



# Magnesium Elektron

SERVICE & INNOVATION IN MAGNESIUM

# Elektron Feedback Analysis

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## SPECTROGRAPHIC ANALYSIS OF PROCESS SCRAP

The recycling of magnesium scrap from the diecasting process is a key element in determining the cost competitiveness of using magnesium for structural applications. As the use of this material for such applications increases, the recycling of process scrap and second generation components is likely to play an increasingly important role in the supply of magnesium in the long term.

The demand by designers and end users for high purity alloys for the majority of new applications suggests that unlike other materials, a two tier system of alloys, i.e. primary and secondary, is unlikely to evolve; in today's market place, recycled alloy ingot is required to meet the same stringent quality criteria as primary metal in terms of chemical composition and oxide content.

While oxides and certain impurity elements can be removed when recycling die casting scrap, it is not possible to remove other elements, such as nickel and copper. If present in excessive amounts, these elements can have a detrimental impact on alloy performance, particularly corrosion resistance.

To assist diecasting foundries in monitoring contaminant levels in the scrap generated from the high pressure die casting process, Magnesium Elektron has introduced Feedback Analysis as part of its Recycling Service.

## FEEDBACK ANALYSIS

Magnesium Elektron's European Recycling Service can be divided into 3 segments:

1. Scrap Collection and Transport
2. Scrap Processing & Refining
3. Ingot Casting, Packaging & Delivery

Throughout the recycling process, scrap collected from any one customer remains segregated from all other scrap types and is refined using a batch type manufacturing process.

Following melt down of the scrap, a control block is taken and spectrographically analysed to determine what refining measures and compositional adjustments are required to bring the alloy back into specification. This initial analysis is, in effect, an analysis of the process scrap from the high pressure diecasting operation.

From this initial control analysis, a plot is made over time showing levels of the impurity elements copper, nickel, and silicon. In addition, the level of aluminium is also recorded. (High levels of copper and silicon in association with high levels of aluminium suggest contamination through mixing magnesium process scrap with aluminium process scrap.)

Data from the analysis of scrap is presented to the die casting foundry in the form of control charts.

## CONTROL CHARTS

The control charts presented by Magnesium Elektron are bound by the ASTM specification limits for each of the four elements. The range between the specification limits is divided into a mid-range and an upper and lower quartile region.

Under normal operating conditions, the control charts are presented to the customer on a monthly / bi-monthly basis, depending upon production volumes. In such

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instances, the control charts will highlight small changes in contaminant levels over time.

The data which makes up the control charts is recorded by Magnesium Elektron on a daily basis. Should variations from the norm be observed by Magnesium Elektron personnel, then customers will be notified at the earliest opportunity such that both Magnesium Elektron and the customer can attempt to link the variation observed to a variation in the high pressure die casting process.

Magnesium Elektron has incorporated Feedback Analysis as part of its Recycling Service to give diecasting foundries an opportunity to measure the performance of their operation in terms of minimising the levels of unwanted contaminant elements. The process control charts provide useful information in supporting our aim of identifying and eliminating process contamination at source.



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