MAGMA News
Thailand Edition

M5 Engineering
Casting Process Optimized

Issue No.: 4 ● December 2014

MAGMA Thai Newsletter

Do you want to publish an article or success story?
info@m5engineering.co.th

Events in 2015

GIFA 2015

6/16/15 - 6/20/15
Düsseldorf, Germany
13th International Foundry Trade Fair with Technical Forum

Thailand MAGMA User meeting 2015

MAGMA
Committed to Casting Excellence

3/12/15
Dusit Princess Hotel (Sri Nakarin Rd. Bangkok)
2nd Thailand MAGMA user meeting.
User presentations and new developments.

MAGMA / M5 Engineering Ltd. wishes ALL of YOU a merry Christmas and a happy and prosperous new year 2015

MAGMA
Committed to Casting Excellence

In the name of MAGMA / M5 Engineering we wish you all a merry Christmas and a happy new year 2015. 2014 was a very interessting year for us with a lots of exiting experiences through all the foundry industries in Thailand. We thank You for Your feedback to improve our services. May the new year bring You all the best, success and good health!

Glueck auf!!!

Glueck auf!!! *This slogan is used by german foundry-man before pouring. It means good luck!!*

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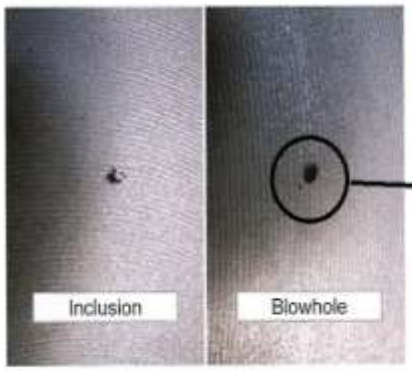
Optimized gating design helps reduce quality issues

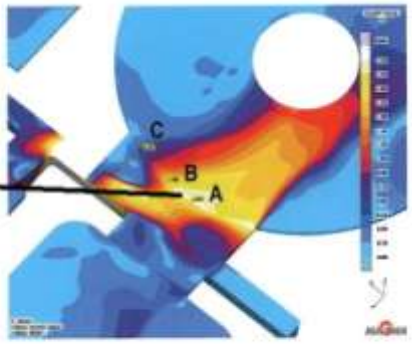
The Foundry ETA d.o.o in Cerkno, Slovenia belongs to the E.G.O. Group and produces grey iron parts using alloys EN-GJL-150 to EN-GJL-300 from 0.1 up to 50kg on horizontal molding lines. Stove hot plates in different sizes belong to their major products. To cast these types of parts it is necessary to keep the alloy composition within reasonable tolerances, control the quality of the sand and design a proper gating system in order to fill the castings smoothly and homogeneously.

Eta CERKNO

A poorly designed gating system for these kind of castings can easily lead to a high scrap rate (up to 75%), as the whole surface will typically be machined. This means no defects such as sand inclusions or blowholes are acceptable. Therefore the main target in designing a proper gating system is to keep metal velocities and related turbulences as low as possible.



Typical defects in the casting

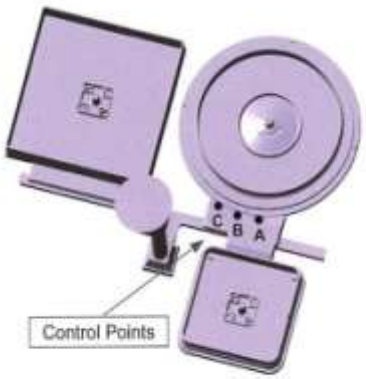


Velocities in the gate area for the original design

When the foundry started to produce a new hot plate with a 360 mm diameter and a thickness of 5 mm, ETA ended up with substantial quality problems. Many parts had to be rejected because of sand inclusions and blowholes.

ETA investigated the flow behavior of the melt with MAGMA5 to find the root cause for the defects and to take the right measures to reduce the high scrap rate. As an indicator for the flow behavior they used virtual control points in the gate areas and velocity results in MAGMASOFT. The local gating speeds at three different locations can be seen in figure 4.

To avoid the peaks in the metal speed (up to 2 m/sec) especially at the end of filling and to homogenize the metal flow in general, the gating system design (ratio of cross section between sprue : runner : gate) was changed. Additionally a second gate was introduced. (See figure 5).



Original gating design and control points

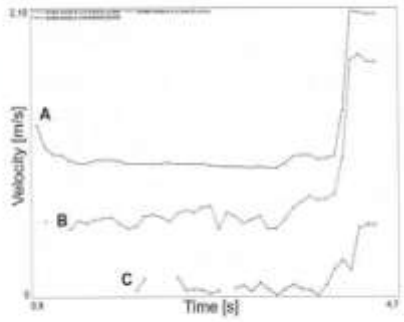


Figure 4 Development of metal speed in the gate area

Due to the increased ratio between runner to sprue and gate runner, the overall flow velocities could be reduced.

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Figure 5 shows the development of metal speeds for the new design (both gates). A statistical analysis of the simulated average, maximum and minimum velocities at the different locations of the two designs clearly showed that all critical parameters in terms of metal speed (especially the average and maximum) could be reduced.

Figure 5: Optimized gating design

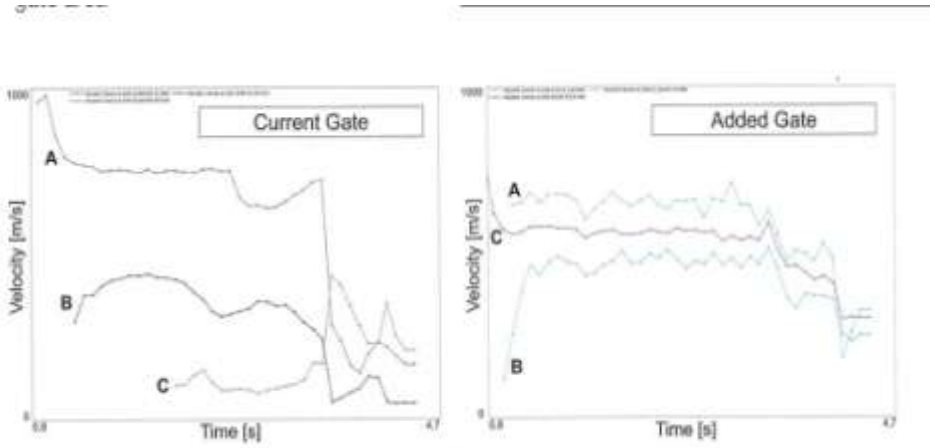

Figure 6: Development of metal speeds in the gate areas

How does casting process simulation with MAGMA[5] help me?

Simulating the casting process with MAGMA [5] provides foundries with technological and competitive advantages that increase profits and aid in the optimization of the entire casting process. MAGMA [5] helps foundries eliminate sources of wasted energy and wasted materials, which leads to lower manufacturing costs and lessens the foundries impact on the environment. Casting process simulation with MAGMA [5] offers foundries opportunities for cost reduction and value creation throughout the entire operation.

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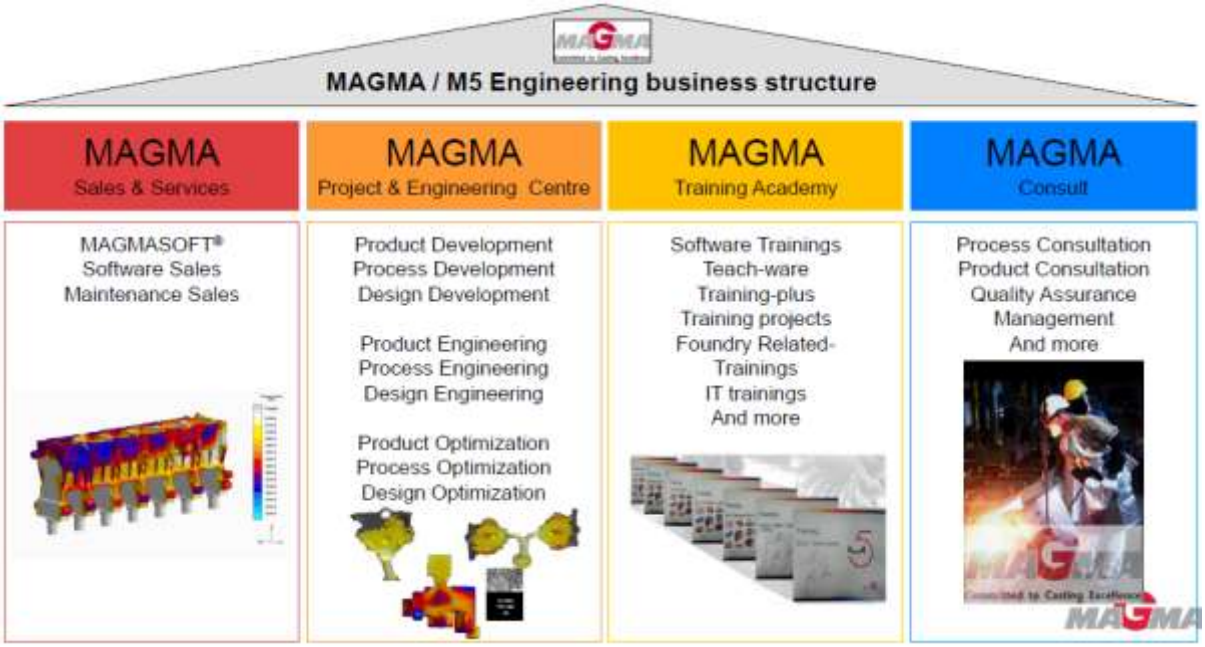

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