

Industrial Solutions

# quadropol<sup>®</sup> QMC<sup>2</sup>

The new generation of the  
high-performance roller  
mill for binding agents



thyssenkrupp







Highest availability, optimal redundancy, maximum throughput: These are the features of the quadropol® roller mill, which is based on a modular system of 2, 3, 4 or 6 rollers. Thanks to its improved performance characteristics and two different drive concepts, the quadropol® QMC<sup>2</sup> mill for binding agents satisfies the highest demands.

# You can rely on our strengths

Our scope extends from single machines to comprehensive plant concepts. Around the globe, thyssenkrupp Industrial Solutions is a strong partner of the cement industry and one of the few full-range suppliers of turn-key cement plants.

When we design our machines and plants, we are consistently orientated towards the needs of our customers. Currently, our work is primarily focused on answering the call for significant increases of capacity to 10,000 tpd of clinker while at the same time reducing energy consumption.

Here, the grinding system plays a key role. Demanding customers all over the world rely on our quadropol® mill concept: The ultramodern roller mill combines high performance, reliability and low energy consumption.

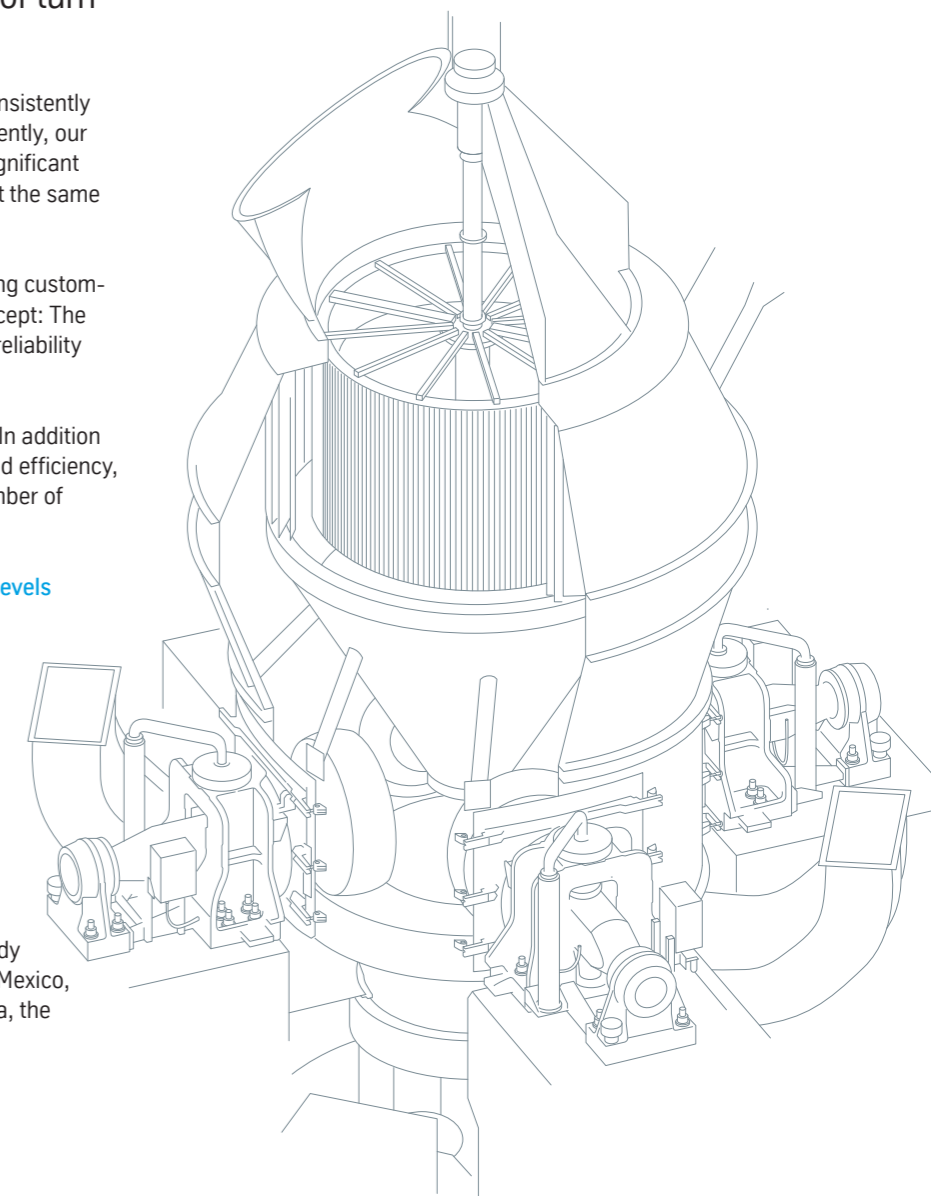
The quadropol® mill is now in its second generation. In addition to its outstanding features with regard to capacity and efficiency, it offers significant improvements in relation to a number of performance characteristics:

- Increased running smoothness – lower vibration levels
- Optimised dynamic loads – small moving masses
- Outstanding accessibility for maintenance work
- Consistent minimisation of the number of components requiring maintenance
- Optimal damping properties
- Maximum flexibility, e.g. when changing over to other types
- Modest civil engineering requirements
- Innovative drive concepts
- Modularisation

The second generation of quadropol® mills has already proven itself in commercial plants, such as in Brazil, Mexico, Colombia, Bolivia, Indonesia, Algeria, Turkey, Canada, the USA and Saudi Arabia.

## A grinding system that fits current needs:

The quadropol® roller mill reaches new dimensions in terms of flexibility and performance, while consuming only half the energy of a ball mill.





# Concentrating forces to achieve top performance

The quadropol® QMC<sup>2</sup> roller mill for binding agents can be custom-tailored to our customers' flexibility requirements. In order to optimally cater for individual requirements, two alternative drive systems are available.

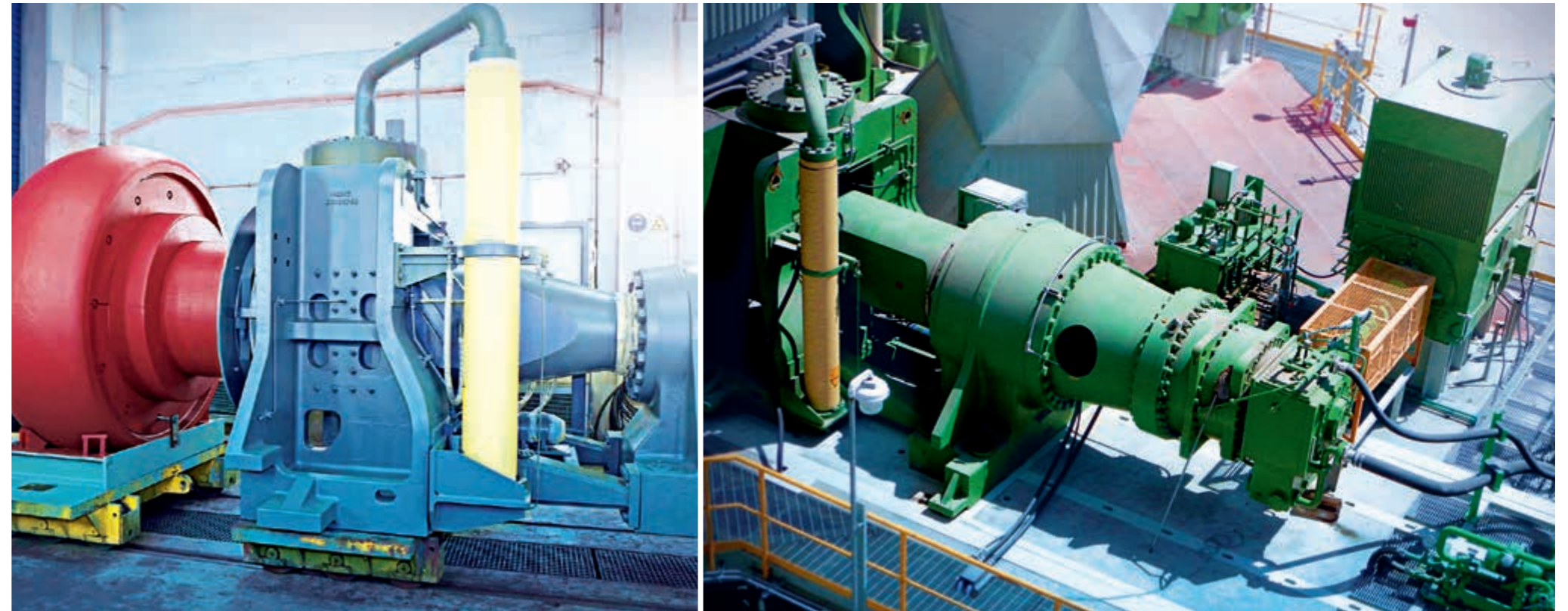
#### The classic option: QMC<sup>2</sup>-TD table drive

According to the classic QMC<sup>2</sup> drive concept, the grinding table – and thus the grinding rollers – are set in motion by a motor with a gear unit. The rotating grinding rollers are pressed onto the bed of material by means of a hydraulic cylinder. As the grinding table rotates faster than the grinding rollers, it presses the material under the roller. This proven and cost-effective method is particularly suited to binding agents which have to meet standard requirements. Throughput and power consumption can be adjusted.

#### The innovative option: QMC<sup>2</sup>-RD roller drive

The requirements regarding the comminution of binding agents are constantly increasing: Cement manufacturers are required to constantly extend their portfolio and to supplement it with new products tailored to market requirements. In this regard, we offer our customers all over the world maximum support thanks to the QMC<sup>2</sup>-RD, an innovative grinding system with highest process-technological flexibility.

It is equipped with an innovative drive concept: All rollers are equipped with their own combined drive and gear unit. Here too, the grinding table is set into rotating motion and the respective grinding roller is pressed onto the bed of material by means of a hydraulic cylinder. However, in contrast to the classic drive the rollers rotate faster than the table, which means that the material is drawn in by the roller and ground even more efficiently.



#### QMC<sup>2</sup>-RD advantages at a glance:

- Increased product fineness of composite cements
- Adjustment of the roller speed to different products
- Highest product flexibility for optimal reaction to market requirements
- Smaller motors and gear units, resulting in reduced driving torque
- Maximum availability thanks to redundant drives
- Rapid decoupling of a drive train
- Short stoppage times

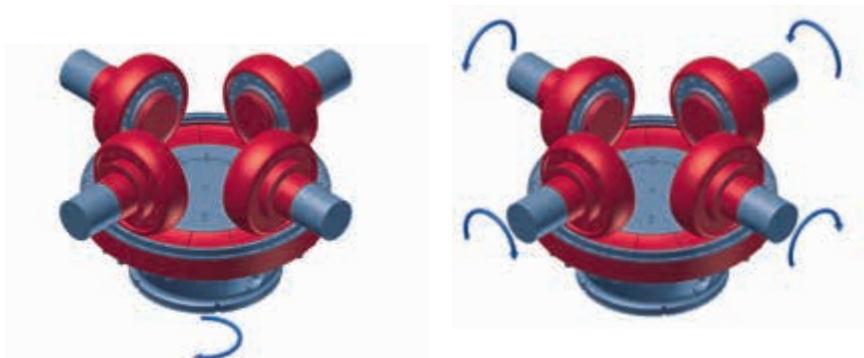
In addition, the QMC<sup>2</sup>-RD includes all features of the QMC<sup>2</sup>-TD.

## Built to last

Irrespective of the selected drive concept, the general mill design is standardised. In the second mill generation, we have consistently implemented customer requirements for a simple hydraulic system as well as small moving masses and mechanical components.

To achieve this, each roller unit has only two bearings: A maintenance-free pivot bearing at the shaft end and a dust-tight anti-friction bearing in the grinding roller. Each unit is equipped with a hydraulic cylinder (for the operating pressure) and a lubricator. All sensors are located outside the grinding compartment. The roller unit is compact, completely pre-assembled and is installed "just-in-time".

As a basic principle, all QMC<sup>2</sup> roller mills are equipped with the thyssenkrupp Industrial Solutions Machine Protection System. It monitors the gear unit and other important mill components to shut them off in case of overload. The monitored parameters include, for example, roller speed, roller vibration and hydraulic pressure. Operating data may also be evaluated via remote access.



QMC<sup>2</sup>-TD table drive

QMC<sup>2</sup>-RD roller drive



# A matter of adjustment

Ideal heat exchange can be achieved only with optimally homogenised material and gas flows. An optimised velocity profile assists in minimising internal material circulations.

The gas distribution in the quadropol® mill can be adjusted to the required operating conditions. This allows the specific gas flow rate and the pressure drop in the grinding system to be reduced – and energy consumption decreases.

Depending on the application, hot gas is supplied via one, two or four hot gas inlets. In addition to extensive simulations of flow conditions and dynamic stresses of the grinding system, numerous laboratory analyses as well as wear and grindability tests ensure perfect system configuration.

**The advantage of smooth running: optimal damping and maximum gear unit protection**

Smooth running is decisive for the availability and longevity of a plant. The roller units of the quadropol® mill are supported on separate concrete foundations which provide outstanding damping properties.

As roller units, grinding table and gear unit do not have any contact with the mill housing, the grinding forces are directly transmitted into the foundations. No grinding forces act on the mill housing; the outer grinding-roller seal between the roller and the housing minimises the intake of false air. Visual inspections may be performed at any time. Thanks to the encapsulated roller unit, traditional sealing air fans are a thing of the past and are no longer required.

The design of the quadropol® mill ensures optimal damping and low-vibration operation – these are the prerequisites for long-lasting and effective gear unit protection.



The largest QMC<sup>2</sup>-RD is installed in Mexico. The system has a rating of 4 x 1,800 kilowatt and a capacity of 300 tonnes per hour.



A QMC<sup>2</sup>-RD mill in France producing OPC finenesses < 10% R 25 µm.

# No time for stoppages

Mill output and the product portfolio place the highest demands on the availability of a mill.

Thanks to its redundant drive, the QMC<sup>2</sup>-RD can continue to operate even if one drive fails. Depending on the number of rollers, it can still run at 70 to 90 percent of its nominal capacity. The same applies to the QMC<sup>2</sup>-TD: The mill remains operative in two-roller mode while maintenance work is carried out on the other roller units.

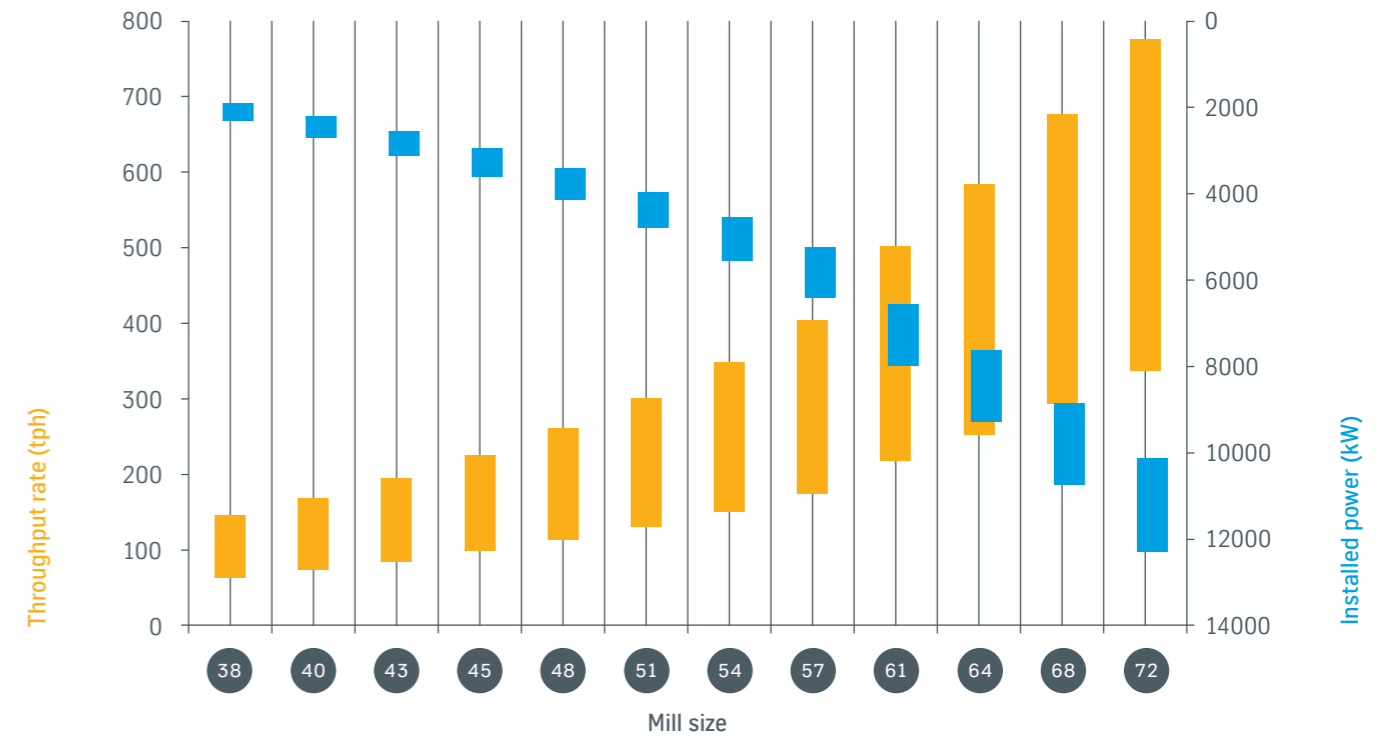
**Individual plant engineering solutions save space and costs**

After a detailed analysis, we submit to our customers our proposals for individual plant concepts and interconnected systems. The aim is always to devise the most cost-conscious solution for steel and civil structures. Depending on the customer's requirements and the country of installation, closed buildings can be erected without limiting accessibility.

Usually, the roller units and other components are mounted or dismantled with the aid of a truck-mounted crane. When designing a plant, we always bear in mind optimal accessibility for maintenance work, as well as the appropriate compactness of the overall plant.

If the space available is limited (as in the case of a plant extension), a ring craneway may be installed. It can be used to hoist the roller units from the mill, move them away easily and set them down on the ground, for maintenance purposes.

## QMC<sup>2</sup> cement comminution



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