

Schlüsselbauer Technology GmbH & Co KG, 4673 Gaspoltshofen, Austria

Grafe Beton incorporates custom-made wet cast, monolithic manhole bases into the comprehensive product range

An innovation has occurred once again at Grafe Beton in Saxony. The family enterprise only commenced a comprehensive modernisation of its pre-cast concrete block production at the Schönfeld factory at the end of 2009. The existing production facilities were supplemented with new large board manufacturing equipment, including the relevant handling systems on the wet and dry side. The company Frima which is headquartered in Emden supplied the complete plant which then commenced operations in Spring 2010. An extensive report in this regard appeared in the BWI 2/2010.

Almost exactly two years later, Grafe Beton played a pioneering role once again when a new production line for monolithic manhole bases was commissioned at the Stölpchen factory in Spring 2012. Grafe Beton opted for the Perfect manufacturing process of Schlüsselbauer Technology GmbH & Co KG from Gaspoltshofen in Austria. Grafe Beton has been closely associated with the technology partner Schlüsselbauer for many years and has been operating several facilities of the Austrian technology supplier for the manufacture of a comprehensive civil engineering range at its factory in Stölpchen. Starting with ten moulds, the first tailor-made concrete manhole bases are now being produced after installation of the industrial manufacturing equipment. The concrete monoliths marketed under the name Grafe-Perfect manhole base, have been an integral part of the range offered by Grafe Beton since May 2012.



The Stölpchen plant of Tamara Grafe Beton GmbH

■ Mark Küppers, CPI worldwide, Germany ■

Concrete roof tiles. Everything started with this product group at Grafe Beton in 1903. The product portfolio developed over time, new sites were developed and the company grew into a transregional supplier of concrete goods and concrete precast components for civil engineering.

Today the family enterprise is in its fifth generation and, with 165 employees, it is a major employer in the region. A total of four production sites and two gravel pits also give the company a considerable size by area. The broad product range and the accordingly large storage space provide clear competitive advantages for Grafe Beton. Almost all standard products are available in large quantities and can also

be supplied directly to the customer at short notice upon request.

A comprehensive range of concrete goods for horticulture and landscaping has been produced at the already mentioned Schönfeld site, which has belonged to the company since 1982 and is now the headquarters of Grafe Beton. The main products here are concrete paving stones in all designs (aged, multicolour, etc.), concrete blocks and concrete slabs, also in a wide range of product variants.

At the Stölpchen factory, where the production of Perfect manhole bases has now commenced, a completely different product range is being manufactured. Here the focus is clearly on precast concrete components for civil engineering. Oil separators in

different variants, small sewage treatment plants, road gullies, tailor-made angled elements and pump shafts are included in the product catalogue. But a comprehensive manhole range is manufactured at the plant in Stölpchen first and foremost.

Ready-mixed concrete is also part of the range at Stölpchen, which is also manufactured in the third factory in Pirna. The fourth factory is located in Kleinkmehlen. This is where Grafe Beton manufactures special concrete elements.

A total of 38 transportation vehicles and truck mixers are available to transport the goods from the four factories to the customers. The Grafe Beton sites are all located in the Greater Dresden area. While the delivery area for ready-mixed concrete is naturally limited due to product requirements, Grafe Beton is strongly represented with its civil engineering products on an international level in Austria, Switzerland and in Poland and, in addition to Dresden, also in Greater Berlin. Concrete paving has been already delivered to Munich at a special architect's request; of course, the delivery areas are normally limited to the cost-effectiveness of the transport, as for all suppliers.

Grafe Beton expects that its new monolithic concrete manhole bases will be able to supply an extensive area. An average of eight concrete manhole bases were time consum-



The high quality of the concrete surfaces convinced Grafe Beton right from the outset



The new Perfect manhole base manufacture is housed in the rear section of this hall, where precast manhole components have been produced with a Schlüsselbauer Exact plant for years.

ingly manufactured by hand at Grafe Beton every day before commissioning of the new Perfect manufacture. With the modern Schlüsselbauer manufacturing system, one single employee can now manufacture ten concrete shaft monoliths every day.



A total of ten Perfect moulds are currently available at Grafe Beton

The Grafe Perfect manhole base

Grafe Beton commenced manufacture of the monolithic concrete manhole base using Schlüsselbauer's Perfect procedure with ten DN 1000 moulds of different heights in May of this year. Since then, the range has included concrete manhole bases of the nominal width DN 1000 with variable external heights from 700 to 1150 mm. Dependent on the shaft height, connections with diameters of up to 600 mm are possible with an exactly fitting gradient and individual angulation.

If these precast concrete components are continuing to enjoy ever growing popularity internationally, Grafe Beton spots clear opportunities here to quickly and successfully gain a foothold on the market with this product which is new for the company too. Thus, the Grafe Perfect manhole base cast in one piece met with great interest beyond the Dresden region immediately after its market launch.

Modern hot wire cutting technology for exactly fitting moulded parts

As always, Perfect manufacture commences in the processing centre for the manufacture of the EPS negative channel. To this end, the individual channel components, such as the main channel and inflows, are manufactured individually in an exactly fitting manner and then joined to form a single unit using hot adhesive. The components are manufactured in accordance with manufacturing software specifications. The shaft parameters for the channel runs and connections are inputted in an input mask on the computer for each manhole base in advance. From this, the computer develops a model which then gives the specifications for the negative channel and thus the working steps for the production employee.

Several hot wire saws are available to the processor which shape the individual EPS components. The cutting stations have two-dimensional or three-dimensional cutting technology. The latter is used for the exact adjustment of the individual sub-channel negatives to the main channel negative.

Due to the gradual adjustment of the angulation and incline of all inflows, the flow behaviour is optimised throughout the channel course. If the negative channels are completely joined together and glued, the relevant negative bodies for the connections are applied

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View into the processing centre for the EPS negative channel



The assembled EPS negative channels are fixed in the steel mould using magnetic technology and secured from lifting.

and also glued. Different negative bodies are available for the connections. EPS connection negatives with assembled seals permit, for example, the manufacture of concrete manhole bases with integrated seals. Once the concrete shaft elements have hardened, the EPS bodies are removed and the seals remain firmly connected to the concrete in the pipe connection.

Rapid filling of the moulds with the concrete truck mixer

The finished negative channels are now inserted into the opened moulds prepared with releasing agent. The moulds comprise two parts and are symmetrical. Both halves can be pulled far apart on rails. The core of the mould is thus easily accessible for installation of the negative channel body. The small-scale cleaning work can also easily be performed after demoulding.

Magnets ensure fixing of the light EPS negative channel and prevent its lifting during filling with concrete. When all magnets are set, the two-part mould is pushed together and firmly sealed using a turn-buckle.

Grafe Beton has installed the moulds for the new Perfect shaft manufacture in the rear section of the production hall for part-1 products of nominal widths 1000/1200. These precast concrete manhole

components (risers and cones) have been produced on an Exact Schlüsselbauer plant for many years. This is supplied with concrete from the central concrete mixing plant via a Rekers bucket conveyor. The new Perfect manhole base manufacture is outside of the range of the bucket conveyor. Thus, a different and simpler method of transporting concrete was sought and found. A truck mixer from Grafe's own fleet now transports concrete to the Perfect manhole base moulds. Self-compacting concrete is used in the Perfect process which is manufactured with Liebherr mixers at the central concrete mixing plant in Stölpchen. The concrete is then transported to the production hall by truck mixer. The moulds are then carefully filled directly by the truck mixer. The driver of the mixer controls the concrete flow speed from the truck mixer, the employee responsible for Perfect manufacture ensures the gentle inflow of the concrete without separation, using simple tools.

The truck mixer is not used for small quantities at Grafe. A complete day's production is always encased in concrete. This means that the employee only manufactures the negative channel for up to ten moulds in the processing centre and installs it into the moulds. Only when all moulds are fully filled and firmly sealed is the concrete mixer called.



A truck mixer from Grafe's own fleet transports concrete to the production site



Finished Grafe Perfect manhole bases in the field warehouse.

The manhole bases are cast upside down. The subsequent floor area of the manhole base is the visible concrete surface in the filled mould. When a filling process is complete, the truck mixer is changed over to the next mould. Thus, in approximately one hour, the ten manhole bases are cast and are left to harden until the following day.

The moulds are opened on the next day and the formwork hardened manhole bases are lifted from the core of the mould. This is performed with a Schlüsselbauer rotating gripper which is moved by the crane track in the hall. The monolithic manhole base is lifted up, rotated by 180° and placed in the hall. The EPS negative channels are then manually removed, collected and shredded in a machine purchased for this purpose and pressed into blocks. The EPS blocks obtained are recycled by Grafe-Beton itself and used as recess bodies in concrete pre-assembled component production for weight-saving.

Expectations are fulfilled

Grafe Beton saw the positive effects of its Grafe Perfect manhole base even after the first weeks of production. The elements were accepted very positively by the market and were able to be marketed accordingly. Grafe sees the convincing advantages of the Perfect monoliths as the appealing, high surface quality of the shaft elements and the great flexibility of the system. Customer enquiries can be quickly fulfilled with individually manufactured concrete elements.

Grafe Beton is striving towards doubling the number of moulds in the near future. Otherwise, the increasing demand which is anticipated will not be able to be met in a satisfactory manner in the long term. In order to continue concrete pouring with a truck mixer, the manufacture of Grafe-Perfect manhole bases will then be relocated to a new hall with sufficient space for further growth.

Grafe Beton is very satisfied with Schlüsselbauer's service, beyond commissioning too. All components were supplied in a timely man-

ner, installation occurred without problems and the staff at Grafe Beton were well-prepared for the new tasks by training sessions.

Grafe Beton is seeing that this loyalty has paid off in the good and longstanding partnership between Grafe Beton and Schlüsselbauer. Thus, an angular large mould for special products was commissioned in the summer. This mould, which was manufactured according to customer requirements, was also supplied by Schlüsselbauer.

It remains to be seen what measure is next on the agenda at Grafe Beton. The company produced concrete pipes in-house until the late 1980s, before the reunification. Resumption of this in the near future with new machine technology would not be surprising where this dynamic family enterprise is concerned.

Excellent ingenuity – Grafe Beton was awarded the 'Top 100' quality seal in 2011

The Economic University of Vienna verified the innovative behaviour of Grafe Beton GmbH over several months under the leadership of Prof. Dr. Nikolaus Franke. Only creative companies with foresight and a sense for innovation joined the ranks of the 100 most innovative medium-sized companies and are now entitled to bear the quality seal for one year, this also includes Grafe Beton.

"Creative ideas and novel thinking are not just a way for us to increase our turnover. We are also passionate about what we do and want to make an impact. The distinction makes us proud and shows us that it is worthwhile pulling together," states Managing Director Tamara Grafe.

The innovation management of Tamara Grafe Beton GmbH is rated as 'A+' overall, whereby the average of the TOP 100 is 'A-'. 'A' rated companies possess professional innovation management which is also uncommon on an international scale. Companies with this rating set benchmarks. The probability of future innovative successes is very high. ■



The central concrete plant with the Liebherr mixers produces the self-compacting concrete for the Grafe-Perfect manhole bases which is then transported to the production hall by truck mixer.

FURTHER INFORMATION



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