

# Betomat vertical concrete production plant



**LIEBHERR**

# Vertical concrete production plant from Liebherr: a concept with many advantages

Betomat tower mixers have been used successfully throughout the world for many years, both to produce pre-mixed concrete and in precast element and concrete product manufacturing.

Their well-proven modular construction principle permits plant to be planned individually from 55 to 240 cu. m/h set weight of concrete. Versions with two intensive-action mixers operating alternately are also available, or with the second unit used as a pre-mixer in concrete element production. Liebherr's full range of options and accessories satisfies every requirement. A tandem plant can be installed to double the output again. The complete concept is geared to the cost-effective production of high-quality concrete in a plant with low rates of wear.

## 1 Advantages of the Betomat concept

The vertical mixing-plant layout guarantees high production rates and ample storage volume on even a limited site area. The modular-element principle permits numerous design variations and output ratings to be supplied. Compact and self-contained, the vertical plant layout is environmentally acceptable and also has advantages in winter operation.

## 2

### The Betomat for pre-mixed concrete

Since it is made up of modular elements, the Betomat is not only suitable for use as a permanently installed facility but can often be employed temporarily on large-scale construction sites such as dams or tunnels. From the plant concept to its control system, everything is geared to smooth filling and throughput of the truck mixers. The twin-track option is of particular value when delivering pre-mixed concrete.

## 3

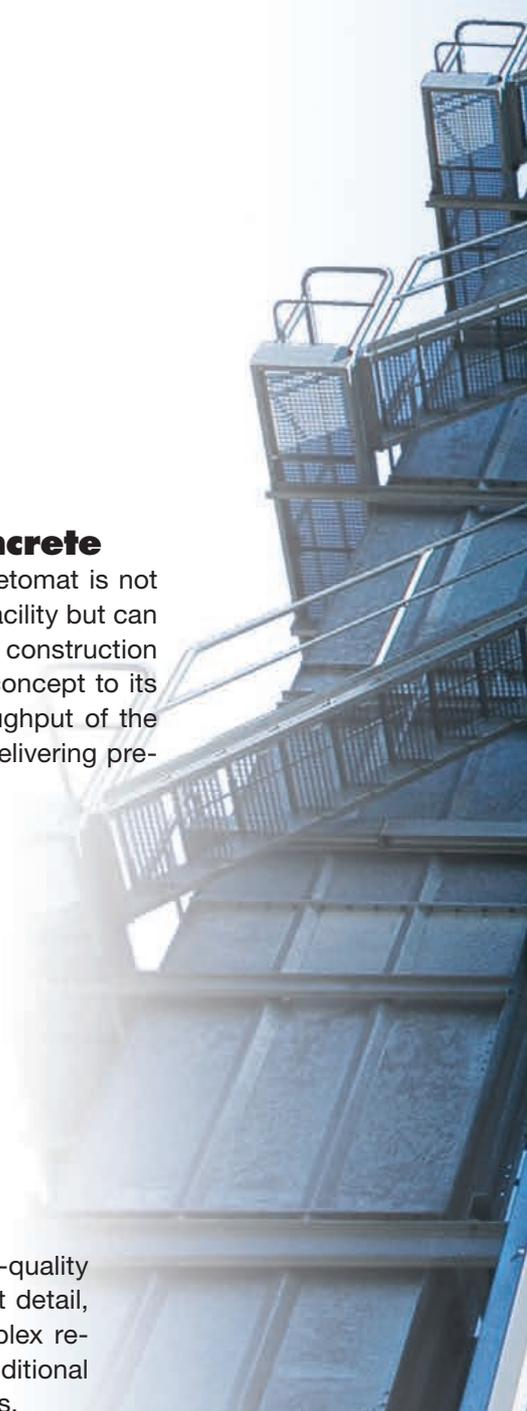
### The Betomat in the precast and prefabricated concrete products industry

The generous materials storage capacity, with up to 10 silo compartments, is a genuine advantage for users in this industry. The plant itself, its control system, dragline loader and requirement indicating points, together form a convincing overall concept.

## 4

### The Betomat in detail

The selection and positioning of the high-quality components has been planned to the last detail, so that a perfect overall equipment complex results. The purpose-made options and additional equipment satisfy the same high standards.





# 1 Advantages of the Betomat concept

The mixing plant's vertical layout, with the aggregates located directly above the weighing and mixing platform, guarantees high output and the necessary storage capacity.

The tower layout occupies only a minimum of ground area. To suit customers' needs, numerous alternative versions are available, with one or two mixers and various loading systems: bucket elevator, S-pattern conveyor or inclined belt.

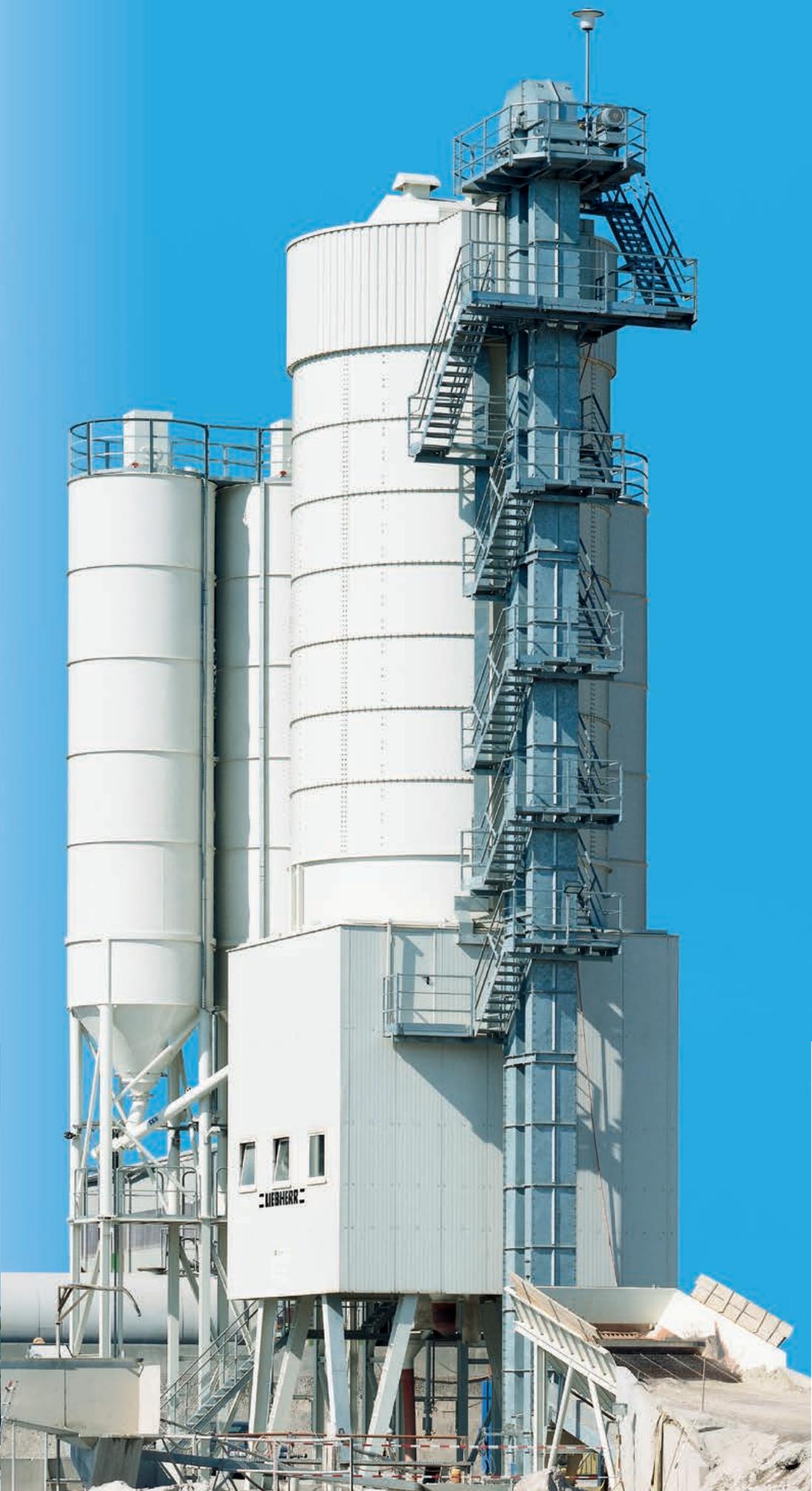
Compact and self-contained, the vertical layout minimizes dust and noise, is therefore extremely pro-environmental and capable of working without problems in the winter season as well.

Pre-assembled modular units make the plant extremely easy to assemble and keep erection times to a minimum. Because of this, even temporary operation on a construction site is a viable proposition.



Erecting a Betomat II-400

Betomat III-570



Betomat II-400



Betomat II-235

# 2 The Betomat for pre-mixed concrete

It would difficult to imagine the pre-mixed concrete industry without the Betomat. Plant size and version can be precisely matched to the customer's needs, and an on-site building incorporated into the layout if required. Modern control systems and software make the Betomat extremely easy to use and can include a large number of additional procedures, for example invoicing, vehicle movement control or a concrete-laboratory program. For top-quality concrete or for maximum output, Liebherr can supply the most suitable mixing system: ring pan mixers with or without agitators, or its double-shaft mixer.



Betomat III-360



Betomat III-290



Betomat II-400



Betomat II-400



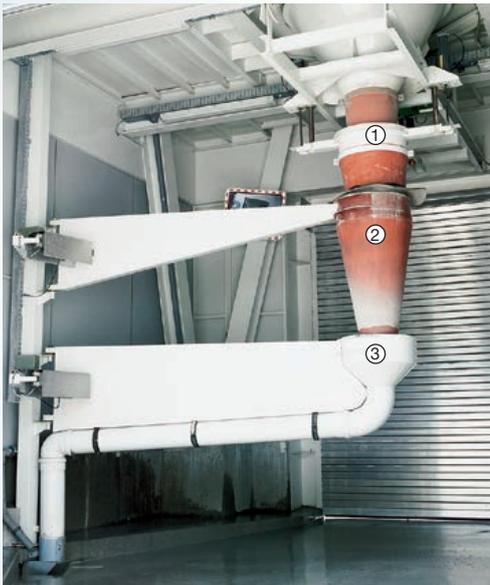
## The Betomat - a powerful plant with many options

The plant can be supplied on request with two discharge lines, for rapid truck-mixer filling. The appearance of the plant can of course also be varied too. There are various forms of loader available for aggregate storage (belt conveyor, bucket elevator, S-pattern conveyor) and various discharge hoppers as well. The aggregates are moved by the shortest route to their storage compartments, and the low number of moving parts helps to guarantee reliable operation and minimum wear for a long period.

Other highly practical options from Liebherr include an automatically lowered extending nozzle (1), a swivel chute for truck discharge (2) and a swivel collecting hopper (3) to accept water when the mixer is being cleaned and thus minimize contamination of the plant.

Residual concrete returned to the plant and the water used to clean the truck mixers and the main mixing plant have to be disposed of reliably and at moderate cost. Liebherr can supply two types of concrete recycling plant (trough and screw patterns) with capacities between 4 and 22 cu. m/h. Sand and gravel are washed out and the residual water containing cement trapped as a suspension in an agitator tank. All these materials can then be re-used in concrete production.

Liebherr's high-pressure mixer cleaning equipment greatly reduces the effort that would otherwise be involved in performing this task. At the touch of a button, the mixer with its gate can be cleaned each evening or before lengthy work breaks; this reduces the time-consuming task of manual cleaning with a hose to an absolute minimum.



Swivel chute and extending nozzle



Concrete recycling



Before and after cleaning



# 3 The Betomat in the precast element and prefabricated product industries

Betomat mixing plant from Liebherr produces high-quality concrete for a vast number of manufacturing applications throughout the world, for example paving stones, concrete slabs, curbstones, drainage systems, bridge-building elements, cross-beams, house walls, prefabricated garages or tower segments for wind-powered generators.



The Betomat's generous storage capacity, with up to 10 compartments, is a major advantage for these industries. Since the Betomat occupies very little space, it is easy to integrate into a precast element or concrete product factory and can be linked to existing buildings without difficulty. Aggregates can be supplied by inclined belt conveyor from points some distance away, if necessary. As a systems supplier, Liebherr is a single source for the entire concept.

The mixing platform is of ample size to accommodate either one or two intensive-action mixers, or three in special circumstances. A second mixer is often invaluable for pre-mixing when producing concrete products. Liebherr supplies intensive-action mixers that are ideal for the most varied tasks. Even the smallest 0.5 cu. m RIM-M ring pan mixer is available with an agitator system for excellent mixing results.

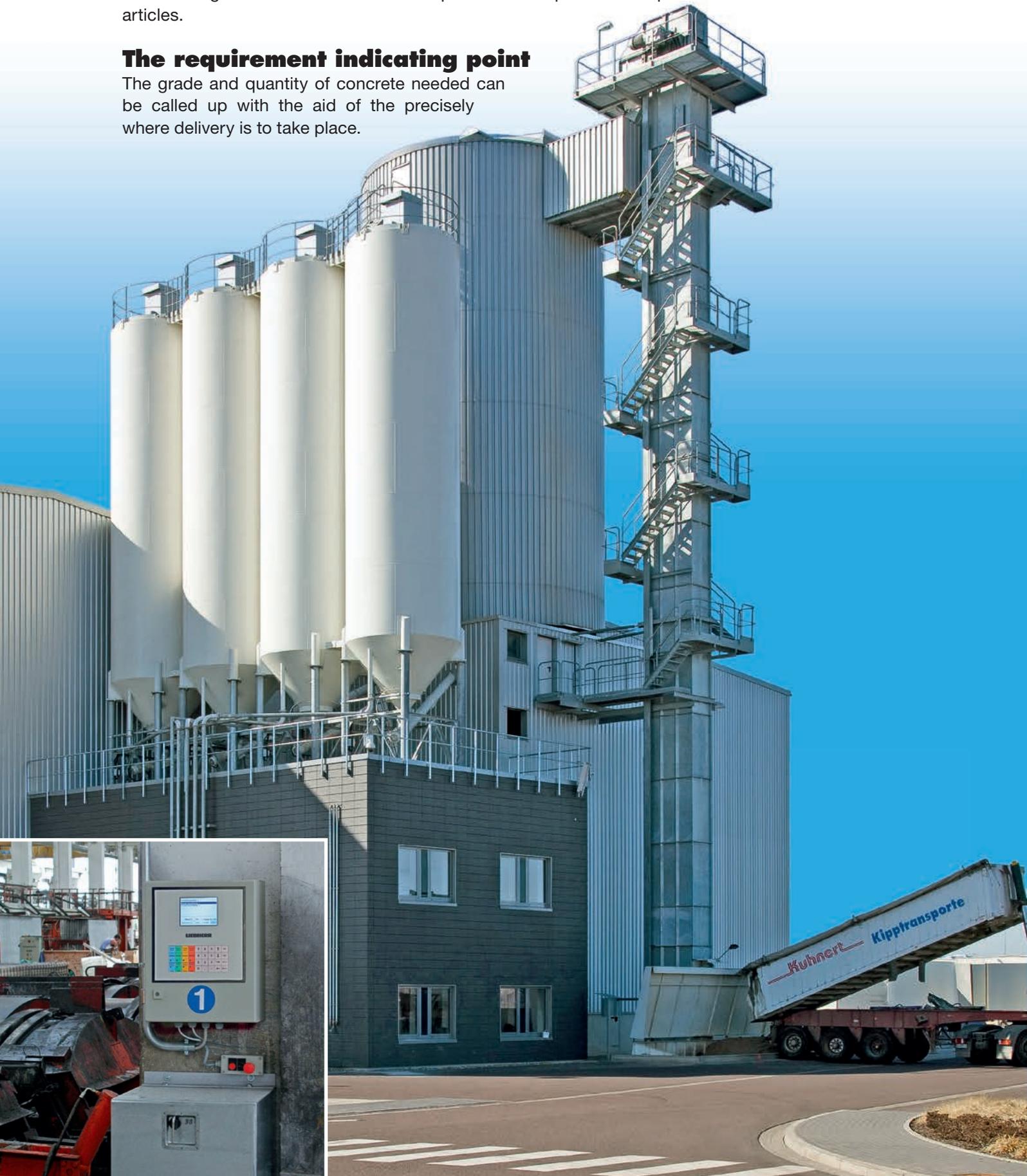


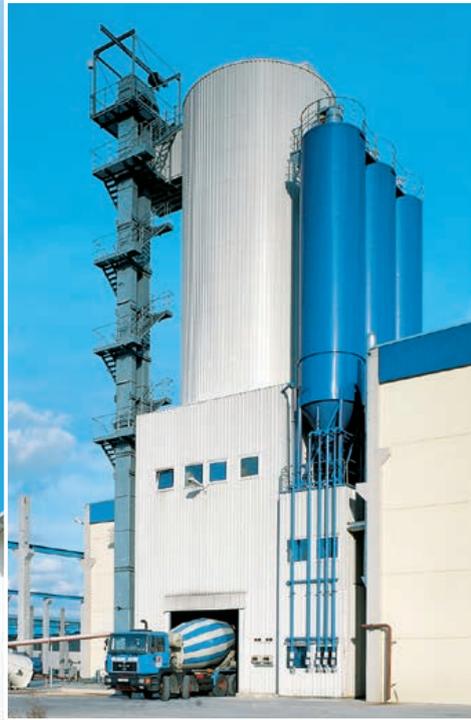
## Fully integrated into concrete product manufacturing

Liebherr is the single-source supplier for the entire concept, from aggregate loading to delivery of the freshly mixed concrete to the production areas. Many years of experience in this field are a guarantee of success in the production of precast and prefabricated concrete articles.

## The requirement indicating point

The grade and quantity of concrete needed can be called up with the aid of the precisely where delivery is to take place.





## **"Just-in-time" concrete production**

When all systems are perfectly coordinated, reliable production and delivery of concrete precisely where and when it is needed presents no problems:

- Loading aggregates
- Calling for deliveries
- Concrete mixing
- Movement of the concrete to the production area
- Cleaning the mixing plant
- Cleaning the skip loader tracks
- Transferring residual concrete and cleaning water to the recycling unit
- Recycling residual concrete
- Re-use of the raw materials thus obtained



Skip loader track



Production control

Recycling unit

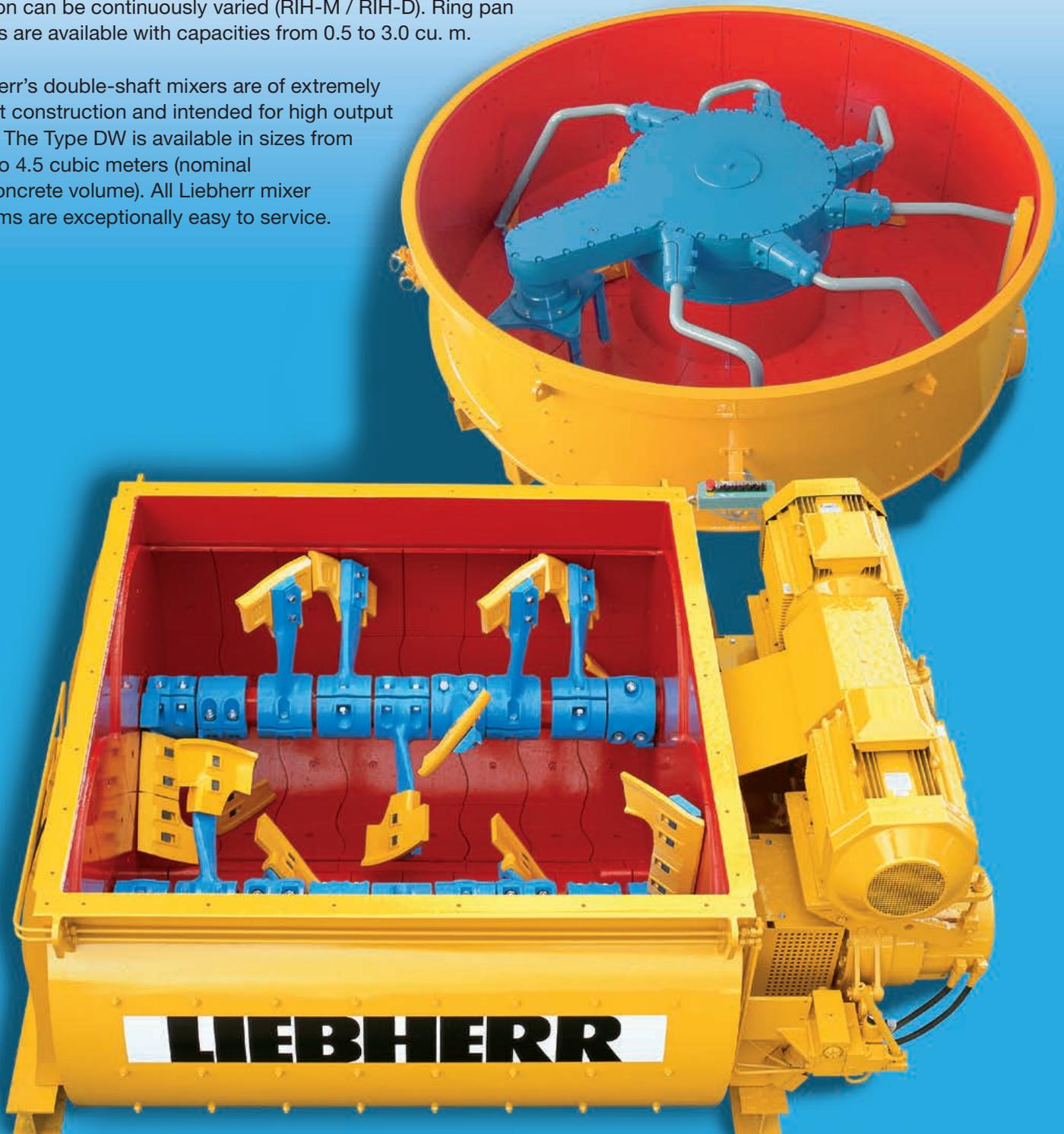
# 4 The Betomat in detail

## The ideal mixer for every task

For more than 50 years, Liebherr has developed and built its own mixer systems. In the company's technical mixing-plant laboratory, these systems are tested with the most varied mix constituents, developed and optimized.

Based on the successful Type R ring pan mixer, there are now two further versions with additional agitators for higher-quality grades of concrete. The Type RIM is supplied with either one or two mechanically-driven agitators (RIM-M / RIM-D). The Type RIH has either one or two hydraulically driven actuators, which have the advantage that the speed of agitator rotation can be continuously varied (RIH-M / RIH-D). Ring pan mixers are available with capacities from 0.5 to 3.0 cu. m.

Liebherr's double-shaft mixers are of extremely robust construction and intended for high output rates. The Type DW is available in sizes from 2.25 to 4.5 cubic meters (nominal set-concrete volume). All Liebherr mixer systems are exceptionally easy to service.



## **Litronic MPS microprocessor control**

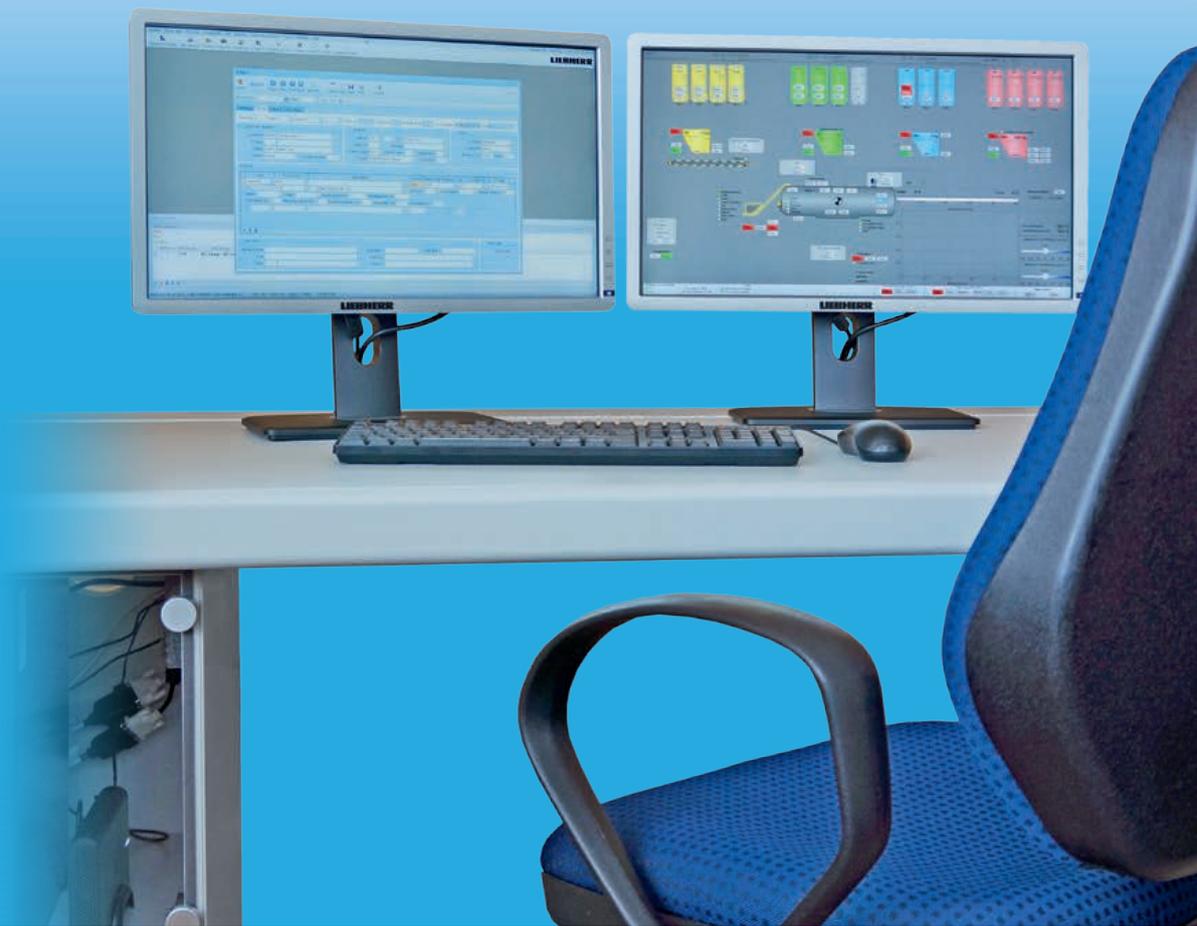
Litronic MPS is an open-system concept using industrial standards on a broad basis. This ensures that new hard- and software developments can be incorporated into the system without difficulty. Every step in the process is clearly visualized on the computer screen. Interfaces are provided for links to existing data processing systems. Extensive additional software packages are available and can be retrofitted later if necessary.

## **Litronic FMS moisture measurement**

For precise determination of the moisture content of aggregates, Liebherr uses intelligent, capacitive-action sensors developed in-house.

## **Litronic TMS temperature measurement**

Liebherr supplies its Litronic TMS system for contactless measurement of the temperature of the material in the mixer.



Litronic TMS temperature measurement



Litronic FMS moisture sensors



Sensor installed



Rotary distributor belt



Cement weigher



Water weigher



## The machinery platform

Ample space is provided on the machinery platform for access to the mixer inlets and other components, so that cleaning is an easy matter.

## Rotary distributor

The individual aggregate silo compartments are filled from a rotary distributor or, on larger installations, a rotary distributor belt.

## Weighing systems

The cement, water, aggregate and admixture weighers all supply precise measured values to the control system. All weigher systems are suitable for calibration. Rapid, accurate batching is essential if mix formulae are to be complied with despite high output rates.

Up to six cement-screw inlets can be accommodated at a single cement weigher. The aggregate weigher has protective rubber mats to prevent wear.

## Other forms of material delivery

Additional batching devices can be used to supply steel, synthetic fibers, micro-silicate slurry (compacted or loose) or dye to the mix.



Aggregate weigher



Admixture weigher



Admixture tanks



Version with two truck discharge tracks



Positive dust extraction from mixer



Cement filter systems



### **Dewatering system**

As an option, a dewatering system can be installed under the batching gates. Water from the aggregates is trapped and conducted away downwards by a channel system.

### **Two discharge tracks**

The version with two discharge tracks is available with either one or two intensive-action mixers. It permits one truck mixer to be filled and another driven into position ready for filling. Two gates are always provided on each intensive-action mixer, so that both mixers can supply either truck filling point.

### **Environmental protection**

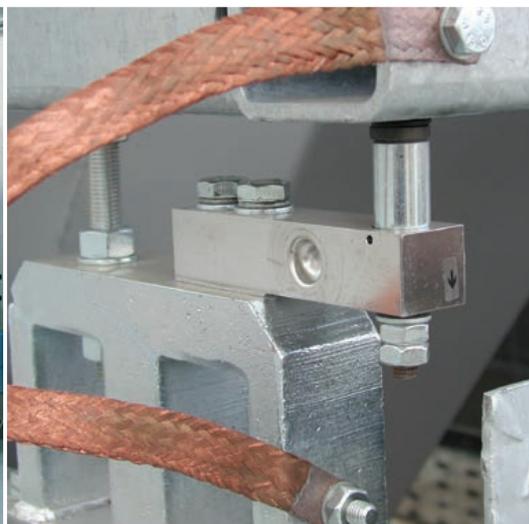
To avoid contamination of the air in the vicinity of the mixing plant with dust, Betomat plants have positive mixer dust extraction and the cement silos are fitted with air outlet filters.

### **Winter operation**

Thanks to a precisely coordinated heating system for the plant and the additive storage facilities, together with heat-retaining paneling, operation in the winter season can proceed without difficulties.



Heating



Weighing cell

# Program

## Betomat tower plants

• Bucket elevator or belt conveyor

• Multi compartment aggregate silo

• Batching devices

• Additive weigher

• Aggregate weigher

• Water weigher

• Mixer system as twin shaft or ring pan

• Discharge hopper and truck lane

• Rotary distributor for aggregate storage in silo compartments

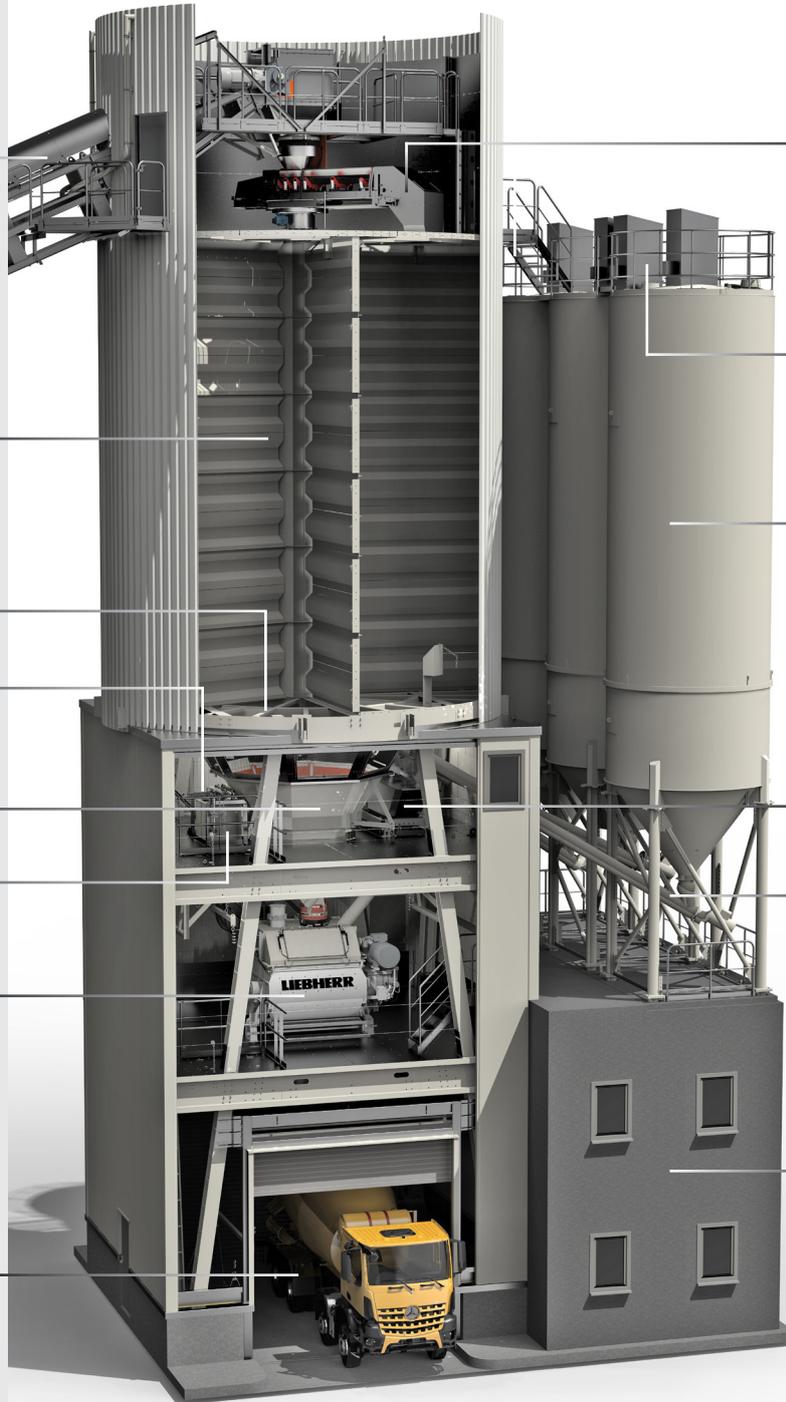
• Exhaust air filters for cement silos

• Cement silos

• Cement weigher

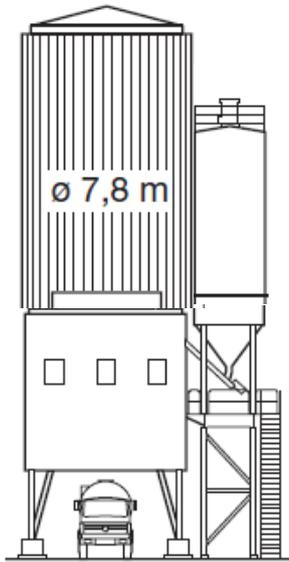
• Cement screw

• Control room

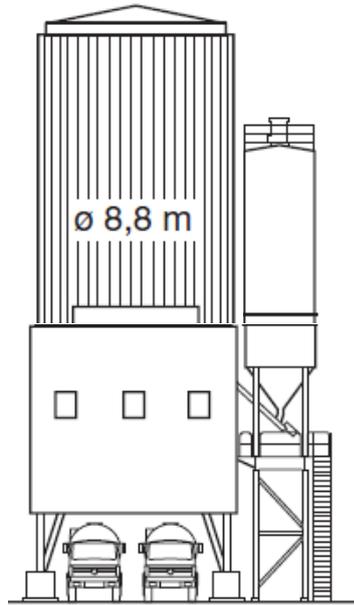


Type

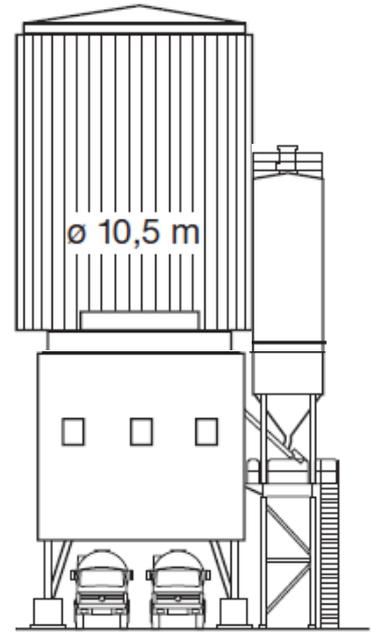
# Betomat tower plants



**Betomat 3**



**Betomat 4**



**Betomat 5**

Type	Height m (appr.)	Aggregate volume m <sup>3</sup>	Compartments max.
<b>Betomat 3</b>	21,0	220	10
	22,5	290	10
	24,0	350	10
	25,5	420	10
	27,0	490	10
	28,5	560	10
<b>Betomat 4</b>	24,5	345	10
	26,0	430	10
	27,5	515	10
	29,0	600	10
	30,5	685	10
<b>Betomat 5</b>	24,5	470	12
	26,0	600	12
	27,5	730	12
	29,0	860	12
	30,5	990	12

# Other examples of vertical concrete production plants:



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Subject to modification.

**Liebherr-Mischtechnik GmbH**  
Postfach 145, D-88423 Bad Schussenried  
☎ +49 (0)7583 949-0, Fax: +49 (0)7583 949-3 99  
www.liebherr.com, E-Mail: info.lmt@liebherr.com