orders
2017	Wanfeng Meridian provided magnesium alloy parts such as cluster frames and front-end module frames for NIO ES8
2019	Wanfeng Auto Wheel developed two types of magnesium alloy cluster brackets for Changan Ford U625 and U611, becoming the first magnesium alloy cluster bracket supplier of Changan Ford
2020	Wanfeng Auto Wheel and T3 (China FAW, Dongfeng Motor and Changan Automobile) established a T3+1 strategic cooperation mechanism, responsible for the design, manufacturing and services of large magnesium alloy casting parts. The first batch of products mainly included cluster brackets, wheels, front-end modules and gearbox housings used for nearly ten vehicle models.
June 2020	Wanfeng Auto Wheel secured an order from Tesla Model Y to provide the latter with magnesium alloy seat brackets, seat frame stamping parts and other products and services
December 2020	The EM3 project of Evergrande Hengchi New Energy Vehicle Research Institute (Shanghai) Co., Ltd. placed an order with Wanfeng Auto Wheel for two types of cluster brackets worth about RMB42 million

Source: ResearchInChina

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Enormous market potentials prompt companies to expand production

In view of enormous market potentials, domestic companies have invested in building or expanding automotive magnesium alloy die casting bases to meet the growing market demand. In the future, the competition in the industry will become more intense, and the automotive magnesium alloy die casting market will mature.

Expansion Projects of Major Automotive Magnesium Alloy Die Casting Companies in China

Companies	Time	Project overview	Related automotive products
Eontec	2018	The "Yi'an Yunhai Light Alloy Precision Die Casting Parts Production Base" invested by Eontec and RSM Group with RMB500 million jointly produces magnesium alloy and aluminum alloy die casting products. As of the end of July 2021, the second phase of the project had entered production.	Steering brackets, navigation products, doors, clusters
	April 2021	Eontec plans to invest RMB120 million in a precision manufacturing project in Zhuzhou Jinshan Science and Technology Industrial Park to mainly produce magnesium-aluminum alloy die casting parts for automobiles and rail transit.	-
RSM Group (Boao Mg-Al Manufacturing)	April 2019	Boao Mg-Al Manufacturing's die casting project uses magnesium-aluminum alloy materials with a total investment of RMB200 million. After accomplishing the production goal, it will achieve the annual sales of RMB300 million.	Cluster brackets, automotive shock-absorbing towers, etc.
	January 2020	Boao Mg-Al Manufacturing's high-performance magnesium alloy production line and waste magnesium recycling project was completed, with a total investment of RMB46.8 million, the additional annual capacity of 430,000 automotive die casting parts and 1.95 million die casting parts for manual (electric) tools as well as the annual recycling of about 4,076.7 tons of waste magnesium alloy.	New: 250,000/a center console brackets, 180,000/a seat frames
	June 2020	Boao Mg-Al Manufacturing invested RMB220 million in building a project with the annual capacity of 20kt magnesium alloy, 8kt magnesium particles and 1 million magnesium-aluminum alloy auto parts for medium and large vehicles	Auto parts
	November 2020	The company, Baosteel Metal and the Qingyang government jointly invested RMB10.4 billion in 300kt/a high-performance magnesium-based light alloy and 150,000 t/a magnesium alloy die casting component projects	-
	September 2021	The company plans to invest no less than RMB2.5 billion in a 100 kt/a high-performance magnesium-based light alloy and deep processing project	-
Wanfeng Auto Wheel	January 2019	Wanfeng Auto Wheel invested RMB250 million in transforming the existing plant and implemented a 300 t/a large-scale complex magnesium alloy casting flexible production line, which was already put into operation.	-
Telemax	August 2021	Telemax invested RMB2.1 billion in a magnesium-aluminum alloy new material application project in Qinghai Salt Lake, with the annual capacity of 5kt of magnesium-aluminum alloy new materials used for automotive and new energy fields.	-
Sinyuan ZM	March 2021	Sinyuan ZM applied for IPO and raised RMB332.35 million for the production project of high-strength magnesium alloy precision die casting parts and the construction of a technology R&D center.	Car lamp heat dissipation brackets, armrest structural parts, display structural parts, cluster brackets, etc.

Source: ResearchInChina

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Contact

Beijing Headquarters
TEL: 13718845418
FAX: 010-82601570
Email: report@researchinchina.com

Website:
www.researchinchina.com

WeChat: zuosiqiche

zuosiqiche

Chengdu Branch

TEL: 028-68738514
FAX: 028-86930659