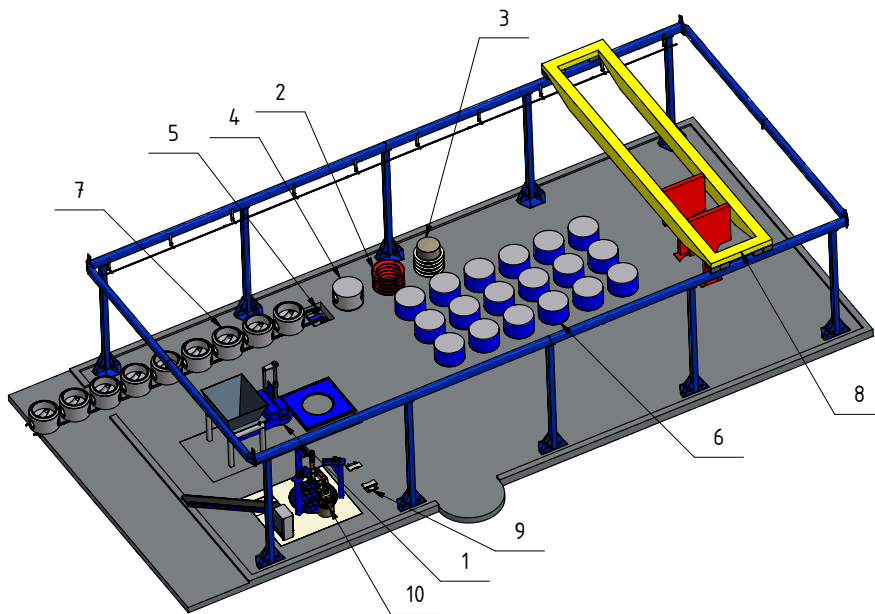


Prinzing GmbH, 89143 Blaubeuren, Germany

PRIMUS manhole bottoms are functional, economical and ecological

Prinzing GmbH from Blaubeuren has brought a new production method for manhole bottoms onto the market under the brand name PRIMUS. A preliminary report appeared in BWI 06/07. The completely new method has been further developed up to readiness for production and distinguishes itself by a high degree of automation, so that only very little use of personnel is required for the production of manhole bottoms with variable channels. The monolithic PRIMUS manhole bottoms fulfil the highest demands in relation to dimensional accuracy, function and long service life. The method additionally fulfils the latest requirements in relation to ecological environmental consciousness.



Complete PRIMUS plant, made up of: 1 manufacturing, 2 steel pallets, 3 interior supporting cores, 4 steel pallet removal, 5 buffer track, 6 moulds, 7 PRIMUS bottoms, 8 crane turning gripper, 9 interior support core removal, 10 milling centre

The complete PRIMUS plant is illustrated in fig. 1. The following description conveys an initial overview of the process steps and the special features of the new plant and the manhole bottoms.

Sales, work preparation and control of manufacturing

Comprehensive software is available for this, in which all order data, such as nominal width, connections, falls etc. are first of all compiled. After a plausibility check has been carried out automatically, the customer receives the manhole data by fax for checking and confirmation. In order to carry out a day's production, the production cards are printed and the data for the PRIMUS plant are transferred online, from which the corresponding manufacturing and robot programs are generated. The current production status is reported back

to Work Preparation. Naturally comprehensive additional programs and modules are available for the complete processing of orders and for administration.

Manufacture of the monoliths (blanks)

The moulds are comprised of interior support core, steel pallet and mould jacket (fig. 2). Compaction is performed by the vibration method. This results in a low water-cement ratio and fast early strength of the concrete. This means that the manhole bottoms can be demoulded from the support core and jacket after approx. three hours and will already have the same quality and dimensional accuracy of manhole bottoms that were manufactured using the wet pouring method with hardening in the mould. The concrete is fine-grained. This leads to even surfaces and high strength values. It has proven to be the case that the strength of the drilling core is higher than for normal concrete (fig. 3).



Fig. 2: The moulds are comprised of interior support core, steel pallet and mould jacket



Fig. 3: Drilling cores \varnothing 90 mm, length 100 mm from the manhole bottoms, left normal concrete, right PRIMUS manhole bottom



Fig. 4: Milling the channels on the milling centre

Milling the variable channels and connections

Resting on the steel pallet, the manhole bottoms, which are still fresh but dimensionally stable, are fed to the PRIMUS milling centre. First of all, any desired channels are now milled, fully automatically. The industrial robot thereby works from underneath and removes the concrete at a high speed (fig. 4). The robot arm subsequently moves to the outside and mills the connections to fit the channels (fig. 5). To this end the manhole bottom is turned around its axis according to the angle of the connection. The channel is designed for optimum flow. This means that the largest possible radius is always manufactured and the transit from a smaller inlet to a larger outlet is stepless (fig. 6). Connections to fit all common types of pipe are milled under program control, naturally also with any desired fall. A chambered seal, which is inserted in a corresponding groove, is used for concrete pipes, plastic pipes, cast iron pipes and similar pipes (fig. 7). For stoneware pipes a corresponding socket is manufactured, in which the pipe is inserted with the seal.

Short lead times bring extra advantages

The lead time of a manhole bottom, i.e. the time from the start of production to the completion of the manhole bottom, is approx. 4 hours. Directly after milling, the part is lifted up from the PRIMUS milling centre, the steel pallet is removed and the finished manhole bottom is turned over into its natural position. Quality checking then takes place. Short lead times significantly lower the expense for mould jigs and profile rings.

Summary: advantages of the new method

- The program-controlled manufacture of arbitrary channel types and the associated inlets and outlets for any desired pipe connection is fully automatic, geometrically optimised and dimensionally accurate.
- Mould expenditure is minimised as a result of early demoulding and short lead times.
- The tool costs and drive power of the milling robot are low, since the concrete is still of low strength.
- No mould parts and models are required for the channels and connections at all, just a milling robot with the appropriate software.
- The method is suitable for manholes in nominal widths 1,000, 1,200 and 1,500 mm



Fig. 5: Milling the connections on the milling centre

- The residual concrete is recycled.
- Personnel costs and costs for the manufacture of the PRIMUS manhole bottoms are lowered considerably.
- Only a small amount of space is required for the installation of the plant.

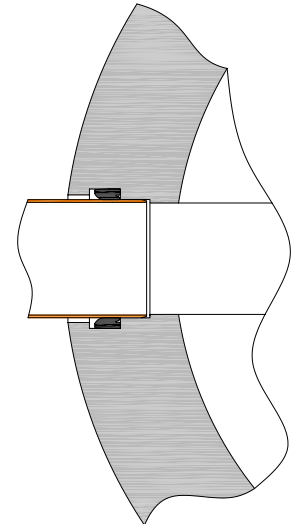
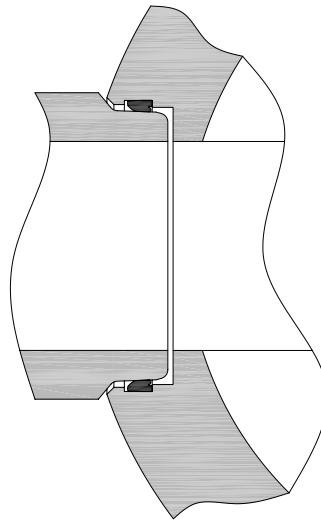


Fig. 7: Chambered elastomer seal, e.g. for concrete and plastic pipes (illustration from DS Dichtungstechnik)

Advantages of the new PRIMUS manhole bottoms

- The manhole bottoms are made monolithically from highly-compacted fine-grained concrete.
- Dimensionally exact manhole bottoms are created due to the partial hardening in the mould jigs.
- The channels are designed for optimum flow.
- PRIMUS manhole bottoms are made from concrete with high strength and low water-cement ratio (C 40/50) or from high strength concrete (C 60/75).

- PRIMUS manhole bottoms are exemplary as regards the ecobalance. No additional plastics, manhole liners and models are used.



Fig. 6: PRIMUS manhole bottom NW 1000 mm, inlets NW 150 and 200 mm, outlet NW 300 mm

FURTHER INFORMATION

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