How Effective Is Your Spraying Process?

Dear readers,

Welcome to the first MAGMAacademy newsletter of 2018. We look forward to an exciting year with you and hope you enjoy reading our newsletter.

To ensure reproducibility in the production of high-quality castings, you need to make many different decisions and implement them. In high pressure die casting, this applies, among others, to designing the spraying process. The simulation with MAGMASOFT® allows you to gain insights into the process early on, secures quality and helps reducing costs. Learn how to effectively design your spraying process using casting process simulation in today's article.

Are you a MAGMASOFT® user? From now on, at the end of the article featured in the newsletter, you will find news from the support section of our website. Follow the link to learn how to facilitate the daily use of MAGMASOFT®. Read a MAGMAtip or watch one of our numerous video tutorials for this purpose.

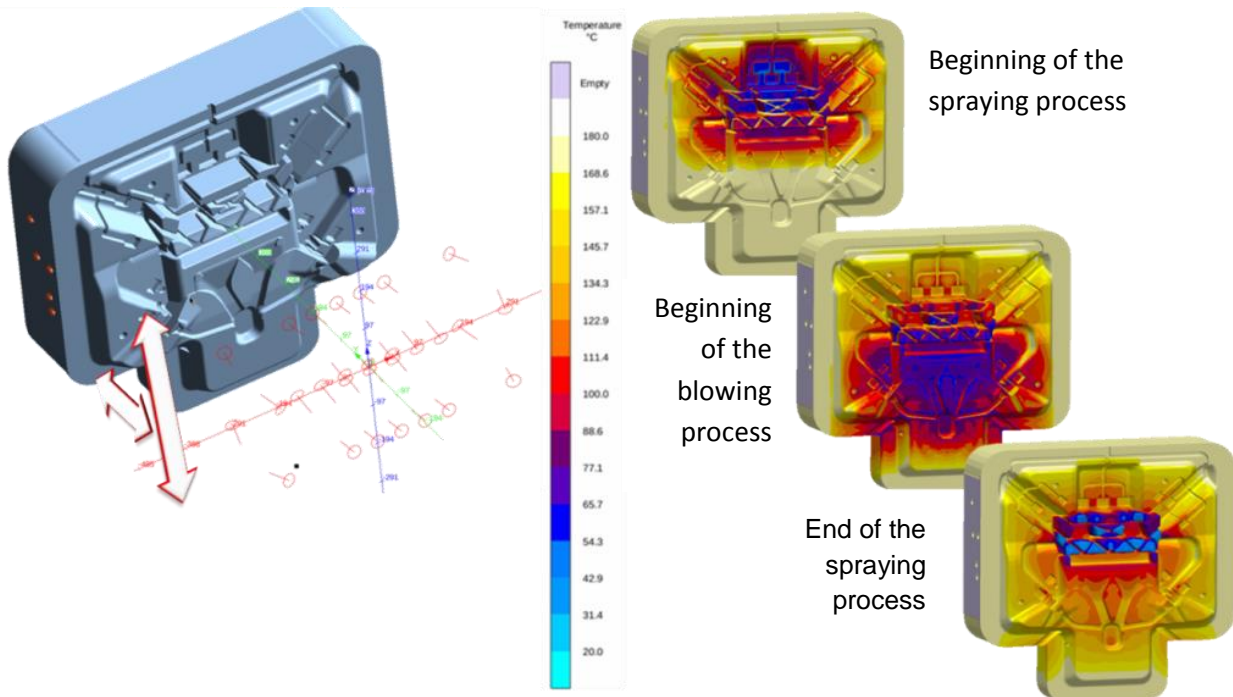Now look below for the new article dealing with the question: "How Effective Is Your Spraying Process?"

Your MAGMAacademy

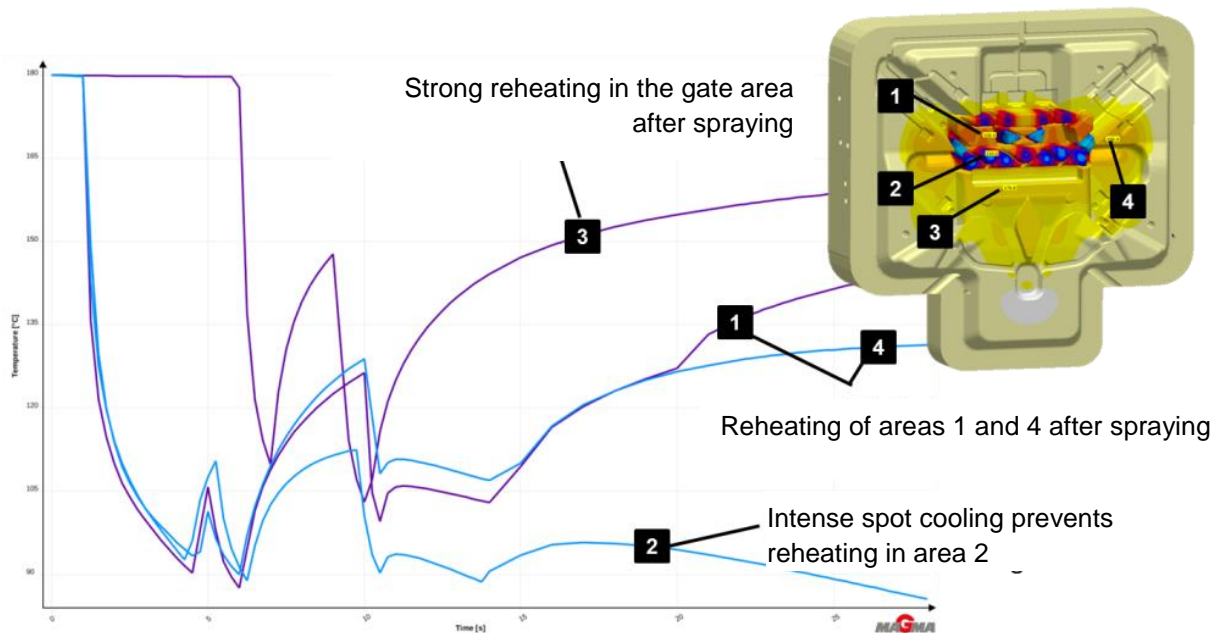**How Effective Is Your Spraying Process?**

The increasing complexity of modern high pressure die castings and the variety of quality requirements call for early-stage robust decision-making on casting process design. Structural components are characterized by complex thin-walled geometries, often combined with thick-walled areas for fastening points. In addition, minimum draft angles as well as the high demands on surface quality pose a particular challenge for the spraying process. From a tooling point of view, a major priority is the prevention of early-stage damages caused by thermal shock due to conventional water-based spraying.

The new options available in MAGMASOFT® 5.4 allow optimizing the spraying process in detail: For example, you can analyze in detail the surface temperature of the die or the wetting of individual tool areas for optimizing the casting quality. In this context, among others, cold laps, porosity or die soldering are considered. Moreover, it is possible to evaluate the distortion of tool components or the lifetime of a die insert.

The following images show the spraying process represented in MAGMASOFT® with individual spray nozzles and spray circuits as well as the spray head movement including the display of the resulting local surface temperatures of the die in the course of the spraying process.

Beginning of the spraying process

Beginning of the blowing process

End of the spraying process

Thermocouples in areas near to the surface of the die allow evaluating the effectiveness of the spraying process combined with the inner die thermal control. Based on an idealized homogeneous initial temperature of the die, after the energy discharge at the die surface caused by the spraying process, in the areas 1 and 4 a reheating of the surface takes place due to the energy stored in the die. Particularly in area 3, near the gate, in the course of the cycle a clear temperature hysteresis occurs, causing a risk of early-stage damages to the die due to so-called heat checking.

Strong reheating in the gate area after spraying

Reheating of areas 1 and 4 after spraying

Intense spot cooling prevents reheating in area 2

The temperature curves in the die area close to the surface illustrate the effectiveness of the spraying process combined with the internal die thermal control. The internal spot cooling in area 2 locally removes energy from the die and reduces the reheating of the die surface.

Do you wish to learn more about this subject? Then attend the German-language seminar "Simulation und Druckguss" taking place at MAGMAacademy in Aachen (Germany), on April 10-11, 2018. This seminar gives an overview of the individual process development tasks, from the determination of the machine size up to the gate design. The flow behavior for different runner systems is discussed using concrete examples, thus providing the basics of designing gating systems for robust high pressure die casting processes.

_____

News for MAGMASOFT® Users

MAGMAtip
In the support section on our website, you can find the new tip on the topic, "Simulation of an Open Feeder Without Insulation Topping". In this MAGMAtip, you are introduced to two possibilities of adjusting the process conditions to consider open feeders without anti-piping powder or lids.

Video Tutorials
In the support section you can find the new video tutorials. For example take a look at the video on "Creation of a Geometry Alteration Preview Using Optimization". Here you learn about how to create a preview video of your geometry changes during optimization in two different ways.