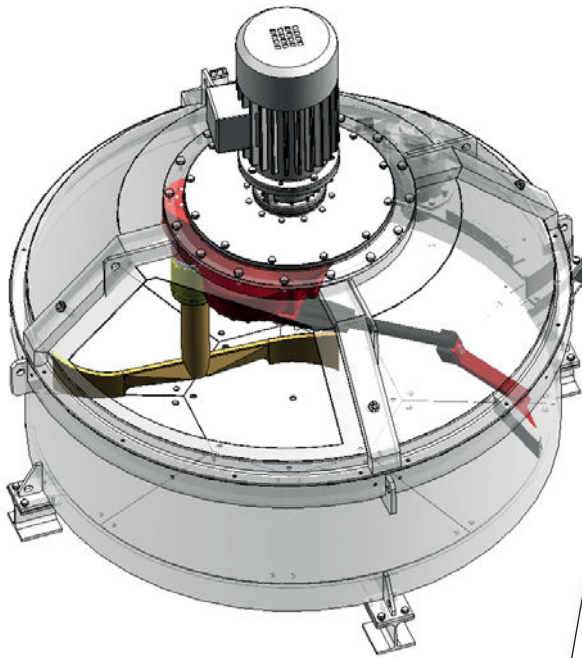


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Prüfbericht

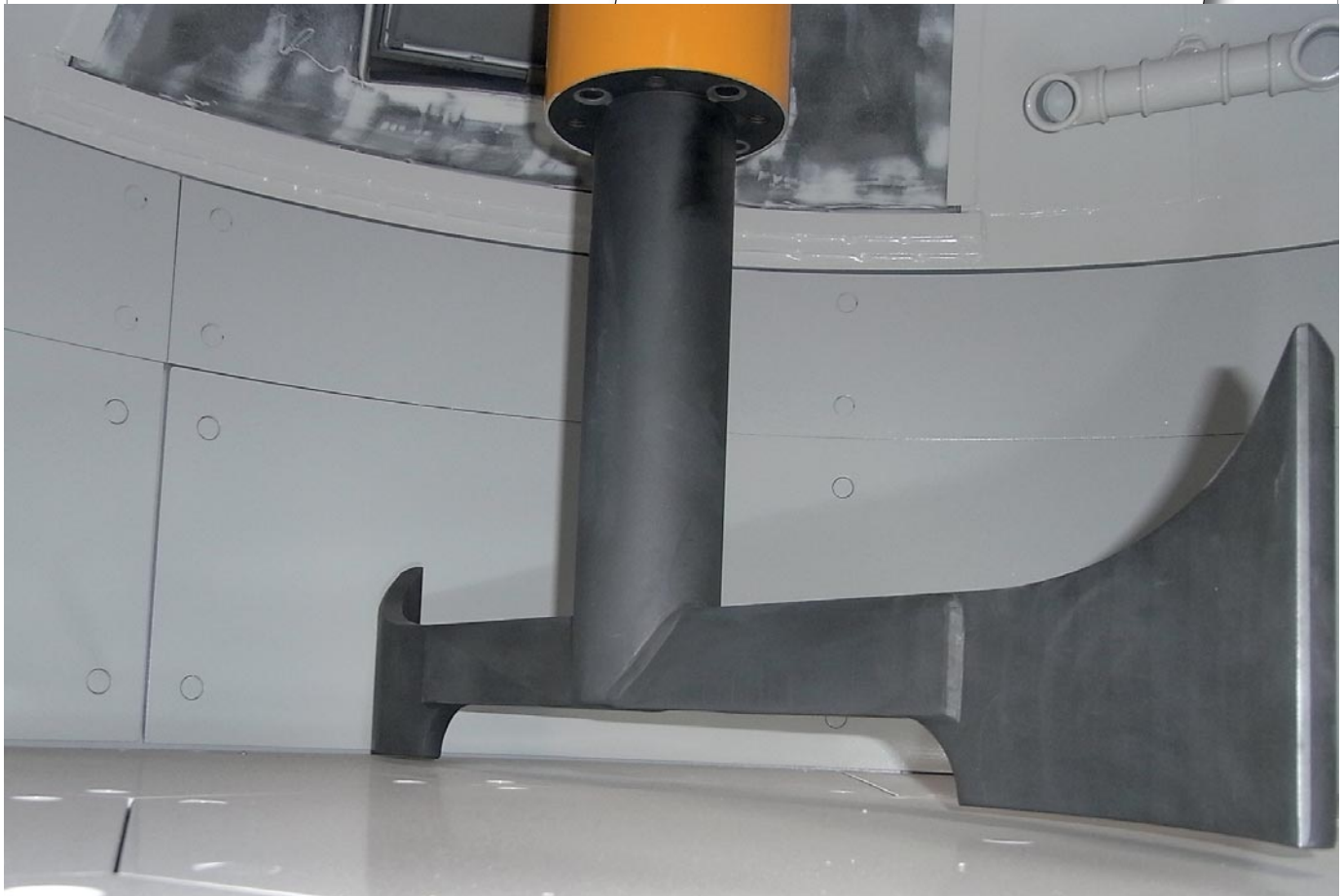
Mischwirksamkeit des Teka Hochleistungsplanetenmischers
Typ THT D-4-II bei der Herstellung von Hochleistungsbetonen

Projektleiter: Prof. Dr.-Ing. Harald Beitzel

Auftraggeber: Teka Maschinenbau GmbH
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Teka Maschinenbau GmbH, 67480 Edenkoben, Germany

New high-performance turbine mixer series

Teka Maschinenbau GmbH presented the newly-developed Teka high-performance turbine mixer series (THT) - the result of intensive product research and development work - at the bauma 2013. The mixing effectiveness of the mixers from the THT series has been scientifically proven by the Institute of Building Process and Environmental Technology (IBU) in Trier. In the meantime the new mixing turbine has already proven itself in practice at numerous companies in new installations and also in the conversion of existing planetary mixers.

Teka Maschinenbau GmbH has been among the world's leading manufacturers of high-performance mixers for the building materials industry for over 50 years. Teka mixers are represented at many well-known manufacturers worldwide in particular for the manufacture of concrete and concrete products. Since the introduction into the market of the planetary mixer series (TPZ), Teka has been able to strengthen its market presence continually, especially in the manufacture of high-quality special concretes.

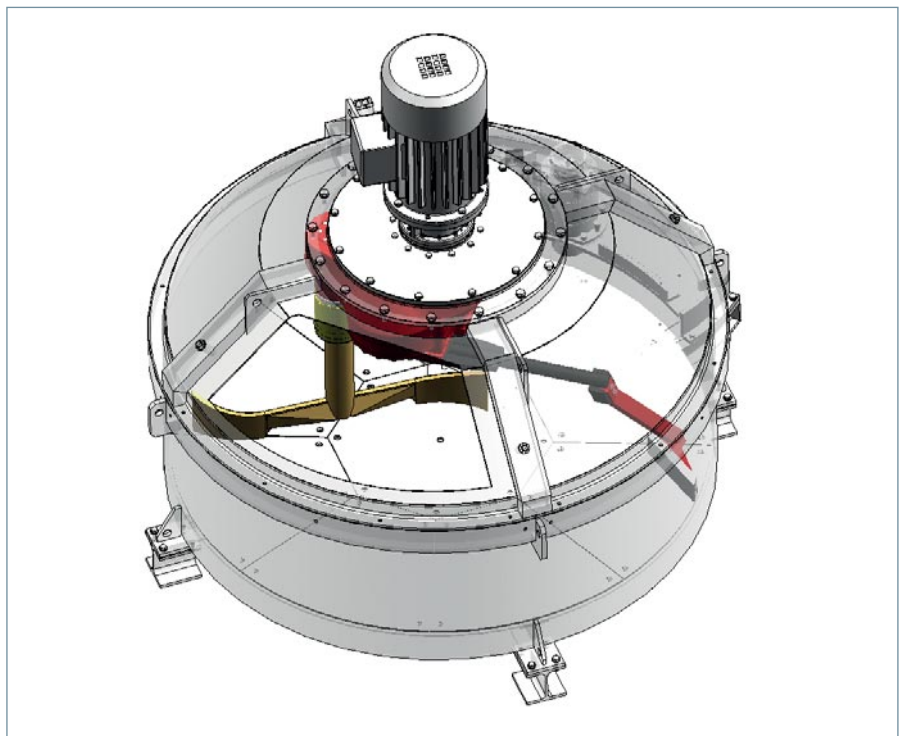
The TPZ planetary mixer series encompasses mixers with capacities from 250 to 4500 litres. All mixers are constructed using a modular system. There are three different model groups, in which the number of planets or mixing stars varies. Different mixer troughs and drive sizes are available in each model group. The first model group encompasses mixers with a volume of 250 to 1125 litres. Since these sizes are mostly used for special concretes such as dyed facing concretes, self-compacting and polymer concretes or also ultra-high-performance concretes, all mixers in this group are equipped with frequency-controlled drives. Hence, the speed of rotation of the mixing tools can be adapted optimally to the respective product. The mixers in the sizes from 1500 to 2250 litres are accommodated in the second model group and those with capacities from 3000 to 4500 litres in the third. These types are usually equipped with hydro-couplings, but can also be equipped at the customer's request with a rigid coupling and a frequency-controlled drive.

New Teka high-performance turbine mixer series (THT)

The concept behind the patent-pending mixing turbine was to build a tool for the Teka planetary mixer with which the contamination in the mixer and the effort required to clean the mixer were to be reduced. This resulted in the mixing turbine, which not only fulfils this point, but also increases the quality of the mixed product still further, especially in the case of difficult mixing tasks, shortens the process times with



All planetary mixers from the TPZ series can be easily converted to use the new mixing turbine



The patent-pending mixing turbine operates as the mixing tool in all Teka mixers from the new THT series



The mixing turbine from Teka offers an optimum mixing effect even with the most difficult mixing tasks

regard to the mixing and emptying times and permits an immense variability of batch sizes for the same mixer size.

The combination of the TPZ high-performance planetary mixer with the new mixing turbine and frequency-controlled drive was presented at the bauma 2013 as the new Teka high-performance turbine mixer series (THT). With this series it is possible to fall back on the proven standard parts from the planetary mixer series. Thanks to the sophisticated modular system principle, the mixer can be configured optimally for the respective product that is to be mixed. In order to optimally exhaust the possible combinations, a type designation was introduced for the new THT series that is no longer orientated to the filling quantities, but rather to the specific requirements of the individual customer in combination with the required components. In addition to the motor rating, the type designation also encompasses the size of the troughs as well as the gearboxes to be used.

The outstanding characteristics of the new THT series can be summarised as follows:

- different mixing trough sizes up to a capacity of 3000 litres.
- equipped as standard with the patent-pending mixing turbine for an optimum mixing effect even with the most difficult mixing tasks.
- depending on the application and power size, the installation of a second mixing turbine is possible (from 1500 litres onwards)
- drive power optimally adapted to the mixture which is to be mixed.
- with the same mixing chambers there is a choice of different motor and gearbox variants. This ensures that the drive power is used to the optimum, which reduces the energy requirement to that which is absolutely necessary.
- due to the design of the interior of the mixer, possible points of adhesion for the mixture have been drastically reduced, which means considerably less contamination of the mixer. This results in longer intervals between cleaning and a minimum cleaning time.

- ability to mix even the smallest batch sites
- complete emptying in extremely short times is possible
- all existing planetary mixers up to a volume of 2250 litres can easily be converted into a THT.

The Teka THT turbine mixer is ideally suited to the most difficult mixing tasks and the most diverse batch sizes. Teka Maschinenbau GmbH has had the mixing effectiveness, in particular for the production of concretes of the new generation, scientifically investigated at the Institute of Building Process and Environmental Technology (IBU) in Trier [1].

Under the leadership of Prof. Beitzel, the manufacture of steel fibre reinforced concrete (SFC), self-compacting high-performance concrete (SCC), self-compacting lightweight concrete (SCLC) and ultra-high-performance concrete (UHPC) was assessed. The homogeneity of the mixture was categorised on the basis of DIN 459-2 (Building material machines - Mixers for concrete and mortar - Part 2: Procedure for the examination of the mixing efficiency of concrete mixers) and in accordance with the RILEM Final Report TC 150-ECM (Efficiency of Concrete Mixers - Assessment and Classification of Performance Mixers). The results determined apply to all four concretes examined (SFC, SCC, SCLC and UHPC):

...the coefficients of variation [of the THT D-4-II mixer] determined [fulfil] the requirements for the mixture limiting proportion of the RILEM Final Report TC 150-ECM for the category 'High Performance Mixer' [1].



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The mixing effectiveness of a Teka high-performance turbine mixer of the type THT D-4-II when producing high-performance concretes was scientifically examined at the Institute of Building Process and Environmental Technology under the leadership of Prof. Harald Beitzel

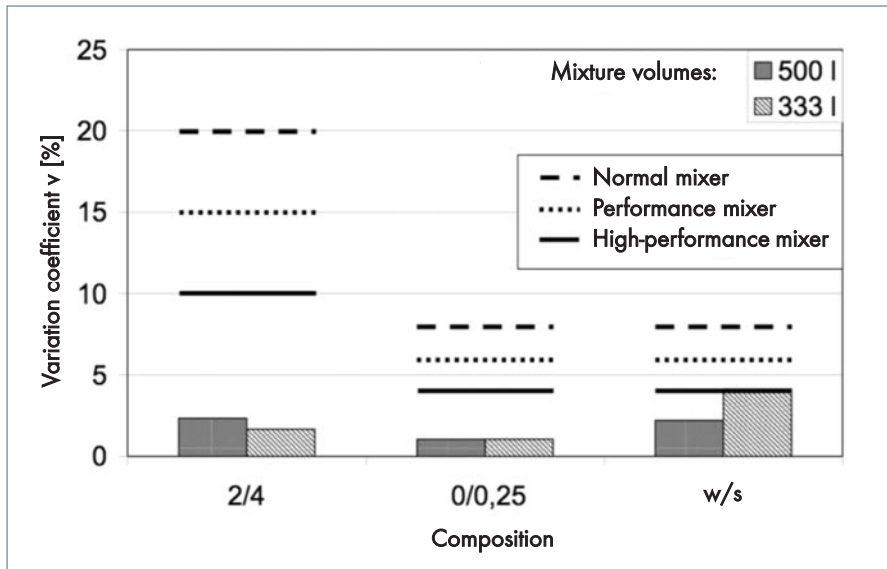


Fig. 5 shows an example of the results from the test report for UHPC. Ultra-high-performance concrete is one of the most demanding concretes of the new generation.



Depending on the size of the mixer the use of several mixing turbines is also possible, even when converting existing planetary mixers

Fig. 5 shows an example of the results from the test report for UHPC. Ultra-high-performance concrete is one of the most demanding concretes of the new generation.

The Teka THT D-4-II high-performance turbine mixer examined fell within the strict requirements for a high-performance mixer by up to 75 %, even in the production of UHPC. The wording of the IBU report regarding this is as follows:

Using the Teka THT D-4-II high-performance planetary mixer with the maximum nominal filling, an ultra-high-performance concrete can be manufactured within the mixing times examined with reliable quality. Cost-effective production of ultra-high-performance concrete is possible within a pure mixing time of 3 min [1].

Apart from the concrete mixing quality, the power consumption of the mixer was also recorded in order to assess the active power. The IBU thereby determined that, in the production of UHPC with a nominal filling of 500 litres, 80 % more energy was input into the concrete than in the case of SCC. The Teka high-performance turbine mixer is thus also able to provide the high power that is required in particular for UHPC on account of the many shear planes.

The Teka high-performance turbine mixer has in the meantime achieved outstanding mixing results with facing, fibre reinforced and polymer concretes as well as self-compacting and ultra-high-performance concretes. The new THT series has also already proven itself with refractories.

Teka Maschinenbau GmbH is one of the leading suppliers of conversions and plant modernisations. A large number of concrete plants were modernised in 2012 in Germany alone in order to meet the customers' latest requirements. The new THT series with mixing turbine was installed several times here, always to the fullest satisfaction of the customers.

Teka Maschinenbau GmbH offers everything from one source, from joint pre-planning with the customer to project engineering, installation and commissioning. The efficient service as well as the extensive spare parts warehouse and the corresponding supply of spare parts are further important decision-making criteria for Teka's satisfied customers.

Literature

- [1] Mischwirksamkeit des Teka Hochleistungsplanetenmischers Typ THT D-4-II bei der Herstellung von Hochleistungsbetonen. Institut für Bauverfahrens- und Umwelttechnik (IBU), Trier, Februar 2013

FURTHER INFORMATION



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