IN FORM

NEWSLETTER
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Dear friends of our business, dear customers,

what "crazy times" these are, we hear again and again, and then we wish each other "and stay healthy." Unfortunately, we have not been able to get together with many of you for a long time, at best only in video conferences. Indeed, we are moving through turbulent times. In addition to the pandemic, the economic crisis has kept or is keeping most of us busy.

Yet, we do feel comfortable in turbulent times. On the one hand, we assume that the **consolidation** in our industry will continue. We are optimistic that we will be among the winners also in this crisis, and we would be pleased to support you in securing **your production** for the long term - preferably with us. This is what we work for every day - **for 100 years now**, by the way! To make this possible, we kept our workforce complete during the crisis, and we continue to invest heavily.

Even in turbulent times, we look ahead into the future: 3D printing of sand molds is the ideal combination of two worlds - we remain in familiar territory in terms of molding material and alloy properties, but we benefit from the advantages of **additive manufacturing**. We continue gathering experience with this new manufacturing technique by completing customer projects.

We are best when we join efforts with you, advising you in the design of the products to make them suitable for casting. An increasing number of such joint projects has moved from design phase into series production at our facility. To get started and for reference, check out our website for a wealth of technical information. We offer another format to get started: a **free seminar named "Fundamentals of Foundry Technology"** which was put together by one of our highly experienced sales professionals. In recent months, a great number of online seminars has been booked.

Read about these topics in this issue of **IN FORM**. And feel free to contact us about them, even and especially in these “crazy times”.

Enjoy the reading, stay tuned and stay healthy!

Yours,

Background: On the situation of the foundry industry

Bankruptcies after the pandemic

Just as automotive manufacturing is suffering in Germany and around the world, suppliers and automotive foundries are suffering as well. We are often confronted with the opinion that the non-automotive foundries must be doing well then. Why, in fact? If our country's largest and most important industry weakens, the other industries cannot detach themselves from that. And so most of the industrial sectors, and the foundries that manufacture for them, went through a recession last year, the final end of which cannot yet be predicted with certainty.

The real problem in the non-automotive, non-ferrous sand casting sub-sector is the industry structure: There has been overcapacity for decades. While customers have partially transferred their purchasing volumes to foreign countries, nearby and far away, the industry's production capacities were not reduced in line with that; on the contrary, further capacities have been built up. At first sight, this leads to an ideal procurement market - overcapacity results in low prices. In the medium to long term, however, (excessively) low prices lead to a lack of future prospects for the businesses and to a lack of investment into new machinery. As a result, businesses slowly die until an external shock leads to insolvency.

From the 70s: still reality in many foundries today

This is where we stand today. There was already a sharp increase in insolvencies in our industry in 2020. We expect this to continue or even intensify in 2021 and 2022. On the one hand, interim aid and suspended filing requirements for insolvencies will expire at some point; on the other hand, it is usually the economic recovery after the recession that leads to insolvency, since the upswing has to be financed in advance.

Then, with an insolvency filing, the cost advantage for the purchaser is gone – either the insolvency administrator increases prices so drastically that the attractive conditions of previous years are adversely overcompensated within a short time. And if the company continues to operate, it will barely be able to cover its costs by selling at the old prices. As in most cases one insolvency is followed by the next, the customer may feel forced to relocate its patterns due to plant closure or permanent uncertainty. This relocation leads to considerable internal and external one-time costs, ruining the full-cost calculation of the previously cheap prices.

And that's how your suppliers' plants should look like now

Summing up, the upcoming market consolidation will be an opportunity for healthy companies. As supplier of difficult parts of excellent quality, we have established a pole position for such opportunities to come. Structurally, we are focused on medium-sized series, where we see the basis for success with a large content of in-house added value. With Corona, we have not reinvented the wheel: we have always offered to take over existing patterns into series production in our works. In the past 10 years, in addition to new business, patterns from 10 different Western European foundries have been transferred to us. We would be pleased to assist you likewise in mastering such a challenge and in establishing the security of your supply chain.

And if there is not yet a need for emergency measures, because all suppliers are still delivering - how can I as a purchaser tell if my foundries are fit for the long run? What makes me feel safe that a new casting partner will not soon cease operations on its part? In various stages of his career, the author has personally experienced what indicates a healthy, well-run foundry:

- A tour of the plant reveals a good balance of old, but well-maintained, and brand new machinery and equipment.
- There is no succession problem (age of senior management and/or the owner).
- All crucial value creation processes are effected in-house and with own staff.
- There are no dependencies on individual industries or customers.
- Independent from boom or recession, the foundry has a clear business focus (>90%), serving clearly either the non-automotive or clearly the automotive sector. Hybrid business models are suspect.
- Responsibilities are assigned in a broad organization chart, and there is a strong headcount in support functions, including QA, logistics/order processing, process planning/design/simulation, sales.
- The company has demonstrated that it stands for a balanced mixture of efficient PPS system, certified management systems, a knowledgeable middle management and, whenever required, a direct, pragmatic approach.

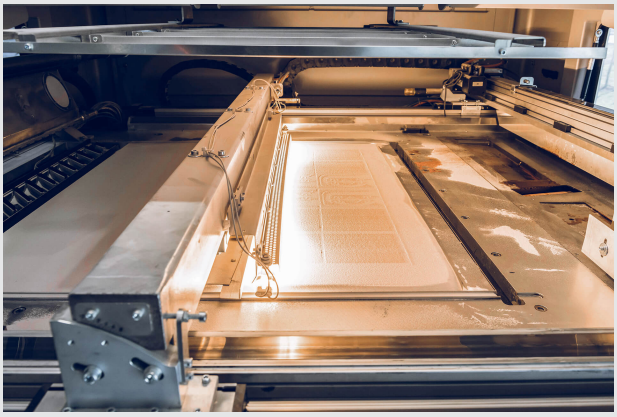
Also this room should be available at your supplier…

We cannot check off these bullet points for others, but we would like to invite you to measure us against them. Over many years, our technical set-up and our organization have visibly grown with the demands of our customers. We have remained flexible with a strategic orientation - always below large-series production. We serve a very wide variety of customers. Our industry exposure is balanced among many industries. We are financially independent and family-owned. We are a long-term sustainable partner for your business.

by Björn Schmidt, Sales

Innovations: *Experience and case studies for 3D printing for sand casting*

In recent years, additive 3D manufacturing based on 3D data has been one of the most exciting innovations for foundries. We employ the process on a regular basis with good results. In doing so, we rely on printed sand molds or printed cores. From a technical point of view, 3D printing can do a great deal and is very fast when needed. Higher costs can be justified by geometric requirements, by small quantities or by time pressure. If this is the case, a wide range of applications opens up – right up to use in series casting. There are almost no restrictions in terms of dimensions. Metallic printed products on the other hand, as in SLM, will always come with significantly higher process costs, while metallurgical properties are very different to those of castings, which are very well understood.



Technical process: 3D printing systems process normal quartz sands with binder systems that we are familiar with from our traditional casting production – furan resin, phenolic resin or silicate ester. Individual sand layers of 80 to 400 microns are printed. Onto each of these layers, the binder is applied selectively to the area, where the contour of the mold or core will remain, to locally harden the sand layer. The machine repeats this process until the desired build height is reached. Sand that is not bound will be removed during post processing. So what are the main areas to apply this technology to?

3D sand molds are used in series production if they (typically cores) offer significant advantages in terms of design or function. Printed cores replace complex, multi-part core packages that require assembly. It is easier to insert a completely printed core into the casting mold than a complex assembled core package. 3D printing allows channels inside the casting that cannot be produced using "normal" core production – tighter tolerances, local undercuts, supporting frameworks, bionic designs for optimized force flow or for weight reduction. Performance increases have been achieved in application cases even for automotive engine series casting. We can also imagine this for structural components. Pioneering for structural parts is the aerospace industry with investment casting via 3D printing to save weight.

Currently, **3D sand printing for spare parts production** is profitable for low quantities, depending on the geometry, up to a maximum of 10 to 20 pieces. This can be attractive, too, for new, complex parts that will run in very small numbers or with many variants. The financial benefit is that there is no need to purchase expensive patterns when old models are lost or worn out. In combination with 3D scanning of damaged components, a digital twin can be reverse engineered. This may even be cheaper than designing a new 3D data set from a 2D print. Moreover, warehousing costs are also reduced because only data – not patterns – requires storage.

3D sand molding in the prototyping field is very rapid, compared to traditional pattern making. Depending on time pressure and budget, a mold ready for casting can be delivered within 10, 15 or 20 working days. As with conventional pattern making, we need a few days of lead time for simulation, technical coordination and mold design, but overall and on average we achieve a reduction in delivery time for raw parts to one-half of the time. The design freedom for multiple iterations is another advantage. A change in the

data set is comparatively inexpensive, and the next raw part produced via 3D printing already incorporates the desired changes.

In conclusion: As always in life, things are not simple. The value and benefit of 3D printing must always be examined on a case-by-case basis. There are applications, in which additive manufacturing makes sense or is the only solution. Experience with such processes is important to us. We will continue to follow this path as well.

Knowledge transfer:

Fundamentals of foundry technology

Dietermann offers an approximately 3-hour free webinar on the **basics of casting technology**. The speaker works for Dietermann in sales and is, among other things, a guest lecturer at the Technical University of Nuremberg and the University of Applied Sciences Munich in the departments of production engineering. He has given the lecture with positive feedback at well-known companies **for interested departments from the areas of purchasing, design, development, project management and quality management**:

History of metallurgical development
Aluminum □ melting characteristics
Alloy properties
Casting process with lost mold
Casting process with permanent mold
Process comparison
Casting finishing
Surface treatment
Quality documentation
Development of the foundry structure
Product development

Speaker: Ulrich Munz, engineer (university of applied sciences) of foundry technology

Mr. Munz studied business administration at the University of Applied Sciences Heilbronn and foundry technology at the University of Applied Sciences Giessen-Friedberg in the 1970s, and has been active in the foundry industry for over 40 years. During his involvement, he has worked in well-known foundries (OEM, Tier1 and Tier2) in the areas of core and sand casting, permanent mold and low-pressure die casting along with cold and hot chamber die casting. His career is characterized by preventive participation in product development with regard to optimization and economic efficiency.

If interested, please contact sales@dietermann-guss.de.

Insight: *Dietermann's history in short*

- **1921**: Foundation; Plant in city center of Duelken next to railway station (today a day-care center for children)
- **1945**: Destruction and reconstruction after world war II
- **1972**: Dr. Franz Reiners and Franz Michael Reiners acquire the company from the founder's descendants
- **1976**: Construction of a new plant on the green field in a local industrial zone; significant investments into modern molding plants in decades to follow
- **1999**: Construction of new building for post-processing
- **2009**: Franz Georg Reiners joins, takes over management and ownership; modernization of foundry to start
- **2015**: New building for machining and quality assurance; modernization of machining to start

Dietermann + Co.: NF SAND CASTING.
PERFECT IN FORM. RELIABLE.
FOR 100 YEARS.