

Dear customers,



If the molding lines of our foundry were the muscles and the employees' heads were the brain of Dietermann, the sand conditioning would be the circulation and the sand mixer the heart of our company. Both were renewed and largely replaced this summer - the open-heart surgery turns out to be a great success!

Having done that, we are not only on the highest technological level a foundry can be. Rather, we are ahead of the state of the art, as a sand preparation plant as realized in our foundry is unique in Europe. We were not satisfied with standard solutions and chose a new approach. If you consider the decisive importance of sand in our production process, you will soon understand why we did so.

Courage for unusual solutions, which we are well known for, has been the right approach in this most important investment in our company during the past ten years: The sand quality available to us today together with a significant expansion of the capacity, prepares us well for being able to continue delivering high quality castings to our customers during the years to come.

If "sand" may sound simple at first to outsiders, its consistent and right quality is a highly complex interplay of multiple factors. This issue of **IN FORM** tries to highlight some of the factors of this matter.

With some pride I can say, that this surgery has been planned and executed well by our staff. We are proud as well of the fact that we were able to accomplish this investment without making use of any public subsidies. Even though subsidies are common in our industry today, at home and abroad, they distort competition. We like to face fair competition.

Yours sincerely,



Sand preparation: a round trip

One year passed from the invitation for tenders to the start of operation. However, the selected plant manufacturer was granted only two weeks' time from plant shutdown to resumption of work to remove the old construction and get the new one in place. That this is not a piece of cake can be understood if you understand the dimension of the plant: join us for a walk along the way of the sand:

More than 98% of the used molding sand is recycled. From the demolding stations of the various lines and molding places, all of the sand is returned into the sand preparation jointly which guarantees a first mixing. In a very fine screen, the sand then is broken up and foreign material is removed reliably. Thereafter, the sand gets some hours rest – even sand needs to recover!



Afterwards the sand is transported into the heart of the plant: the mixer. But before this, it is weighed and its consistency, e.g. temperature and water content, is measured. This information is included in the calculation of the recipe. The sand recipe of each batch is different: the staff of each molding line sets the sand quality they need for the current production, which is different from line to line and from one pattern to the other.

This information is used as set value for the calculation of additives, e.g. clay or water volumes. Together with these additives, the used sand and a small amount of new sand are then mixed, i.e. homogenized, the bond is activated and each grain of sand is enclosed by it. Before being transported to the molding lines, the prepared sand then will be tested



online, both to check the actual quality of the sand versus the set value and to gather comparative data for the next batch to come. Thus, a control loop is installed and continuously in operation.

However, all testing and monitoring is neither helpful nor meaningful if the most important indicators, the "thumb" and the experience of our employees, did not come to the same result. Their testimony: "We should have done this much earlier" tells us, that the decision was the right one, fortunately.

After this short virtual tour, we are happy to invite you for a live tour with us!



Molding sand: how it affects the casting quality

Why do we undertake so much effort to produce a high and constant quality of the sand? Don't even children know how to prepare sand? What requirements does a very good molding sand need to fulfill?

Ease of flow:

First of all, it is important that the sand flows "as coffee powder", so that every little edge of the pattern, however small it is, is filled with sand and thus is reproduced in the casting. This contradicts the normal tendency of sand to form lumps together with water and clay. This tendency increases in the course of time. Apparently, ease of flow and high strength seem to contradict each other, too.

Compactability and Strength:

To hold the entire shape of the pattern after molding, when closing the flasks and during the casting and solidification process, the sand must have a high strength. Particularly for very thin structures or great pattern heights this is very challenging. Therefore, the sand has to offer a high compactability for the molding lines; on the other hand it needs to have high strength in itself.

However, high green strength is a contradiction to high gas permeability (see below) or ease of flow, as well as high compactability contrasts with low water content (see below). For this reason, we mix and mull each batch just according to the technical requirements of each molding line, and each operator is able to adjust the sand currently required based on the workpiece.

Moisture content:

Liquid aluminum likes to absorb water vapor. Water is present in ambient air, in cores and particularly in the molding sand. This absorbed water can affect the casting quality negatively if absorbed by the melt. During the cooling process this gas remains as pores and defects in the workpiece. For this reason, the sand should be as dry as possible. Dry sand, on the other hand, usually generates low compactability (see above).

PROZESS ÜBERSICHT						04.03.2013
ÜBERSICHT	PROZESS	WARTUNG	KALIBRIERUNG	DIAGNOSTIK	ALARM	MISCHER
ÜBERSICHT ÜBERSICHTS GRAPHIK KEIN SAND GEFORDERT						
MISCHER MODUS AUTOMATIK	MISCHER STATUS	MISCHER STATUS		WIEGEBEHÄLTER KLAPPE		
MISCHER MODUS	MOTOR EIN	CHARGENGEWICHT	WASSER ZUFUHR	AUSSTRAGSTÜR		
SANDANFORDERUNG AUTO	+76 AMP	2142 kg	+27,25 l	AUSSTRAGS FÖRDERER		
SAND BEDARF	LEITWERT	TEMPERATUR	NEUSAND ZUFUHR	EIN		
TEMPERATUR GESTEUERTE VERDICHTBARKEIT	+1,37	+26,7 °C	+0,5 %	ZUSCHLAGSTOFF STEUERSYSTEM		
TCC DEAKTIVIERT	BINDER ZUSCHLAG STATUS		90PKZ EIN			
TESTER ZYKLUS EIN	BINDER ZUSCHLAGSTOFF #1	ZUSCHLAGSTOFF #2				
TESTER ZYKLUS	+6,15 kg	+8,14 kg				
VERDICHTBARKEIT	SOLLWERT	WASSER ZUGEBEN	WASSER ERFORDERT	ZUSCHLAGSTOFF #1 GEWICHT	ZUSCHLAGSTOFF #1 GEWICHT SW	
+52	+52	+27,25	+27,36	+14,15	2,90	
AKTIV BINDER	VORHANDENER BINDER	VORHANDENER SOLLWERT	FEUCHTE	GRÜNDRUCK FESTIGKEIT	TESTS DURCHFÜHRTE	
+4,79	+6,99	+7,00	+3,31	+25,1 PSI	+56	



With our new sand conditioning we are able to reduce the water content to up to 50% today compared to our former installation; this allows us to secure the casting quality and still achieve good molding results.

Gas permeability:

Ambient air within molds needs to escape during the casting process. If the air cannot escape through the sand, there will be turbulences within the metal flow and the filling process will take longer. Turbulences will result in defects, a prolonged pouring process will result in solidification of the part before it is filled completely with metal. Both effects of low gas permeability are therefore undesirable!

Good to know, that the gas permeability of today's system compared to the previous sand system has more than doubled.

Surface:

The surface quality of our castings has always been very important to us. In fact, that was one of the reasons why we have resisted to change a running system. Surface quality does not come from fine new sand grains by itself as they tend to change after some weeks of operation. As described above, correlations between the individual sand parameters make it difficult to maintain this fine grain size; lumps tend to appear. Moreover, within each cycle the sand will be contaminated with foreign particles, e.g. from cores.

With more than 6 months' experience, we can now confidently say, however, that the old surface quality has at least been maintained, if not better. What has also been reduced are outbreaks of the surface, which sometimes had to be removed by extensive grinding; having abandoned this, the final surface shape is even more reliable according to the pattern and thus the specification.

Grain size:

We purchase new sand of the classification that fits our expectation of surface quality. However, as sand is recycled, not used up, the particle size distribution will change over time. On the one hand, their size increases (see above), on the other hand, the mixing

and mulling process in most applications resembles a milling process. Therefore, sand grains are grinded into dust. To avoid this, we picked an unusual but most gentle mixing process.

To bring all these seemingly contradictory requirements in line, and to even do so in an economically reasonable way, is far from being simple and moreover a main reason for quality differences in sand casting. Maybe this overview has helped you to understand why we spent so much time to reach the top of what is technically feasible.

"Hannover Messe": DIETERMANN exhibits again!



As in 2009 we will be exhibiting this year at the world's most important industrial fair, the Hannover Messe (Hannover Fair). You will find us from **April 4 to April 8, 2011 in Hall 3 / Booth F45.**

This year we will again exhibit jointly together with our machining partner 'CDL Präzisionstechnik' presenting us as a one-stop solution provider. We would be happy to welcome you in our booth! Please contact us to schedule an appointment.

Of course, we are happy to provide you and your colleagues with entrance tickets.

See you in Hannover!

