

# A new name in grain refining

AMG Aluminum is a world leading provider of aluminium master alloys and grain refiners for the aluminium industry. It is the top supplier out of the three major manufacturers in the world.

To give a focus to their aluminium activities, and develop a global approach, AMG Aluminum was formed by decades of superior quality, technical knowhow and customer service by the people of KB Alloys, LSM and LSM Brasil. Consequently, AMG Aluminum is now one single, focussed business unit of AMG Advanced Metallurgical Group, with a global footprint of five manufacturing plants enabling it to provide a wide range of aluminium master alloys and grain refiners worldwide. As one international business, AMG Aluminum has leveraged the history and strengths of each part to better serve the aluminium industry every day.

Parent company AMG Advanced Metallurgical Group had around 3,100 employees and revenue of US\$ 1.2 billion in 2012. AMG Aluminum is part of the AMG Processing Division of AMG. The other divisions are AMG Engineering and AMG Mining (both non-Al). The corporate office is in Wayne, PA in the USA where Julien Crisnaire, the Global President of AMG Aluminum, is based. The non-UK plants are Wenatchee, WA and Henderson, KY in the USA, São João del Rei in Brazil, and Jiaying Zhejiang in China. In total AMG Aluminum has around 350 employees.

## Getting the chemistry right

The transition to AMG has been very smooth, reflecting customer confidence in the established operations. LSM has just reached its 75th Anniversary and AMG is grateful for that legacy. AMG Aluminum UK, based in Rotterdam has 83 employees, of which 12 are administrative and managerial. There are five analytical testing and chemistry development engineers, and an in-house engineering team on the Rotherham site, which is shared with LSM and consists of 32 acres of active buildings spread over 64 acres. Plant operator



1 Cast aluminium samples before (right) and after (left) the addition of TiBAI™ 5/1 grain refiner.



2 Entering a new era - the gateway to AMG Aluminum UK in Rotherham, with (right) Kevin Lawson, Managing Director and (left) Mark Nolan, Regional Sales Manager.

teams make the grain refiners and master alloys on site. Quality testing is carried out at a process and product level, depending on the customer's needs. Customers needs vary in terms of microstructure, chemistry, and testing frequency needs.

At 60 per cent by weight, the most used product is TiBAI™ 5/1, the grain refiner of choice for cast aluminium to be used for foil rolling down to 6 µm, for example. When added to molten aluminium, it provides a fine and uniform as-cast grain structure by releasing nucleant particles. Without this ingredient one could not roll the aluminium down. Casting speed can also be increased. Figure 1 shows the change in grain structure (in comparison with pure aluminium) achieved using TiBAI™ 5/1, which has 5 per cent titanium and 1 per cent boron content. The second most popular grain refiner is TiBAI™ 3/1, which is used in different rolling scenarios. The trademarks are long established.

Sustainability-wise, AMG Aluminum and AMG prides themselves on providing high value-added speciality alloys and master alloys and engineering systems which contribute to CO<sub>2</sub> reduction and conservation of natural resources by the aluminium industry. Practically speaking, the addition rate, the cleanliness of the melt, and other factors can all affect the cus-

tomers final product when in production.

## Important elements

The industry view of grain refiners is that they are key elements to their casting operation and especially end-users for their processing. If a billet cracks or foil rips under processing, further processing costs must be incurred. For them it is about guaranteeing their quality to their customers in turn.

The best opportunities for growth are the BRIC countries such as India and China and also the Middle East, with some of the largest smelters being developed at Alba, Ma'aden, EMAL and Dubal, with AMG Aluminum growing its business in the latter region.

I price sensitive regions it is essential to emphasise the benefits of product quality and consistency, particularly when used in combination with an AMG Aluminum rod feeder. Fine control of the addition rate of AMG Aluminum grain refiner brings high added value to the customer, and better cost control. A rod feeder machine costs of the order of US\$ 16-17 k, but is seen as a fundamental investment by the customer.

The addition rate of TiBAI per tonne of aluminium will vary depending upon what the aluminium is for and its measured purity. Aluminium billet will require a specific addition rate based on the analysis. AMG Aluminum describes its TiBAI as 'potent', meaning that less is required to achieve the same result as other makes. AMG Aluminum also strongly recommends effective delivery is achieved via one of its own rod feeders. This combination is what can save money for the client.

The key to grain refining is the addition of

the grain refiner with the right potency. The processed material with the addition will develop quality issues for the customer and so the saving of using low addition or low potency is not a real saving. If the addition rate is too high, then no additional benefit is realised and so the true value of the high quality grain refiner is not achieved. The key is to add the high quality, high potency refiner at a controlled rate to match the needs of the customer's application. AMG Aluminum works

with customers globally to optimise the process and addition.

### An evolution

The intent in the formation of AMG Aluminum, with its full focus on the aluminium industry, is to create an evolution in the grain refiner and master alloy market. This has been achieved by delivering consistent, high quality, secure logistics and performance, therefore bringing excellent returns to the

client base. From billet right through to foils and aerospace alloys, AMG Aluminum is seeing a large number of new partnerships growing across the world. From large multinationals to single producers, AMG Aluminum is ideally placed to meet the needs of its clients with technical support, and provide them with confidence it is supplying consistent high quality and its superior performing product via its rod feeders.

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## Reliable rod feeders from AMG Aluminum

AMG Aluminum is a customer-focused, technology-driven organisation dedicated to innovation, ultimate quality, technical expertise, and rapid response to customer needs. It has earned a trusted reputation for reliable delivery of consistently dependable aluminium grain refiners and master alloys anywhere in the world.

For more than 50 years, AMG Aluminum and its UK plant have worked in partnership with a UK manufacturer called Thompson and Hudson Wire Machinery. Based in Yorkshire, Thompson and Hudson produce the highest quality rod feeder systems in the market. AMG Aluminum offer standard specifications for rod feeders which prove to be sufficient for most customers. They can also adapt the machines and controls panels so they are specifically designed for a particular customer's needs.

The AMG Aluminum rod feeder systems are designed for the continuous grain refinement and alloying of aluminium casthouse melts using aluminium master alloys in rod form. AMG Aluminum is a world leader in the technology and manufacture of TiBAl grain refining rod and the AMG Aluminum rod feeder systems are designed to maximise the benefits of using AMG Aluminum grain refining rod. The AMG Aluminum rod feeders comprise a control panel and a rod feeding machine. It is simple to decide which rod feeder is suitable with three questions:

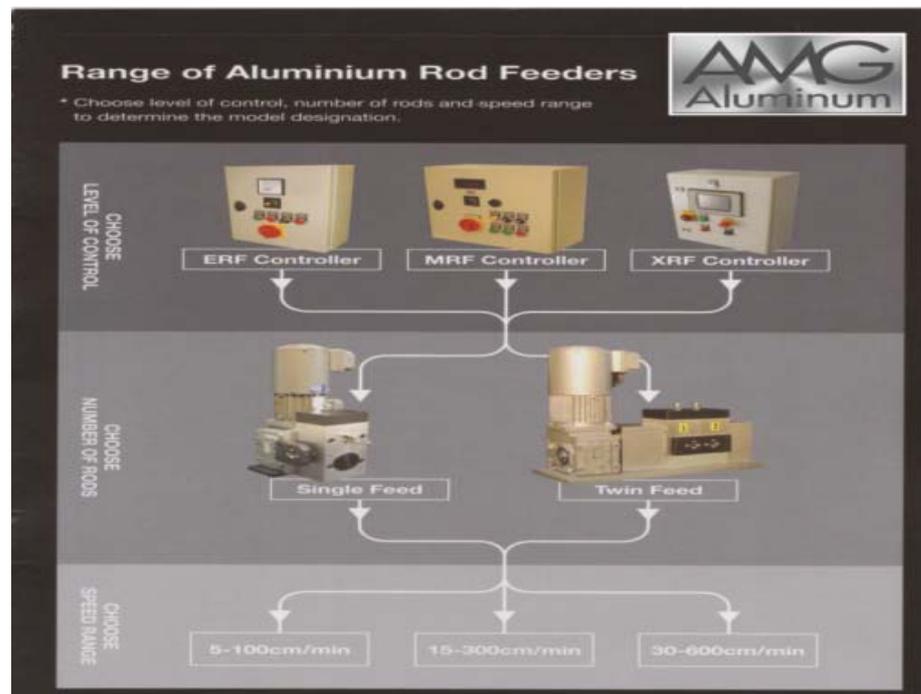
### 1. Which controller?

AMG Aluminum offer three types of controllers, the ERF, MRF and XRF:

- The ERF is the basic control panel, which has simple speed settings/ analogue display, built in alarm system and start, stop and reverse buttons.
- The MRF is a more sophisticated controller which has all the aspects of an ERF and more. The MRF has digital display and a shaft encoder (this allows more accurate speed control).
- The XRF boasts all the features of the ERF and MRF and also includes touch screen control which incorporates speed control, speed display and the alarm for rod monitoring.

### 2. Which rod feeding machine?

AMG Aluminum offer two types of rod



AMG Aluminum supplies a number of variants on its rod feeder systems.

feeding machine, the single feed or dual feed machine. The single feed machine allows for one strand of grain refiner to be fed into the launder at any one time. Guide roll bearings on the feed-box inlet ensure smooth operation, and low friction guides direct the rod to the desired area. The benefit of the single feed machine is it is compact and ideal for use in casthouses with space limitations.

Dual rod feeding machines are capable of feeding two strands of rod simultaneously. The benefit of a dual rod feeder is that it allows for continuous grain refinement without a break between the changeover of grain refiner coils. It also gives the cast house the option of increasing the input by feeding two coils simultaneously.

### 3. What speed?

AMG Aluminum's standard rod feeding speeds are as follows:

- 5 - 100 cm/min
- 15 - 300 cm/min
- 30 - 600 cm/min

Speeds can of course be accommodated to customer's needs. Speed ranges can be reduced to as low as 1cm/min for the most crit-

ical applications.

The firm also supply dual-axis decoilers to casthouses worldwide. They supply two types of decoilers, the DA250 and the DA450. The DA250 has a max. weight of 250 kg, while the DA450 has a max weight of 450 kg. The decoilers can be used with either single feed or dual feed rod feeders and can be used for rod pay off in either a horizontal or vertical axis. The decoilers can stand alone on the floor or be lifted to a position on a fixed frame.

Spare parts for all the products can also be bought. These sales are handled directly by Thompson and Hudson Wire Machinery. All rod feeders are made to order. Generally AMG Aluminum aim to despatch rod feeders four weeks from receipt of order, however this lead time can vary dependent on specifications required. Rod feeder dimensions vary dependent on which control panel the customer chooses and whether they choose the single or dual feed machine. All dimensions can be found in the AMG Aluminum rod feeding brochure.

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