ECOCURE™ HE INNOVATIVE COLD-BOX BINDER

Case Study

Greater Efficiency and Fewer Emissions in Brake Disk Production

M. BUSCH, one of the leading foundries for brake disks and brake drums for the commercial vehicle industry, is increasing efficiency in production while simultaneously reducing emissions.

In 2011, the Bestwig-based company decided to test a new, more efficient cold-box system that also produces fewer emissions. After a two-year test and sample production phase, plant management, coreshop management and procurement staff at M. BUSCH had no difficulty in choosing to switch to the ECOCURE™ HE binder system.

It is a decision that the foundry manager and the core-molding management team still believe was the right one even two years after the switch. "With the ECOCURE™ HE cold-box binder, we are producing more cores without increasing binder use. In addition, we have reduced the use of additives by approximately 75% and shortened cycle times by 15%. The reduction in binder and amine quantities naturally leads to a reduction in emissions."

Further synergies are generated through the reduction in binder, additive and amine quantities, including sand accumulation on the core tool/adhesive tendency, potential casting flaws and disposal costs, which in turn have a very positive effect on overall costs.

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» The Product

With the development of the ECOCURE™ high-efficiency binder, the efficiency and yield of the PUR cold-box system have been successfully improved through increased reactivity, thereby reducing the need for binders in core production. The reduced binder amounts are consistently lowering emissions and reducing material and storage costs in foundry operations. High-efficiency binders generally reduce BTX emissions.

ECOCURE™ high-efficiency binders are very reactive, which means that greater strengths can be achieved in comparison with standard systems. The core strength achieved in this way makes core production more reliable, while at the same time reducing rejection rates. Less binder quantities also means less production of odor, pollutant emissions, tar and gas. Overall, many synergies that bring not only advantages in core production but also financial benefits to foundries.

In the case of the LF versions of the HE binders, it can now be guaranteed that free formaldehyde content is below 0.1%. It is therefore undetectable, which means that it is no longer listed as a hazardous component on the safety data sheets.

BTX emissions have been decreased thanks to the reduction in binder quantities. Furthermore, the HE1LF system used at M. BUSCH features no volatile organic compounds (VOCs). The LF version of this HE binder is therefore currently the most environmentally friendly cold-box system on the market.

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» ECOCURE™ HE in Use

All cores produced at M. BUSCH are manufactured using the ECOCURE™ high-efficiency binder. As an exponent of state-of-the-art technical foundry processes, M. BUSCH uses automatic core shooters that work particularly quickly and effectively and with extreme precision.

The company works with four core-shooting machines that shoot approximately 2,000 cores weighing roughly 5–60 kg per shift. A core-shooting machine with a total output per shift of approximately 600 cores with a similar core weight is also used. Core extraction and coating with MIRATEC™ are performed within seconds in an automated process. M. BUSCH therefore has one of the most modern core production lines and can boast lean production supported by the use of highly efficient foundry auxiliary materials such as the HE system and MIRATEC™ coatings from ASK Chemicals.

Switching to the formulation currently in use has achieved the following reductions:

- Added binder amounts by 16%
- Use of additives by 76%
- Amine quantity by 31%

The cycle time has been shortened by 16% and the scrap rate lowered by approximately 20% since introduction.

	2012	2013 HE system
Cold box T1 to 100 kg	0.62 kg	0.52 kg
Cold box T2 to 100 kg	0.62 kg	0.52 kg
Additives to 100 kg	0.8 kg	0.19 kg
KAT amine to core box	8 g	5.5 g
Total cycle time	**12 secs**	**10 secs**

Tab. 1: A typical core formulation with the associated amine amounts and cycle times at M. BUSCH from 2012 with a standard system and, for comparison, from 2013 with the HE system.

Per metric ton of sand	2012	2013 HE system
Cold box T1	6.22 kg	5.76 kg
Cold box T2	6.64 kg	5.76 kg
Additives	5.16 kg	4.78 kg
Catalyst	1.49 kg	1.28 kg

Tab. 2: Consumption data/total usage of foundry auxiliary materials per metric ton of sand in 2012 compared with 2013.

About ASK CHEMICALS

ASK Chemicals is one of the largest suppliers of complete solutions and tailor-made consultation services for the foundry industry. The core of our company's activity involves manufacturing all foundry consumables required for the production chain as well as providing optimum technical services in order to perfectly adapt our products to the processes on the customer's premises.

Our wide product range contains binders for all core manufacturing processes, coatings, additives, feeders, filters, release agents, metallurgical products including inoculants, Mg treatment wires, inoculation wires and pre-alloys for iron casting. Core production and prototype development as well as a wide range of simulation services round off what the company has to offer.

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