

## FIRST DIGITIZED FOUNDRY LAUNCHED RETROFIT AT SIEMPELKAMP SUCCESSFUL



**LARGEST INDUCTION FURNACE IN EUROPE**  
FOCUS ON SAINT-GOBAIN PAM CANALIZATION

**RAISING RETROFIT POTENTIALS**  
ABP SHOWS WHAT CAN BE ACHIEVED WITH MODERNIZATION



## Einleitung

The first fully digitized foundry in Germany has now gone live – and we are very proud to be one of the three partners in this forward-looking project. In cooperation with Siempelkamp Giesserei GmbH and ZORC Technology GmbH, we are combining our expertise to create a solution that will function like a blueprint for the foundry industry at least throughout Europe, but in our estimation also worldwide. In doing so, not only are we addressing the megatrends of decarbonization and digitalization, but also demographic change. The description of the ‚go live‘ on the following pages is intended to be an inspiration for your future.

With the international best practice in this issue from Saint-Gobain PAM Canalization with the largest induction furnace in Europe and an overview of our retrofit measures, we convincingly document that we have understood the mission for the future.

*Kind regards  
and Glück auf!  
Till Schreiter, CEO*

# The move towards the first fully digitized foundry plant in Germany

At the turn of the year, hardware and software for digitization were installed at Siempelkamp

**Siempelkamp Giesserei GmbH in Krefeld, together with its partners ABP Induction Systems GmbH and Zorc Technology GmbH, has completed the first complete digitalisation of a melting plant in Germany. This is a reaction to the current challenges on the market: skyrocketing energy prices, the megatrend of decarbonisation and the ongoing topic of demographic change.**

ABP Induction divided the project into three phases: The project was started with engineering and preparation. This involved the analysis of the data structure, the provision of data models and the connection of the equipment. The second step was deployment and testing. This included installing the ABP Edge Gateway, implementing the apps, and verifying data collection and communication. Step three then included the actual release and approval, including user training and defining the next steps.

By the beginning of June 2021, the three partners had contractually committed to the redesign of the melting furnace as a state-of-the-art heavy industry project, and preparations for implementation were underway by the end of 2021. With the scheduled shutdown of the furnaces at the end of 2021, the final installation was made for a fully digitized resumption of operation from January 2022. Since then, regular optimization loops have

been scheduled in the digitized regular operation. Now the Krefeld facility is starting up fully digitized.

## Digitalization of a foundry: These are the building blocks

At the end of December 2021, Siempelkamp’s systems were shut down. „We are literally starting with the hardware in the first step towards digitalization: The PLCs are being rebuilt and upgraded, the old PC technology is being dismantled and servers are being set up to be able to virtualize the working environment,“ explains Wolfgang Baumgart from ZORC Technology GmbH. The server works with a service orchestration tool that distributes the individual tasks into containers. This server then used the orchestration tool to start tapping into the individual data sources from the furnaces and temperature lances to the crane trucks and aggregate trucks like a data octopus. „Today, foundries have an internal Wi-Fi network virtually everywhere. Many sensors are therefore connected via Wi-Fi and are then integrated as IoT devices,“ Wolfgang Baumgart explains. To this end, ZORC employs microcontrollers to cost-effectively connect sensors or PLC systems. „This also works well for older systems: There are some good solutions to digitize these as well – and it can be done at reasonable prices. No large machine is lost in the digitization process. You can take existing systems into the modern

age with available technology at very reasonable prices." So this is how you maintain the value of the system - a sustainable decision if you can keep and upgrade large mechanical systems („retrofit“).

**Digitisation is a complex task**

„Digitizing Siempelkamp is a complex task," the expert explains, „because the paths from melting to casting are multi-layered." He gives an example: In order to produce a 150-ton casting, a multitude of melting and holding furnaces are used, the melt is then treated with magnesium in different ladles and poured into a mold - this is something that is difficult to simulate. But we already have the data from the furnace stage: Energy data, quantities and total energies, or even the measured and calculated temperatures - we can work with that.“

The benefit as he sees it: Routine tasks, especially when it comes to documentation tasks, are automated by the system - this simple work no longer has to be done, so that the user can concentrate on the actual challenge. So, aspects of work organization can also be found in the change processes. „Here, another example from the field: In many cases, employees are still classically „note-oriented“ - everything is printed and handwritten. The fact that this habitual structure is to disappear completely and be replaced by a digital process has to be communicated carefully," says Wolfgang Baumgart. But it helps, he says, that employees are already familiar with the new communication medium from their private everyday lives: „Everyone knows a cell phone and has one in their pocket. It's the medium of choice for obtaining quick information, especially when you're stuck in the work processes. For example, think of the work step of taking a temperature reading: The employee takes their cell phone,

checks the specifications, and can put it aside again. So the cell phone is integrated into the work process via company applications - getting used to it is a process.“

**Workflow management for data**

A central component of successful digitization is the ability to allocate all production data. „For this, you need a workflow management in order to be able to describe something like this in a business process. We use our own language for this - the „Business Process Model Notation“.

The individual steps of the production process are represented graphically and broken down into individual steps by the software. You can imagine this process flow like this: „The system starts a melting process, from which tasks are generated for various workstations, e.g. charging for the crane operator, preparing additions for the furnace operator or sparking

off spectrometer samples in the laboratory.

Data is collected along this process and constitutes the „production tree“. This tree can be used directly to generate digital twins or to train artificial intelligence (AI). Structured data of this kind is therefore much more valuable than the unsorted data sets of classic „Big Data“ systems.

In summary, this means: All data is collected and evaluated, is available merged to the business model, and the individual employee is focused only on their task. So what the workflow management system has going for it is that the employee at the individual workstations only ever gets information on his screen or tablet about exactly his tasks that are relevant to him, so that he can complete his task.“

„Managers, in turn, can then check the dashboard to see how the



Markus Fournell shows a hardware component that is part of Siempelkamp's digitalisation offensive.



*Yilmaz Yildir, Vice President Service Sales at ABP Induction.*

process is performing overall.“ This results in the possibility that external intervention can still be made in the actual work process. „If important decisions are pending, actions can be released immediately, which makes the process as a whole faster and more reliable,“ adds Markus Fournell. These business processes are currently being integrated and are replacing the formerly mask-driven systems. These flow organization charts are used to drive the software: „This is the modern way of workflow engines, how you structure your workflows and establish them in a company,“ says Wolfgang Baumgart.

What is needed, are assigned data sets from which production trees can be derived. A production tree may look like this: Material is collected from the various bunkers in the charging chute and then fed into the furnace. After melting, a spectrometer sample and thermal analysis is performed. Based on the information collected, conclusions can be drawn as to whether material

quantities need to be corrected via the furnace stage, manganese for example.

**All the details can be found in the production tree**

Finally, a production tree is created that contains all the relevant information. The branches are formed by all raw materials and all measured values, all energy values and times; they therefore reflect as a process what is ultimately produced: The finished casting as the trunk of the tree. The roots of the production tree are then figuratively supplied by the quality department, containing data on tensile strength results, microstructure, dimension and surface; basically everything the customer wants to receive in the final documentation. „These trees provide two other significant benefits: As a plant operator, you have all the information for accounting together, from costs to material consumption. And: The trees can be used to train digital twins, which can be then used to

simulate production processes and test variants. „These digital twins can be trained very well, especially for metallurgical processes – a key factor for process optimization in operations.“

At Siempelkamp, all processes now run together centrally in one system: „The trick is to bring the individual data together in such a way that there is convergent data that comes from the most diverse areas and subsystems in order to be able to interpret and use it,“ says Dr. Georg Geier from Siempelkamp. This interconnection is not something that is trivial, he says: „We work in grown structures with very different characteristics, hardware and software architectures, and this has to be integrated. This is where the partners ABP and ZORC come into play – we wouldn’t be able to do it without them. We need them at our side, because I am certain: unless we digitize our processes and business models, we won’t be able to generate an acceptable ROI in the future,“ says Dr. Georg Geier.



*Dr. Georg Geier, CEO Siempelkamp Giesserei GmbH.*

# Saint-Gobain PAM installs largest induction furnace in Europe

French group can also recycle 100 percent of casting waste

**An exciting project for ABP Induction in France: This is where Saint-Gobain PAM Canalisation is installing the largest induction furnace in Europe. The French group's goal is CO2 emission-free production. ABP Induction will install an IFM 9 induction melting furnace with a capacity of 30 tons. Commissioning is scheduled for May 2022, with production to begin on 1 June 2022. In addition, Saint-Gobain has developed a recycling service where 100 percent of the casting waste can be reprocessed.**

Long-time ABP customer Saint-Gobain has already succeeded in a number of ambitious initiatives: the major recirculation project (circulation of industrial water, reducing consumption by two-thirds), gas recovery from the blast furnace (recycled for use in the Pont-à-Mousson plant), the exclusive selection of Ecovadis-labeled raw materials, telescopic technology to reduce the CO2 impact of transport, and the introduction of an energy management system at all sites, to name a few.

The investment in a large induction melting furnace is another step towards Saint-Gobain PAM Canalisation's ecological transformation. With the new furnace, production will no longer emit CO2 - this means a reduction in CO2 emissions of up to 10 percent per ton of cast iron produced by

Saint-Gobain PAM Canalisation in Europe.

Further steps in the circular economy: 100 percent of the pipes marketed by Saint-Gobain PAM Canalisation in Europe are also manufactured in Europe - most of them even in France. Compared to imported pipes from Asia, this reduces CO2 consumption. Moreover, 100 percent of the cast material used by Saint-Gobain PAM Canalisation can be recycled indefinitely without any performance loss. To this end, Saint-Gobain PAM Canalisation has developed a recycling service for old cast iron pipes, avoiding all final waste. The old pipes are

transferred to Saint-Gobain PAM Canalisation's plants, where they are broken into pieces before remelting them into new pipes.

The furnace that ABP Induction will deliver has a capacity of 18 MW. The challenge for ABP is the confined installation conditions at the customer's site. With a capacity of 120,000 tons of cast iron per year, the new furnace will increase production and allow the company to respond more quickly to customer requests. What's more, this furnace can be shut down and restarted more frequently, which provides greater flexibility in responding to demand.



# Retrofit: Make older plants fit for the future with modernisation strategies

ABP innovations make it possible for foundry systems to remain competitive for a long time – with high productivity and a sustainable environmental balance sheet

**Foundry and smelting systems typically have a long service life – because, as in the case of ABP systems, they are robust and produced in high quality, and because they are normally serviced on a regular basis. Therefore, it also makes good economic sense to think about modernization of the system – for a longer service life and more efficiency also in higher age. If customers are faced with the choice of making a new investment or modernizing, the ABP experts provide detailed advice and can calculate which investment makes sense. The concept of sustainability with regard to the three dimensions of ecology, economy, and social responsibility plays a significant role – an aspect that ABP Induction has been focusing on in every project for more than ten years, and which now has even more potential thanks to the possibilities offered by digitalization.**

With the modernization of systems, both ecological and economic, as well as social aspects can be taken into account: „It’s about reducing emissions, reducing energy demand, increasing output and productivity, and simplifying work processes for employees, while increasing occupational safety,“ summarizes Yilmaz Yildir, Vice President Service Sales at ABP Induction, „and it’s still not uncommon for systems to run 25 years or more in foundry operations nowadays. That’s also something that has to be taken into account.“ When foundries utilize older systems, they are often faced with two alternatives: use the existing system to its end by performing simple

maintenance and then replace it with a new system, or extend its life through effective modernization while maintaining or even increasing productivity.

## Intensive analysis and consulting process by ABP experts

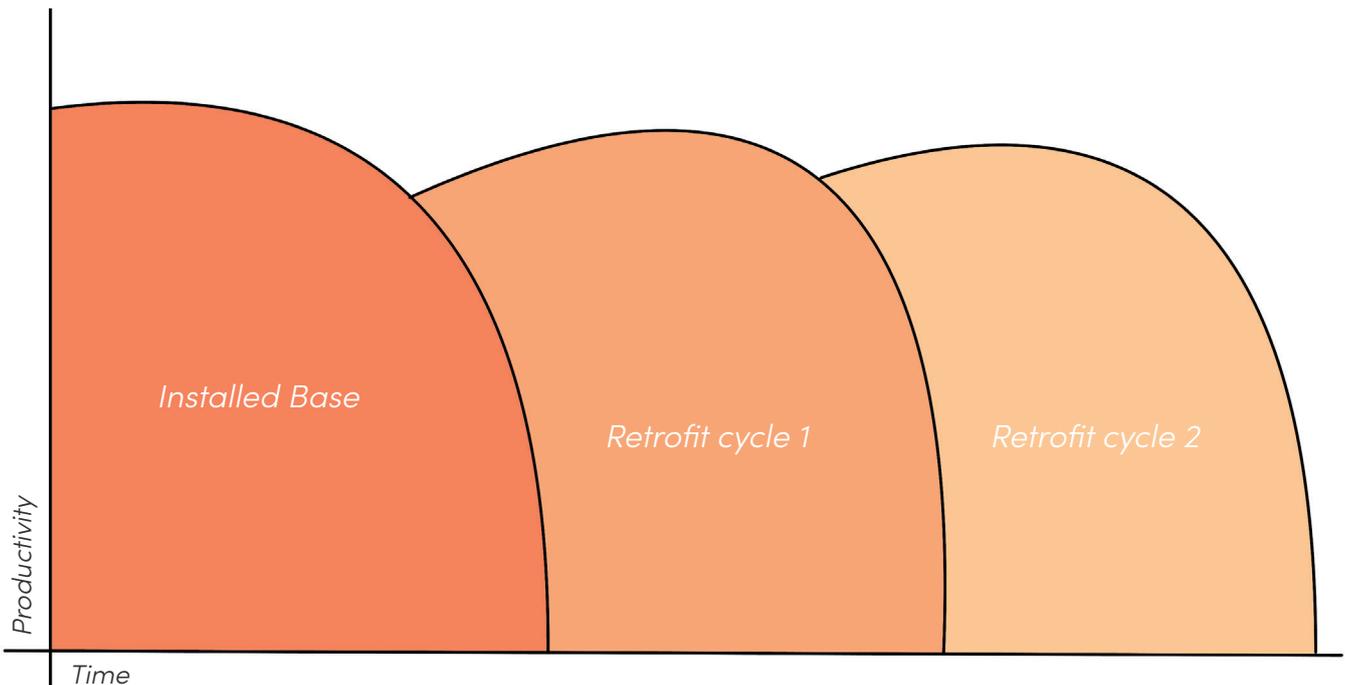
In a high-wage region such as Central Europe, where systems are usually state-of-the-art, investment is a crucial factor. „In many cases, systems in low-wage countries also have a more simplistic design, do not contain certain components, or do not contain them in the same high-quality configuration as in the major industrialized nations – which is, of course, sometimes due to demands in terms of efficiency and productivity. The business value of a system in Central Europe is also certainly different from that of other regions,“ says Yilmaz Yildir. As such, at the beginning of a customer process, the main thing is to determine the customer’s needs, he says: „This is an intensive analysis and consulting process. For instance, the customer may want to make such a big leap in technology that this cannot be achieved with the existing system, even through modernization, in the case, we would advise a new system. In all other cases, we point out modernization alternatives.“ Certain aspects of modernization make it a serious alternative to new system: „Older systems can be quickly upgraded to comply with the latest state of the art and achieve close to the original productivity with the further development of components and parts – or even beyond, if new components make

technological leaps possible, for example, by adapting the process or process technology for more productivity.“ There are several ways to modernize systems: „A new converter, for example, is a targeted investment to maintain existing equipment, enabling systems to continue operating at high efficiency.“

Systems in themselves inevitably age; the aging process and efficiency sometimes depend on the intensity of maintenance, and the continued operational readiness of systems also depends, among other things, on the availability and recycling of spare parts, the keyword being circular economy. „System technology can be brought up to date at regular intervals – in many cases, it is worth investing accordingly,“ says the service expert.

## Retrofit: Maintaining or even increasing system productivity

ABP experts attach great importance to the control and power supply of an system when it comes to retrofitting. In ABP systems, the PLC (programmable logic controller) regulates aspects such as sequence, cycle time, material feed and much more – „it is truly the heart of the system,“ explains Yilmaz Yildir. As part of a modernization, the situation of the system is examined and the necessary scope is defined. It may be worthwhile, for example, to modernize the control system together with the operating elements, which have of course also undergone a development process and have been significantly improved in terms of operability. „When it comes to



*The potentials of retrofit measures in a simplified schematic representation: After installation of the system, productivity decreases over time; through retrofit measures, productivity can be increased again. This can be done in several cycles.*

old system, you have experienced operators, some of whom have been operating the annex since it was purchased. Transferring this specialist knowledge to the younger generation, who have grown up in the age of smartphones and social media, is a complicated and sometimes daunting task. In a sector that is suffering from a shortage of skilled workers, it is particularly important to incorporate modern, intuitive operation via touch screen and thus significantly improve user-friendliness," says Yilmaz Yildir. Put bluntly: Whereas operators used to have to press ten buttons, today one touch switch is all that is needed, he says.

### Digitization opens up new opportunities

Modern components are therefore also good arguments in terms of topics such as work and failure safety, or the serviceability of a system, especially with regards to remote service, as offered by ABP, for example, with digital Expert on Demand (dEoD). „The future of foundries will be defined by

digitalization, and it is precisely the possibilities of digitalization that will give foundries a future," the ABP expert is certain. Digitalization enables plant operators to optimize their own system selectively. The digital portal myABP is the open platform that acts as a manufacturer-independent tool and communication center for this purpose. This platform can be used by ABP's own apps as well as those of other suppliers. Via ABP Intelligence, ABP offers various apps for monitoring and optimizing systems. „If you want to achieve such an increase in efficiency, systems must of course first be Industry 4.0-capable and undergo further development in this direction. This is also an important aspect to be taken into consideration when modernizing a system," says Yilmaz Yildir. To this end, ABP has developed the Industrial Remote Circle with the components myABP Portal, dEoD and Scalance network components from Siemens.

Especially in view of the growing megatrend of decarbonization, it pays off for ABP Induction to have focused on the topic of digitalization

of foundries at an early stage. „We are currently receiving many inquiries from operators regarding environmental aspects such as efficiency and CO2 reduction. The question of how to increase a system's productivity while saving energy and reducing emissions is a key question on the market, and we have the right answers with our modernization and digitalization concept," explains Markus Fournell, Vice President Digitalization & Service Products at ABP Induction. Not only the need for CO2 reduction, but also the price development on the energy market are key drivers. „Companies are now realizing that they need to take action to save energy, increase productivity and become more environmentally friendly - and they can do this without investing in a new system, but precisely by modernizing and digitizing the system."

The buzzword Industry 4.0 has long since arrived in the foundry industry, of course. „But we are also in the process of filling this buzzword with life. Priority must be given to the topic of Industry 4.0 in the foundry world," says Yilmaz Yildir.

**THERMPROCESS:  
Till Schreiter  
becomes president**

The starting shot has been fired for the preparations for the world's largest technology trade fairs GIFA, METEC, THERMPROCESS and NEWCAST. On February 21, 2022, the presidium of the Düsseldorf trade fair quartet convened in its first meeting. For the presidency of THERMPROCESS, the choice fell on ABP CEO Till Schreiter. The election was unanimous. „For anyone who is keen to play an active role in shaping Europe in a sustainable, future-oriented and prosperity-securing way, a visit to GIFA, METEC, THERMPROCESS and NEWCAST is an absolute must. There is no other event in our industry that offers this opportunity to exchange ideas with global experts and decision-makers in person. Especially after the low-contact pandemic period, GIFA, METEC, THERMPROCESS and NEWCAST will be a true source of inspiration,“ explains Till Schreiter.

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**NPS: ABP measures customer satisfaction**

Net Promoter Score reveals prospects in the markets

**ABP Induction has always focused on customer satisfaction and customer benefits. This is best exemplified by the close cooperation with customers when it comes to the development and execution of highly customized solutions, which are usually created in direct exchange with the customers. Of course, customer-friendly orientation also includes regular surveys of customer satisfaction. The Net Promoter Score (NPS), which ABP has been surveying in its target markets for several years, has established itself as a tool here.**

The NPS is a key figure that has seen enormous growth in popularity over the past few years. More and more organizations derive an indication of their own corporate success from a good NPS. In simplified terms, it is used to ask how likely it is that a customer would recommend a company or service to others. And, there is only one question involved.

The advantage of the NPS is the simplicity of the survey – the answers are measured on a scale between 0 and 10. It's about the difference between promoters (who answer with 9 or 10) and detractors (who answer between 0 and 6) of a company – this is the NPS.

„ABP surveys the NPS of customers in all markets worldwide where ABP has a significant presence,“ explains Yilmaz Yildir, Vice President Service Sales at ABP Induction. The challenge, of course, is always to get an adequate number of responses so that the NPS determined is actually meaningful.

Otherwise, values can change from a clearly negative result to a clearly positive result over the course of the survey if only a few participate and the sentiment among these few customers changes radically. External influences can include major events such as the coronavirus pandemic, where direct customer contact was only possible under extremely difficult conditions in the last two years. The absence of an ABP partner or the company's own team due to illness, quarantine or other reasons can also lead to massive shifts. This is why the selection of the base population is important.

It is not recommended to combine all market results into a single average value: „That would significantly distort the results in the individual markets – we wouldn't have anything to gain from that, because we always want to improve depending on the target market,“ explains Yilmaz Yildir. After the survey, the evaluation will then be used to develop potential measures to strengthen customer satisfaction and loyalty for the individual markets.

The next NPS survey is scheduled for 2022 – the values from the survey that was conducted at the end of 2021 are currently being evaluated and analyzed. Customers who participated in the NPS survey will also receive a small thank-you gift for their participation. „Ultimately, our goal is to always improve. However, this only works if customers give us appropriate feedback – also at any time between the annual NPS surveys,“ explains Yilmaz Yildir.