IMA Award Recipients Show Innovation throughout the Magnesium Industry

The 2019 IMA Magnesium Awards of Excellence recognize exceptional achievement in the global advancement of magnesium products and processes. These innovations span the globe covering not only elements of motorized and human-powered transportation, but also the future of medical technology as we serve a growing and aging human population. IMA thanks all of the participants for the outstanding submissions and congratulates this group of winners.
IMA congratulates all Awards of Excellence Winners who dedicate their efforts to magnesium process and product innovations—setting ever-higher standards for making more efficient and environmentally responsible operations. These award-winning companies have found ingenious ways to produce, process, design, and build the global magnesium industry. They are demonstrating what is possible and inspiring others to achieve even greater goals with magnesium innovations.
Gear Box
Hettich GmbH BU castwerk

The IMA Award of Excellence winner in the Automotive Cast Product Design Category is Hettich GmbH BU castwerk of Germany for a gear box for an automatic tailgate lift system with high requirements on position and diameter of the holes in order to avoid axial displacement and noises (0.08mm hole distance tolerance with spc) without any machining. Achieved flatness of 0.18mm over the entire part without any machining.

**PRODUCT INFORMATION**
- **Name of Part or Process:** Gear box
- **Product Using Part:** Daimler
- **Function of Part:** Serial production of automatic tailgate lift system
The IMA Award of Excellence winner in the Commercial Cast Product Category is Hebi Jianglang Metals Co., Ltd. for a Mg alloy frame for a children’s bicycle is a technological breakthrough from the traditional welding of iron and aluminum frames. Mg alloy frame produces a unibody adopting magnesium alloy extrusion process and replaces the traditional welding technology. The linear flow of the entire body is without any welded joints so there is no risk of breaks in the welding process. The shape of the frame is more diversified and the product is more lightweight. Because the magnesium alloy material has excellent shock absorbing performance, the children’s bicycle can protect children’s physical and mental health during riding, weaken the sense of turbulence, and bring a more comfortable riding experience in a better way.

As the world’s most populous country, there are 16.55 million newly-born children each year in China. With widespread education and economic growth, the expenditure for children in the family increases year by year, and the usage amount of the children’s bicycle increases progressively year after year. The magnesium alloy frame & die casted products of the children’s bicycle has been widely recognized by the market as a kind of lightweight high-end product. China’s domestic major-brand manufacturer has developed self-owned brand, using for the children’s magnesium alloy bicycle, magnesium alloy balanced bicycle for children. The die casting of magnesium alloy for children’s bicycle is mainly used on the frame, the wheel circle, the front fork, and other parts of the bicycle resulting in 70% of the major structures in the bicycle being made of magnesium alloy. The total quantity of sales of children’s magnesium alloy bicycle is 530,000, and 180,000 of magnesium alloy balanced bicycle for children last year.

The Mg Showcase

Magnesium Alloy Frame
Hebi Jianglang Metals Co., Ltd.

PRODUCT INFORMATION
Name of Part or Process: Magnesium Alloy Frame
Product Using Part: Children’s bicycle
Function of Part: Light weight, Shock absorption
Alloy Used: AM60B/AM50A
Thermomechanical processing of Allite SuperMag ZE62

Allite, Inc.

PRODUCT INFORMATION

Name of Part or Process: Thermomechanical processing of Allite® SuperMag™ ZE62
Product Using Part: Thermomechanical processing
Function of Part: Increased strength and ductility through Rare Earth Elements
Alloy Used: Allite® Supermagnesium™ AE81, ZE62

The IMA Award of Excellence winner in the Process Category is Allite, Inc. Thermomechanical processing, specifically forging of magnesium alloys, has traditionally been challenging due to the poor ductility of conventional magnesium alloys. Forging, which pressurizes and deforms the crystalline structure of the material, holds great potential to create high strength and exceptionally light weight articles, particularly when the material grain size is kept small during deformation.

ALLITE® Inc. has developed unique rare earth magnesium alloys and designed ZE62 to deliver a superior combination of elongation and strength. ALLITE® Inc. developed proprietary forging methodology for ZE62 including specific material flow analysis, tooling design and thermomechanical processing parameters that successfully retain the material’s crystalline structure and grain size. This enables future production of high-strength forging products with exceptional performance, consistent material density and low-cost production from a range of magnesium alloys. The now documented, patented thermomechanical processing is applicable to a range of existing magnesium alloys widening the application spectrum. ALLITE® SUPER MAG™ ZE62 is designed to deliver a superior combination of tensile strength (380 MPa), yield strength (320 MPa), and elongation (more than 15%).

Weighing 30% less than aluminum by volume and being both stiffer and stronger pound for pound, ALLITE® SUPER MAGNESIUM™ has incredible potential in applications where weight, performance and efficiency are critical, particularly those where components need to be strong and ductile and have specific thermal or electrical properties while still being easy to fabricate. ALLITE® SUPER MAGNESIUM™ represents a revolutionary step forward in the field of material science and is the premier magnesium alloy being branded, positioned, and supported for mass consumer awareness.
The **IMA Award of Excellence winner in the Wrought Product Category** is Fuji Light Metal Co., Ltd. and Japan Medical Device Technology Co., Ltd. for the development of a magnesium alloy to be used in a biomedical device. The magnesium alloy developed for use in the biomedical application does not include rare earth elements or aluminum. The alloy is cast, extruded and drawn into a seamless tube that has an inner diameter of 1.5-3.0 mm and a thickness of 0.11-0.30 mm. All steps of casting, extrusion, drawing, laser processing, and surface treatment are carried out in-house.

Our bioresorbable magnesium alloy scaffold has excellent characteristics such as biological safety (Mg alloy without rare earth), ultra thin strut (100 μm), smaller contact area for vessel wall (less than 20%) and optimum degradable property (within 1 year for disappearance). Our tube facilitates earlier regeneration of vascular endothelialization and suppression of very late thrombosis.

In Kumamoto, we have a consistent production system from the manufacture of the magnesium alloy base material to the final product assembly, it is possible to fabricate high-quality medical devices.

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**PRODUCT INFORMATION**

**Name of Part or Process:** Bioresorbable Scaffold by Magnesium Alloy Extruded Tube

**Product Using Part:** Bioresorbable scaffold

**Function of Part:** bioresorbable coronary scaffold

**Alloy Used:** developed alloy

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*Figure: Bioresorbable Scaffold by Magnesium Alloy Extruded Tube*
Production of Green Magnesium and Magnesium Alloy in a Circular Economy and Low Carbon Model

The IMA Award for Environmental Responsibility was presented to Qinghai Salt Lake Magnesium Co., Ltd. and Magontec Qinghai Co., Ltd. of China for a process using Salt Lake waste brine by electrolysis method to produce magnesium, magnesium alloys and castings—resulting in clean material, green energy, and low carbon production technology.

PRODUCT INFORMATION

Name of Part or Process: Production of green magnesium and magnesium alloy in a circular economy and low carbon mode

Function of Part: Clean Material, Green energy, Low Carbon production technology

Alloy Used: The high quality magnesium alloys used in automobile components industry

The Chain Chart of Qinghai Salt Lake Magnesium Integration Project
To learn more about the benefits of designing products with magnesium, contact the

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*The global voice of the magnesium industry*