

Industrial Solutions

quadropol[®] QMR²

The new generation of the
high-performance roller
mill for raw material



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, 4 or 6 rollers. Thanks to its improved performance characteristics, the quadropol® QMR² mill for raw material satisfies the highest demands.

We focus on your requirements

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 turnkey 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.

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.

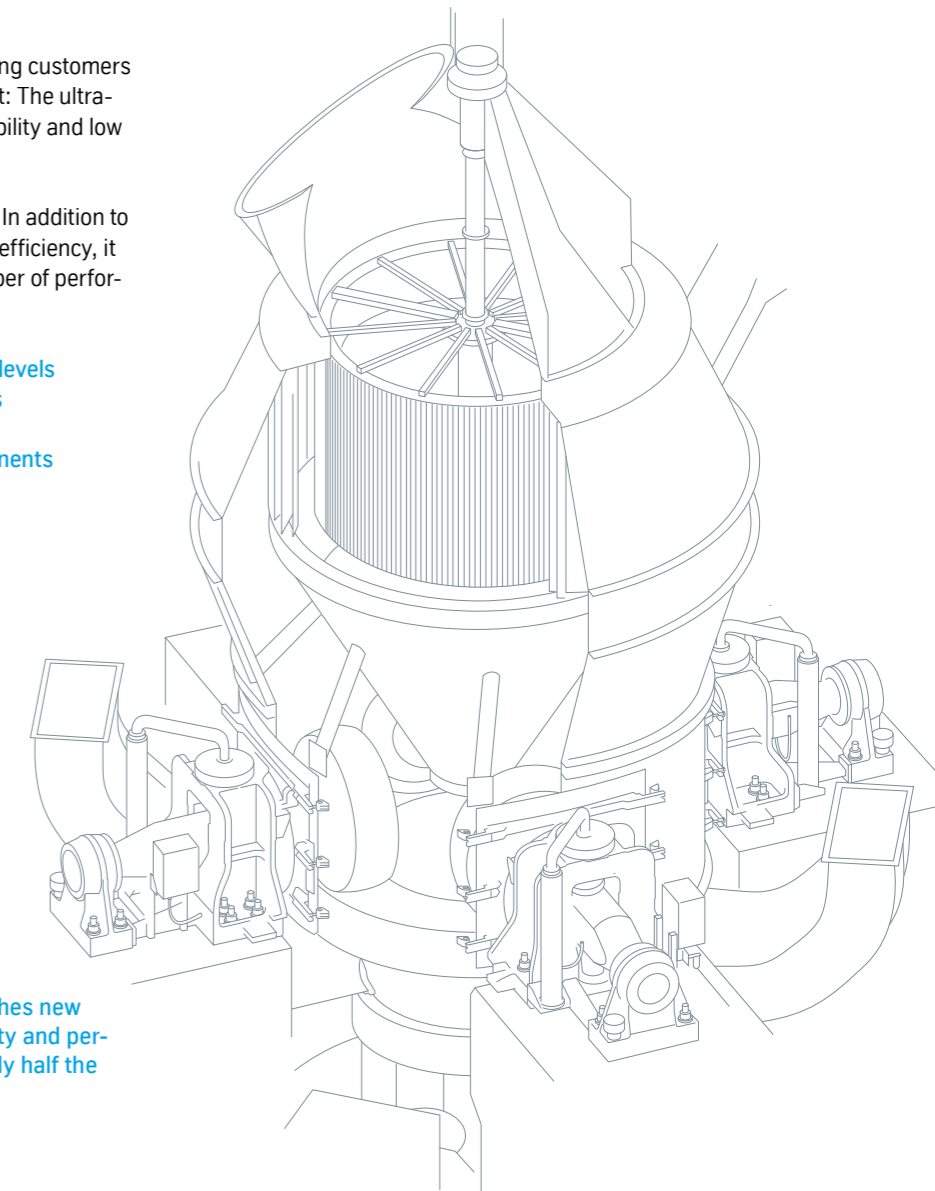
Here, the grinding system plays a key role. Demanding customers all over the world rely on our quadropol® mill concept: The ultra-modern roller mill combines high performance, reliability and low energy consumption.

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
- Modest civil engineering requirements
- Modularisation

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.



We make things run smoothly

Flexibility and ease of maintenance are the outstanding features of the quadropol® QMR² roller mill for raw material. This is ensured by a proven drive concept and a standardised design.

The grinding table – and thus the grinding rollers – of the QMR² mill 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. Throughput and power consumption can be adjusted.

The general design of the mill is standardised. In the second mill generation, we have comprehensively taken into account 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 antifriction 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.

As a basic principle, all QMR² 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.



The roller unit is compact, completely pre-assembled and installed on the concrete foundations "just-in-time" at the end of the erection phase.

The perfect configuration

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® QMR² 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. As a result, this second mill generation achieves an even lower energy consumption than the first generation.

Depending on the application, hot gas is supplied via 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 largest quadropol® is installed in the United Arab Emirates. The system has a rating of 7,000 kilowatt and a capacity of more than 600 tonnes per hour.



QMR² in Mexico: Open plant concept with a QMR² 43/21.



QMR² 43/21 in Brazil: Achieving finenesses of 8% R 90 µm.

Always in action

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

Here we have also consistently implemented market requirements: The QMR² mill still remains operative in two-roller mode and achieves up to 65 percent of its nominal capacity while maintenance work is carried out on the other roller units.

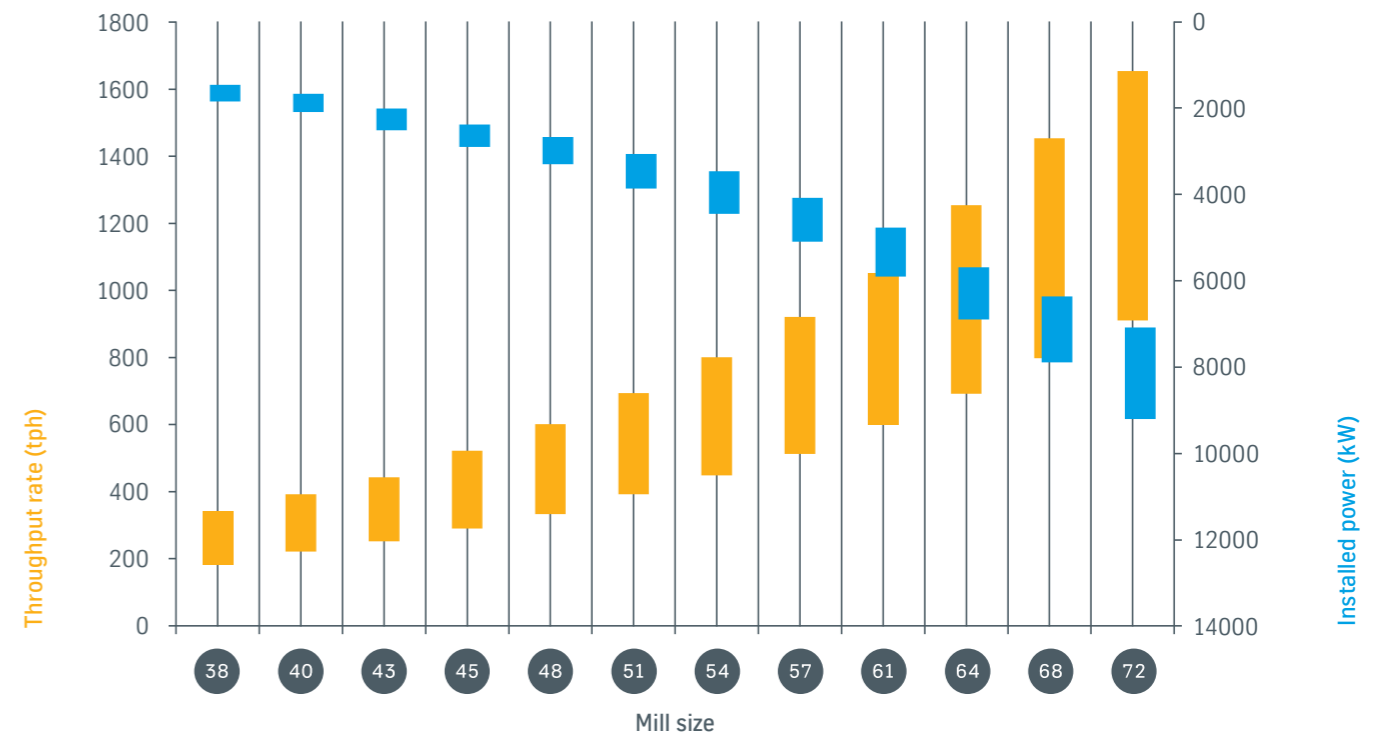
Individual plant engineering solutions save space and costs

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.

QMR² raw material grinding



**Curious to find out more?
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