

Success story

ArcSave®

## Saving energy and solving problems at Outokumpu Stainless



New generation of electromagnetic stirrer improves electric arc furnace operation at Outokumpu Stainless AB in Avesta, Sweden. In the summer of 2014 an ArcSave® was installed on a 90 ton spout tapping furnace for stainless steel production, delivering a wide range of process improvements including the successful elimination of furnace bottom skulls.

### Customer challenges

A global leader in stainless steel and high performance alloys, Outokumpu's stainless steel foundry in Avesta, Sweden is one of the world's most productive. Boasting a fully integrated two meter wide mill with 700 employees, they specialize in the production of steel grades with a high chromium content. The addition of ferro-chromium in the arc furnace process, necessary to produce these particular steel grades does, however, have its disadvantages. With a higher melting point than the surrounding melt, the ferro-chromium can settle on the furnace bottom to form skulls. At Outokumpu this led to variations in tapping weight, higher electrode and energy consumption and even practical difficulties when charging the scrap baskets, all of which had a negative impact on productivity.

### Our solution

Outokumpu chose ArcSave®, the new generation of electromagnetic stirrer (EMS) to optimize the performance of their electric arc furnace operation (EAF). A specific stirring profile, controlling stirring intensity, duration and direction, was created to focus ArcSave's improved stirring power on Outokumpu's desired process improvements, including enhanced scrap and ferro-chromium melting, reduced costs and improved productivity.

In the summer of 2014 an ArcSave was delivered to Outokumpu Stainless AB for installation on their 90 ton arc furnace. A new lower furnace shell made from nonmagnetic stainless steel was fitted and, to exploit the full potential of ArcSave, a new temperature robot was also installed. Wherever possible, equipment was pre-assembled and tested before delivery, and preparatory work including installation took place during available down times.

### Benefits

In line with Outokumpu's objectives, ArcSave has delivered improvements which contribute to a more stabilized arc, more homogeneous steel bath, enhanced slag-metal reaction, more consistent EAF tapping conditions and AOD operation. This gives both metallurgical and financial benefits and a smoother and more reliable process.

“We managed to solve our furnace bottom skull problem using ArcSave®. The result is smoother, more predictable EAF operations at lower cost.”

Pär Ljungqvist, EAF Process Developer, Outokumpu Stainless AB, Avesta, Sweden

**Savings at Outokumpu Stainless AB**

Total electrical energy consumption	-3-4%
Electrode consumption	-8-10%
Power-on time	-4-5%
Tap temperature hit ratio	100%
Tap temperature reduction	-20-30°C
Tap weight hit ratio	+24% (reached 93%)
N <sub>2</sub> consumption	-70%

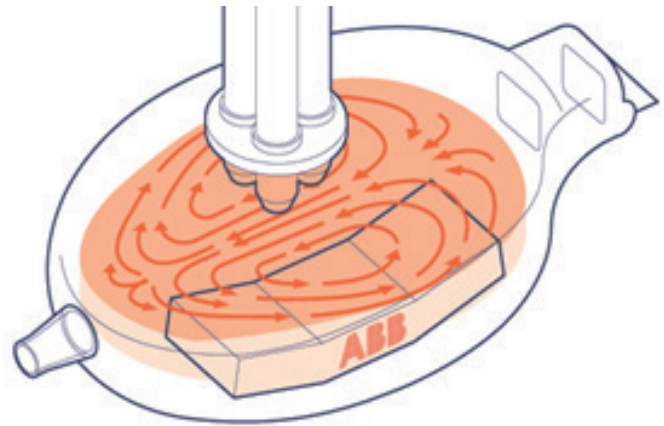
Average savings comparing results from three month before and three months after installation.

**Electromagnetic stirring from ABB**

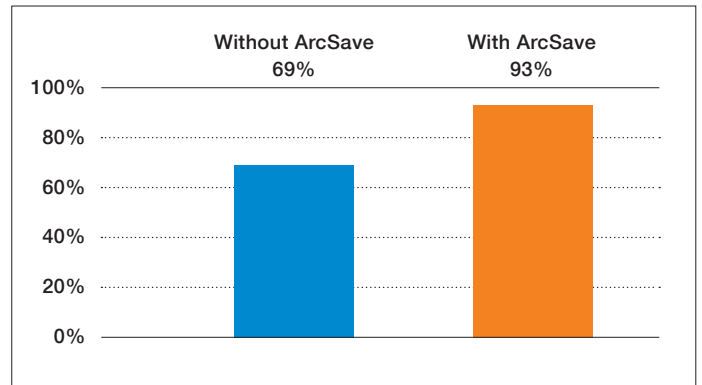
Can your business improve its productivity and process performance with effective and reliable stirring? That’s exactly why the steel and aluminum industry have chosen ABB’s non-contact EMS technology for over 1200 installations worldwide; technology we invented and continuously develop to ensure that you get long-term, significant results. And with the widest and most versatile range of EMS products on the market, we are able to offer you a solution which is customized to your process needs and delivers maximum process improvements.

With EMS effective stirring is achieved when the magnetic field from the static induction coil, placed on the outside of the furnace, interacts with electrically conducting metal bath. EMS effectively reduces elevated surface temperatures and eliminates hot-spots in the melt. This, coupled with minimized oxidation in the melt surface, significantly improves heat transfer to the melt leading to increased productivity, a safer working environment and a more reliable process.

Since ABB’s EMS products provide stirring in the entire bath you will even get more uniform chemical analysis using ArcSave. ABB doesn’t just provide electromagnetic equipment but offers comprehensive performance solutions for your business.



That means our mission is achieved when we deliver the improved metallurgical results guaranteed by our performance warranty. Through expert analysis of your electric arc furnace process we are able to select the solution which best suits your needs. To get the most out of our product, and your process, our in-house experts create a stirring profile to control intensity, duration and direction. During the commissioning phase we test the equipment on-site to guarantee performance, not just in theory, but even in practice.



Tap weight hit ratio increased by 24% with ArcSave.

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