Gyratory crushers.

Perfected design with throughput rates up to 14,000 t/h.
ThyssenKrupp Industrial Solutions is one of the world’s leading manufacturers of machines and plants for the processing industry. Based on decades of experience, our engineers are engaged in research and development. The results have become an integral part of processing technology. Customers worldwide benefit from our innovations. Whether standard or customized designs – ThyssenKrupp Industrial Solutions always provides comprehensive solutions tailored to customer needs – reliably and cost-effectively.

Gyratory Crushers by ThyssenKrupp: because it’s the perfected design that does the job

ThyssenKrupp Industrial Solutions

1. KB 63-89 in Iron Ore. Capacity: 6,200 t/h
2. KB 63-75 in Aggregates. Capacity: 2,600 t/h
The design of the gyratory crushers and jaw gyratory crushers is based on more than one hundred years of experience of ThyssenKrupp in the manufacture of these machines.

Changing mining and processing methods demand (besides new materials and design methods) a continual development of the products. ThyssenKrupp gyratory crushers represent today's leading crushing technology. They are designed for high performances at low operating and maintenance costs.

### Fields of application
- Large scale hard rock ore mines
- Lime and cement works
- Open pit and underground operations
- Aggregates industry

### Design characteristics
- Spiral bevel gear toothing
- Drive motors with heavy duty ratings
- Heavy duty design
- Optimized crushing chambers for direct feed
- High throughput rates
- Optimum crushing ratio
- Change of stroke through adjustment of eccentricity
- Direct drive for high starting torque facilitates start in case of emergency
- Hydraulic main shaft adjustment for wear compensation and overload protection
- Low operating and maintenance costs
- Includes Gyramatic PLC
Gyratory Crusher

Working principle

The main shaft (B) of the crusher is radially guided in the spider bushing (A) and in the inner eccentric bushing (G). The thrust bearing assembly (J) arranged on the piston of the hydraulic cylinder (K) ensures the axial support of the main shaft.

The rotation of the drive motor is transmitted via the transmission gear (H) to the eccentric bushing (G). This rotating eccentric bushing is generating the gyrating motion of the main shaft (B) – which is characteristic of gyratory crushers.

Consequently, the crushing gap between the stationary concaves in the crusher housing and the gyrating crushing mantle changes continuously.

The feed material that enters the crushing chamber from the top is continuously crushed between the crushing tools (C) as it falls by gravitation until it exits the crushing chamber at the bottom (F).

Gap increase caused by wear is compensated by hydraulic lifting of the main shaft.

It also serves as overload protection when tramp iron finds its way into the crushing chamber.

Restart under load in an emergency is supported by a heavy duty drive train using a bevel gear set with cyclo-palloid toothing. The spiral bevel gear allows the installation of drive motors with high ratings.

Main shaft “jumping” under adverse crushing conditions is avoided by a pressurized hydraulic system ensuring permanent contact of the individual thrust bearing discs.

Design

A Upper main shaft bearing assembly with two-armed spider ensures a spacious feed opening, equipped with automatic grease lubrication with electronic and visual level control
B Main shaft
C Crushing tools made of high wear-resistant material
D Cast-steel shell sections, weight-optimized by means of FEA calculations
E Highly efficient dust seal
F Large discharge openings owing to three-armed bottom shell
G Eccentric bearing assembly with replaceable inner eccentric bushing for stroke adjustment, integrated counterweight to minimize unbalanced forces
H Transmission gear including device for setting the tooth clearance, safe lubrication due to hermetically sealed splash lubrication, electronic and visual oil level and temperature control, optionally vibration control
I Bevel gear and pinion with cyclo-palloid toothing ensures smooth transmission of high torque
J Thrust bearing of the main shaft
K Hydraulic cylinder for main shaft adjustment under load
Technical Data

Gyratory Crusher

<table>
<thead>
<tr>
<th>Type</th>
<th>Feed Opening</th>
<th>Mantle Diameter (oversized)</th>
<th>Speed of Eccentric Bushing</th>
<th>Max. Motor power</th>
<th>Total weight of Crusher</th>
<th>Spider 2)</th>
<th>Heaviest Shell 4)</th>
<th>Bottom Shell 3)</th>
<th>Main Shaft Assembly 4)</th>
<th>Eccentric Bushing with Bottom</th>
<th>Hydraulic Cylinder</th>
</tr>
</thead>
<tbody>
<tr>
<td>KB 54 - 67</td>
<td>1,370 / 54</td>
<td>1,700 / 67 (1,750 / 69)</td>
<td>137</td>
<td>450</td>
<td>200,000</td>
<td>29,000</td>
<td>30,500</td>
<td>37,100</td>
<td>32,500</td>
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<td>8,100</td>
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<tr>
<td>KB 54 - 75</td>
<td>1,370 / 54</td>
<td>1,900 / 75 (1,965 / 77)</td>
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<td>650</td>
<td>215,000</td>
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<td>8,500</td>
<td>9,500</td>
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<tr>
<td>KB 63 - 75</td>
<td>1,600 / 63</td>
<td>2,050 / 80 (2,100 / 83)</td>
<td>137</td>
<td>650</td>
<td>270,000</td>
<td>37,800</td>
<td>66,000</td>
<td>43,500</td>
<td>50,000</td>
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<tr>
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<td>1,600 / 63</td>
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<td>332,000</td>
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<tr>
<td>KB (63 - 114)*</td>
<td>1,600 / 63</td>
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<td>1,200</td>
<td>530,000</td>
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<td>75,000</td>
<td>124,000</td>
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<tr>
<td>KB 63 - 130</td>
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<td>3,300 / 130 (3,400 / 134)</td>
<td>125</td>
<td>1,500</td>
<td>495,000</td>
<td>66,000</td>
<td>97,500</td>
<td>86,500</td>
<td>130,000</td>
<td>12,100</td>
<td>13,000</td>
</tr>
</tbody>
</table>

* still available on request

The maximum feed size should not exceed 80% of the feed opening width. Installation drawing with mating dimensions and loads on request.

1) Average component weight incl. internal fittings; safety factors for dimensioning of lifting equipment have not been considered
2) including wear cap
3) excluding hydraulic cylinder
4) with oversized mantle incl. crushing tools
5) Min: typical throughput at minimum eccentricity and F80=680mm
Max: typical throughput at maximum eccentricity and F80=230mm
Bulk density: 1,600 kg/m³

The stated values are for information only and not warranted. They depend on material characteristics and crusher configuration.

Throughput [t/h] at open side setting OSS [mm]

<table>
<thead>
<tr>
<th>Type</th>
<th>130</th>
<th>150</th>
<th>170</th>
<th>200</th>
<th>215</th>
<th>240</th>
<th>270</th>
<th>300</th>
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<tbody>
<tr>
<td>KB 54 - 67</td>
<td>1,200</td>
<td>2,500</td>
<td>1,500</td>
<td>2,900</td>
<td>1,800</td>
<td>3,700</td>
<td>2,000</td>
<td>4,300</td>
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<tr>
<td>KB 54 - 75</td>
<td>1,300</td>
<td>2,400</td>
<td>1,500</td>
<td>2,500</td>
<td>1,900</td>
<td>4,200</td>
<td>2,100</td>
<td>4,800</td>
</tr>
<tr>
<td>KB 63 - 75</td>
<td>1,700</td>
<td>3,300</td>
<td>2,000</td>
<td>4,500</td>
<td>2,200</td>
<td>5,100</td>
<td>2,400</td>
<td>5,600</td>
</tr>
<tr>
<td>KB 63 - 89</td>
<td>2,300</td>
<td>4,500</td>
<td>2,500</td>
<td>5,100</td>
<td>2,700</td>
<td>5,900</td>
<td>3,100</td>
<td>7,600</td>
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<td>3,800</td>
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<tr>
<td>KB 63 - 130</td>
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<td>4,700</td>
<td>10,100</td>
<td>5,100</td>
<td>10,900</td>
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</table>

Installation drawing with mating dimensions and loads on request.
**Working principle**

Special feature of the jaw gyratory crusher is the specific shape of the feed opening, which is extended to one side. The feed opening is normally toothed, and together with the upper mantle it forms the primary crushing zone. Further crushing of the roughly pre-crushed material takes place in the lower part of the crushing chamber, where the specified final grain size is produced. Jaw gyratory crushers are designed to handle substantially bigger feed lumps than the comparable size of the gyratory crusher with the same mantle diameter. Jaw gyratory crushers have higher crushing ratios and a low tendency to get clogged in the feed area as a result of bridging.

**Fields of Application:**
- Coarse feed material
- Block cave mining
- Underground mines
**Technical Data**

### Jaw Gyratory Crusher type

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>BK</td>
<td>54 - 67</td>
<td>2,640 x 1,350 / 104 x 54</td>
<td>1,700 / 67 (1,750 / 69)</td>
<td>137</td>
<td>175,000</td>
<td>46,000</td>
<td>42,000</td>
<td>36,800</td>
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<td>8,100</td>
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<tr>
<td>BK</td>
<td>63 - 75</td>
<td>3,080 x 1,680 / 121 x 66</td>
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<td>209,000</td>
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<td>45,500</td>
<td>45,500</td>
<td>45,000</td>
<td>8,500</td>
<td>9,500</td>
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</tbody>
</table>

### Jaw Gyratory Crusher type

<table>
<thead>
<tr>
<th>Type</th>
<th>Throughput [t/h] at open side setting OSS [mm] 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK</td>
<td>54 - 67</td>
</tr>
<tr>
<td>BK</td>
<td>63 - 75</td>
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### Jaw Gyratory Crusher type

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</tr>
</thead>
<tbody>
<tr>
<td>BK</td>
<td>54 - 67</td>
<td>4,252</td>
<td>4,400</td>
<td>2,400</td>
<td>1,745</td>
<td>4,484</td>
<td>7,200</td>
<td>200</td>
<td>3,400</td>
<td>3,000</td>
<td>3,900</td>
<td>3,900</td>
<td>2,640</td>
<td>1,675</td>
</tr>
<tr>
<td>BK</td>
<td>63 - 75</td>
<td>4,252</td>
<td>4,400</td>
<td>2,400</td>
<td>1,745</td>
<td>4,484</td>
<td>7,200</td>
<td>200</td>
<td>3,400</td>
<td>3,000</td>
<td>3,900</td>
<td>3,900</td>
<td>2,640</td>
<td>1,675</td>
</tr>
</tbody>
</table>

The maximum feed size should not exceed 80 % of the feed opening width. Installation drawing with mating dimensions and loads on request.

Discharge opening  Supporting surfaces

Clearance for mainshaft removal

End of motor shaft

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3) excluding hydraulic cylinder
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Max: typical throughput at maximum eccentricity and F80=230mm
Bulk density: 1,600kg/m³

The stated values are for information only and not warranted.
They depend on material characteristics and crusher configuration.
ThyssenKrupp gyratory crushers are driven directly by a multiple-disc steel clutch with intermediate shaft and a safety coupling. The multiple-disc steel clutch compensates geometric deviations between motor and transmission gear shaft, while the hydraulic safety coupling protects the crusher motor against overload when uncrushable foreign matter is fed to the crusher. The intermediate shaft allows the disassembly of the transmission gear without dismantling the motor.

The monitoring and control system "Gyramatic" of ThyssenKrupp Industrial Solutions gyratory crushers ensures an easy and safe operation of these crushers in different applications. This compact and solid unit consists of a control cabinet with a touch screen terminal and will be integrated into the local electrical equipment. The input values are important operation parameters being measured on the crusher, on relating units and the environment. The touch screen terminal will accept interactive input to set parameters and display the operating data.
Customized Crusher Solutions

For individual applications individual designed spiders are available:
1: Standard ring spider
2: Split ring spider for applications with dimension and/or weight restrictions
3: “Bone” type spider for quick release and larger feed opening
4: “Jaw type” spider for extreme large feed opening

ThyssenKrupp Industrial Solutions pays large attention to provide crusher solutions adapted to clients’ needs. For varying crusher demands dependent on feed material properties and product requirements ThyssenKrupp provides individual solutions. There are different spider designs, wear part shapes and crushing tools available or even tailor-made solutions for specific needs.
Examples of Crushing Plants with Gyratory Crushers

Dependent on the crushing duty, the performance and availability of gyratory crushers are optimised due to specific design and arrangement of feeding and discharging devices.

13
Primary crushing plant with gyratory crusher KB 63-75 for iron ore / overburden. The crusher is directly fed from two sides by means of dump trucks.

- Capacity:  
  - Ore: 3,650 t/h
  - Overburden: 4,500 t/h

- Product P99:  
  - Ore: ≤ 280 mm
  - Overburden: ≤ 350 mm

- Feed size: max. 1,400 mm

14
Jaw gyratory crusher BK 63-75 installed underground in a crushing plant for copper ore.

- Capacity: 2,000 t/h
- Product: P90 ≤ 150 mm
- Feed size in block caving: max. 2,000 x 1,500 x 1,000 mm

15
Relocation of semi-mobile crushing plant equipped with KB 63-114 for copper ore. Proven capacity >10,000 t/h
Research, Development and Services

ThyssenKrupp is dedicated to continuous, innovative research and development. For us, innovations and technical progress are key factors in managing global growth and using finite resources in a sustainable way. With our engineering expertise we enable our customers to meet the rising demand for “more” in a better way, gain an edge in the global market and manufacture innovative products in a cost and resource-efficient way.

This ranges from basic analyses to measurements on new and old crushers.

At first analyses of the deposits or the feed material are carried out by means of up-to-date methods allowing a material characterization and based thereon the right choice of a suitable crusher.

Furthermore, by these basic analyses the best possible adaptation of the crusher can be ascertained, like e.g. the correct sizing of individual components by means of the finite element analysis. The computed values will then be field-tested using a newly developed control- and diagnosis system which allows the control of the most important operating data.

Our services include project research, damage analyses, planning and modification aimed at a modernization and an increase of the output of machines and plants in conjunction with a worldwide after-sales service which also covers the equipment of other manufacturers.

Maintenance and repair services offered by ThyssenKrupp include expert on-site consultancy. Repairs are carried out by highly qualified staff using high-quality and tested spare parts. Increase the productivity of your machinery and equipment.

Get in touch with ThyssenKrupp Industrial Solutions – wherever you are.

- Inspection services
- Stand-by emergency services
- Repair services
  - on site
  - in the workshop
- Diagnosis systems
- Maintenance contracts
- Spare parts services

16 17

Teleservice
- Collecting, archiving and evaluating machine / process data
- Worldwide access via GSM

17

Spare Parts Service
Easy access of crusher components via electronic spare parts catalogue

18

Scan service
- Crushing Tools evaluation by on-site 3D scanning
- Wear analyses and optimization of crushing tools