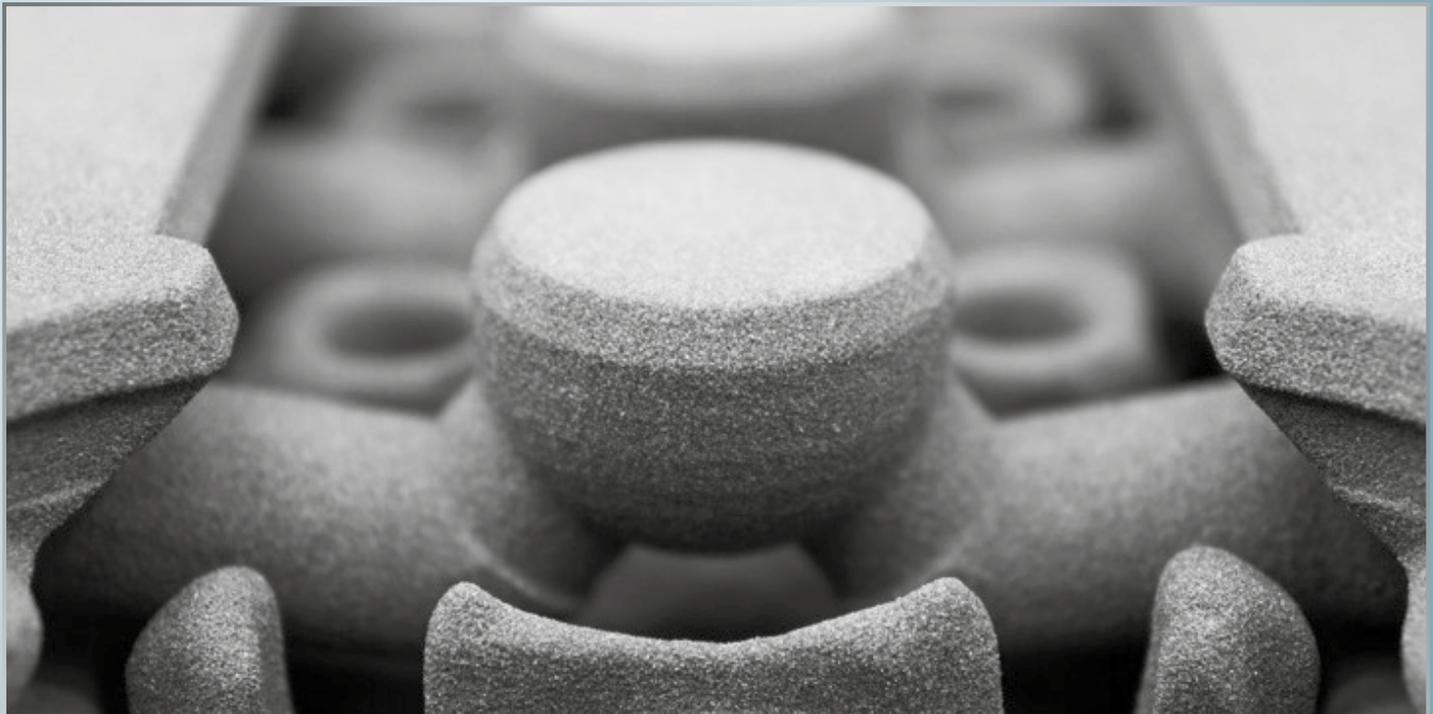




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“Innovations are crucial for success and growth on both the customer and supplier side!”

When it comes to innovation Dr. Jens Müller is the suitable person to talk to at ASK Chemicals. At the fair the company presents several interesting new developments.

Creating value for our customers – with innovative solutions

Dr. Jens Müller, Global Head of Innovation at ASK Chemicals, gives in conversation with CPT a brief outlook on the upcoming GIFA fair in Düsseldorf and describes the importance of innovation for ASK Chemicals and the role of customers in the company's innovation process.

GIFA 2019 is just around the corner and we are all eager to see what the foundry industry will be presenting at the industry's most important exhibition. What new solutions can we look forward to at ASK Chemicals?

A highlight at GIFA 2019 will certainly be our latest solutions for 3-D sand printing. Here we will present some exciting developments both in the field of organic binders as well as inorganic binders. We will also present our new Exactpore 3-D filter technology.

As a leading supplier of environmentally friendly and employee-friendly solutions, we will present new products for this area, such as our latest innovation – the low-formaldehyde system – a package solution consisting of binder, additive and coating that complies with the stricter formaldehyde limits in exhaust gas flow that will come into force at the beginning of 2020. Of course, that's not all. Visitors to our stand can look forward to further innovative products that improve technical and economic performance.

What is innovative for you?

New offers that create high value and are sustainable are innovative. Knowledge is translated into values such as performance, environmental compatibility or cost savings. Ultimately, cus-

tomers and suppliers benefit from this together. The value for the customer is that he becomes more competitive, while the provider of innovative solutions invests part of the value created in generating knowledge and developing further innovation. Innovations are therefore crucial for success and growth on both the customer and supplier side. An innovative product or business model does not have to be perfect from the very first minute, but it has to generate enthusiasm with customers, surprise them and, at least in some aspects, offer more than they expected.

As you say, innovation transforms knowledge into benefit and ultimately into value. Can you put this into concrete terms?

The easiest way to illustrate this is probably to use examples – such as cold box binders, which are now standard in the industry. When Ashland (then the parent company of ASK Chemicals) invented this technology, its knowledge of polyurethane chemistry converged with the automotive foundries' need for fast and reproducible processes to produce sand cores. Then, technology push and market pull forces came together, and our customers and we at ASK Chemicals benefit

from this innovation until this day. Another example is the Inotec inorganic binder system invented by ASK. The anticipation of stricter environmental guidelines resulted in a market pull that our researchers combined with the possibilities of silicate chemistry. Without a close cooperation with our customers' innovative thinking and acting, this development would not have been possible. Today, both our customers' employees and the environment benefit from this innovation.

What is the innovation process at ASK Chemicals like?

Our innovation process consists of three phases: In the first step, the creative phase, we develop new approaches. This is done, for example, through trend analyses and evaluation of new topics in discussions with customers, sales, technical service, R&D, suppliers and other internal and external partners. This is primarily about effectiveness, or “doing the right thing”. This is a very important step, because it is basically about “discovering problems that need to be solved”. In the second step, idea and project management, the core assumptions of the innovation approach, i.e. the technology and the business model, are tested. This is then about efficiency, or

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“doing it the right way”. The projects that also survive this selection process – and these are usually only a few – then enter the 3rd phase, the market launch. At the same time, we aim to have sufficiently clarified all uncertainties critical to success at this point in time in order to be able to convince our customers of the intrinsic value of the innovation.

What role does the customer play in the process described?

ASK Chemicals puts the customer at the centre. As already mentioned above, it is about solving a customer's problem or arousing enthusiasm. We often use the so-called lead-user method. This means that we try to involve particularly innovative customers, with whom we usually have a very good relationship of trust, in the innovation process. Our customers not only contribute to the honing of our ideas and projects, but are also the essential litmus test for the value we want to generate with innovation. In concrete terms, this can also be seen in the

example of the development of our low-formaldehyde (LFS) technology. The customer is confronted with a problem, namely a tightening of limit values for formaldehyde in the exhaust gas flow from 2020 (deadline applies to old plants), which triggers a process as described above. Ideas for solving the problem are generated, initial preliminary tests carried out and optimised in an iterative process between laboratory, test foundry and customer to such an extent that at the end a product package was put together which demonstrably reduces formaldehyde emissions in the drying oven by more than 70 %. And this is exactly what I see as an essential task of innovation, namely the solution of a customer problem.

What are the value drivers that ASK Chemicals has identified for its innovation activities?

We focus on three core areas that are particularly important for our customers: In the “Performance” area, we develop products that simplify,

improve or accelerate foundry processes and thus offer our customers cost and competitive advantages. In the “Environment” area, on the other hand, we have a clear focus on products that comply with the environmental regulations and rules to be expected in the future today without compromising performance. In this way, our customers can already now make their processes and investments fit for the future.

It has always been part of our philosophy to work closely with our customers so that foundries can achieve optimum results with our products. This would not be possible without service as a core element of our business model. This is why we are also placing a very clear focus on innovation in the third area “Services”. In doing so, we are now increasingly relying on digital possibilities that enable us to support our customers even faster and more competently.

Mr. Müller, thank you for the interview!



Solitec HI 703 (water-based coating) shows the user the current status of drying by means of a colour change.

Large-scale casting and waterbased refractory coating – does that work?

With the switch from alcohol to water-based coating, the iron foundry König & Bauer not only uses an environmentally friendly solution that complies with workplace limit values with regard to ethanol, but can also reduce costs in the fettling shop, in explosive-protected areas and in the permanent extraction of the flood basins. With the environmentally friendly water-based coating from ASK Chemicals the iron foundry Koenig & Bauer can also realize drying times of less than six hours.

Ulf Knobloch and Christian Koch, Hilden



Figure 1: The mold is coated at the mobile flood basin.

The Koenig & Bauer Foundry GmbH, Würzburg, Germany, was divested from the Koenig & Bauer Group in 2014 and today, as a subsidiary of Koenig & Bauer AG & Co. KG, serves well-known customers throughout Europe. This takes place either directly with raw parts or in cooperation with Koenig & Bauer Industrial AG & Co. KG (the subsidiary responsible for mechanical processing) with components for pressure equipment and other parts for mechanical and plant engineering.

At the Würzburg site, the foundry looks back on a 200-year company history. Specialized in the production of cast iron with lamellar graphite (GJL) and nodular graphite (GJS), up to 12,000 tons of good castings with individual weights of 0.1 to 10 tons can be poured, blasted, fettled and painted each year via the hand molding process.

In 2011, the foundry with attached pattern making shop underwent a complete renovation with an investment volume of 12 million euros in buildings, facilities and environmental protection.

Modern requirement profile

The Koenig & Bauer foundry, as many other foundries in the manual coremaking and molding sectors, used alcohol coatings over many years. Alcohol-based coatings are characterized by the fact that the cores and molds dry faster or that the solvent can be burned off. However, these advantages are contrasted by a number of disadvantages, such as the need for protective measures and compliance with limit values:

- > Clearance areas in the finishing area (fire and explosion protection)
- > Defined work areas for finishing and flash off
- > Two component purchases (coating and solvents) with special storage in explosion-protected areas
- > Compliance with occupational exposure limits for ethanol or isopropanol

“As a responsible and modern enterprise, it was only a matter of time before we took measures in order to sustainably comply with occupational exposure limits and to demonstrate

ecological responsibility,” states Ulf Schmidtgen, Segment Manager of Koenig & Bauer Gießerei GmbH, mentioning two of the main reasons for the decision to switch to water-based refractory coating.

The conversion should be absolutely cost-neutral, both based on the overall process and without loss of productivity, i.e. the core and mold output per day should at least remain constant. “It was also important for us not to have to invest in oven drying,” adds Stefan Braun, Production Manager. “On the one hand, oven drying would have made our cores and molds more expensive and, on the other hand, there was no space for the necessary infrastructure.” The proviso was therefore to make the conversion to water-based coating without the installation of additional drying ovens.

Water-based refractory coating for large-scale casting

On the basis of the requirement profile, the foundry conducted pilot trials



Figure 2: Stefan Braun, Production Manager, Ulf Schmidtgen, Segment Manager of Koenig & Bauer Gießerei GmbH, and Ulf Knobloch, ASK Chemicals GmbH (left to right), measuring the wet layer thickness.

accompanied by ASK Chemicals, Hilden, Germany, using Solitec HI 703 coating over a long period of time.

Solitec HI 703 is a zircon-free brush and flood coating for cores and molds manufactured using cold processes. The high-solid coating is more flexible in thermal and physical expansion behaviour than zircon coatings. Graphite and oxide content also have a separating effect between sand and the casting. The state-of-the-art binder component holds the water on the coating surface and prevents water migration into the sand interior. The flood viscosity is reached with a minimal addition of water of about 10 % by weight. The uniformly thick layered application with a relatively short dripping time of the coating is a distinguishing characteristic. In ductile iron, sulphur absorbent prevents the sulphur transport from the molding material into the casting surface and thereby averts graphite degenerations. In certain cases, it is also used to combat pinhole defects. The progress of the dry-

ing progress is easily recognisable to the user by a colour change.

Custom process setting

The viscosity of the coating for the cores and molds adapted to dipping and flooding behaviour was quickly determined in a few tests. The implementation of the requirement to achieve short drying time while maintaining productivity required some changes in the production process. For example, trials with hot spraying were performed. In this process, the ready-to-use coating is heated to a temperature of approx. 70-80 °C just upstream from the spray nozzle. This should lead to faster flash off of the water and thus prevent the deep penetration of water into the mold surface. However, the trials did not lead to the desired result due to the geometry of the molds. Although parallel and slightly sloping surfaces and contours were well covered by the coating using the available nozzles, vertical contours could only partially be wetted or not at all.

Attempts to heat the top layer of the mold using infrared radiators also did not lead to a successful shortening of the drying time. The specifications could only be achieved by ensuring constant circulation of the room air in the core shop without simultaneously creating drafts in the working areas. In the molding shop, the process of „molding - finishing - form assembling - casting“ was redefined. Here, too, the drying of the mold halves after coating is assisted with moving air. Now drying times of less than six hours could be achieved. To obtain even more flexibility in the molding shop, a special construction of the flood basin has been in use since the middle of 2018. The mobile flood basin allows for finishing directly on site at the respective forming area, the mold halves now no longer have to be driven across the entire hall and the cranes can increasingly be used for direct production (Figure 1).

In addition to the mentioned advantages, the chosen Solitec HI 703 coating also reduced costs in the fettling shop.

Likewise, it is now possible to dispense with the additional application of a pre-coat coating to the higher thermally stressed points of the cores and molds. The fettling work caused by burn in and mineralization has been significantly reduced. The gas bubble defects have also decreased significantly. Up until now it was necessary to work with a special gas-permeable coating for certain components. Since the conversion to Solitec HI 703, the majority of these have been dispensed with. Ultimately, the surfaces achieved over the entire product range are significantly better than with the alcohol coating used hitherto.

Large-scale casting and water-based refractory coating – that works well!

In 2018, the Koenig & Bauer Foundry completely converted its core and form shop sectors from coating with solvent as a liquid carrier to a water-based product. ASK Chemicals supported and accompanied the changeover phase to

the new Solitec HI 703 water-based coating. Ulf Schmidtgen, Segment Head of Koenig & Bauer Gießerei GmbH (Figure 2), is satisfied: "The result speaks for itself! We use an environmentally friendly and employee-friendly product and have achieved even more efficiency in the process. We were able to reduce casting-related rework and refrain from additional work steps such as the application of pre-coat coating. The mobile flood basin is, of course, a very special highlight which makes our work processes easier for our employees and makes our production processes more flexible." Now the entire surface in the molding shop provided with overhead cranes can be used very flexibly, explains Stefan Braun, because there are no longer the restrictions due to the requirement of explosion-proof areas. Likewise, it is now possible to pour off in the entire hall, regardless of restricted areas. Frequent transport of molds ready for casting is no longer necessary.

The time spent in the fettling area for the elimination of mold and core-related casting defects has been significantly reduced. By switching to water-based coating and the concurrent elimination of explosion-proof areas, maintenance costs in this area were reduced by about 80%. Furthermore, there is energy saving, since no permanent extraction is necessary at all flood basins. As a result of the conversion, the occupational exposure limits with regard to ethanol can now be reliably adhered to, since there is no longer any pollution. Again, storage areas in the production areas are freed up, since day storage for isopropanol and/or ethanol is omitted (Figure 3).

This success story shows that the option of solvent-free coating is also open to hand-molding. A conversion to water-based coating can be carried out without complex drying units and, in addition to advantages for employees and the environment, also offers cost and efficiency advantages for the foundry. www.ask-chemicals.com

Shift from alcohol-based coating to water-based coating

SOLITEC™ HI 703 for large-scale / heavy castings



- 

No need for **pre-coating**
- 

Savings through **reduction of casting defects**
- 

Savings due to **lower energy consumption**
- 

Reduction of **inventory costs by up to 80%**
- 

Savings due to **non-hazardous material**
- 

Ensures compliance with **occupational exposure limits**

Figure 3: The switch from alcohol to water-based coating offers important advantages.