

Industrial Solutions

Jaw crushers

Crushing made easy



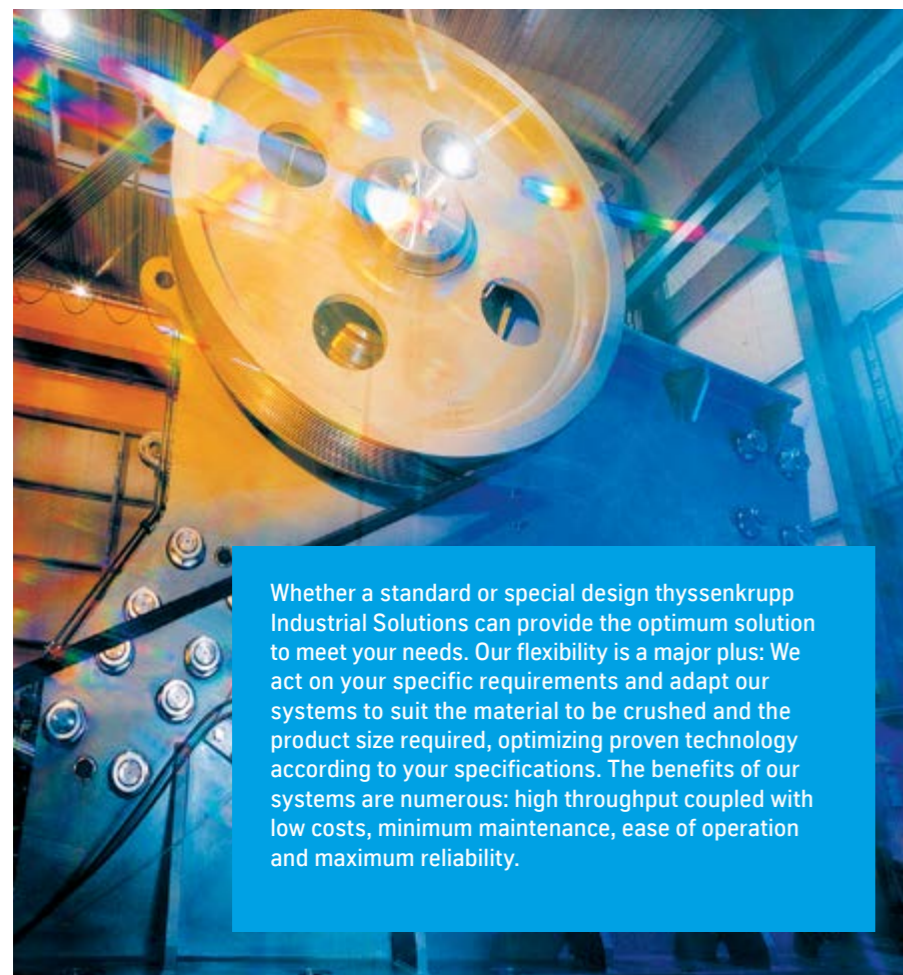
thyssenkrupp



Our solutions for the hardest jobs

When it comes to the crunch, crushing systems from thyssenkrupp Industrial Solutions offer the ultimate in performance, reliability and cost-effectiveness. With us as your partner, you can expect the optimum, customized solution for even the most demanding of jobs.

Call on our services and you can count on a wealth of experience and constant innovative drive. As a leading manufacturer of machines and plants for the aggregates and mining industry, we supply well-engineered crushing systems that have stood the test of time in the hardest service conditions. At the same time, we invest in intensive research and development work to make proven solutions even better and to adapt to changing demands.



Whether a standard or special design thyssenkrupp Industrial Solutions can provide the optimum solution to meet your needs. Our flexibility is a major plus: We act on your specific requirements and adapt our systems to suit the material to be crushed and the product size required, optimizing proven technology according to your specifications. The benefits of our systems are numerous: high throughput coupled with low costs, minimum maintenance, ease of operation and maximum reliability.

Over a hundred years of experience in manufacturing jaw crushers



Fields of application and design characteristics

thyssenkrupp jaw crushers are mainly designed to crush medium-hard to very hard materials.

They are used in mines and quarries as primary crushers to crush blasted rockpile, which may have edge lengths of over 2,000 mm depending on the blasting method, in preparation for finish crushing or conveying.

For these tasks thyssenkrupp Industrial Solutions has in its range two types of jaw crusher, which differ in the kinematics of the swing jaw: single-toggle jaw crushers for a high throughput rate and double-toggle jaw crushers for extremely hard materials and abrasive rock.

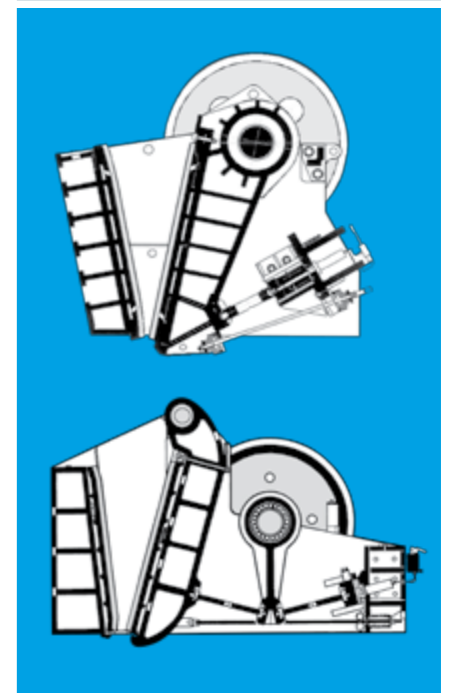
Design characteristics

- Crusher frame and swing jaw made of high-grade steel or special cast steel that has been subjected to a stress-relieving heat treatment in order to prevent residual stresses from the welding or casting process
- Front and back wall reinforced
- Additional outer reinforcing ribs to coincide with the lines of force
- Axles precisely aligned to ensure that neither the drive components nor the toggle plates can jam or be exposed to unilateral stress
- Swing jaws made of heavy-duty materials

- Rubber springs to establish a frictional connection between the toggle plates and the back wall
- Toggle plates made of special steel with no need for lubrication
- Largely dimensioned antifriction bearings
- Eccentric shafts forged from high-strength steel
- One-piece pitmans
- Two heavy flywheels to offset pressure peaks in the crusher
- Crushing jaws made of high-grade austenitic manganese steel, cheek plates made of high-strength special steel
- Crushing jaws can freely expand, avoiding the transmission of high stresses to other components
- Enhanced crushing jaw profile and crushing chamber geometry, optimized for all kinds of feed material
- Optimum nip angle for hard and tenacious materials
- Optimized kinematics of the swing jaw with a high stroke in the feed and discharge areas, ensuring very high throughput rates
- Easy adjustment of the crushing gap using a hand-operated hydraulic device and shim plates or automatic adjustment of the crushing gap
- Crushers can be used as stationary crushers or they can be integrated into wheel-mounted or track-mounted mobile crushing plants
- Central lubrication system ensures a reliable lubricant supply

Applications

- Quarries
- Ore mining industry
- Ore crushing in metallurgical plants
- Recycling industry
- Other areas of the primary industry



From top:

Single-toggle jaw crusher and double-toggle jaw crusher

Single-toggle jaw crushers – design and operating principle

Single-toggle jaw crushers are ideal for maximum throughput rates when crushing medium-hard and hard materials.

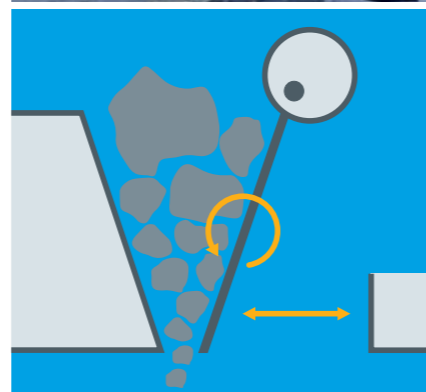
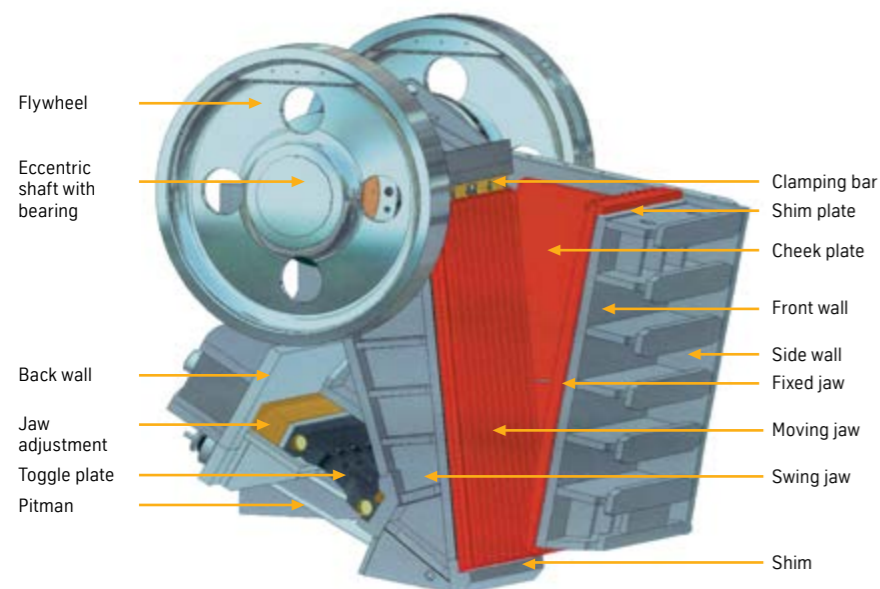
Single-toggle jaw crushers are characterized by the swing jaw being suspended directly on the eccentric drive shaft and the lower part of the swing jaw being braced against the crusher frame by means of a toggle plate.

The kinematics of this type of toggle system result in a higher capacity than that achieved with a double-toggle jaw crusher with the same feed opening. The diversity of feed materials has led to a diversification of single-toggle jaw crushers to suit the particular rock hardness. Available in four sizes as a light or heavy-duty model, they achieve throughputs of 250 t/h to 1,400 t/h.

Depending on the mobility requirement, our product line ranges from large-scale single-toggle jaw crushers which can be integrated into either stationary or semi-stationary crushing plants to a model specially designed for integration into road-transportable plants.

Design

The single-toggle jaw crusher with the largest antifriction bearings and highest flywheel energy



Single-toggle jaw crushers are characterized by a high throughput rate, simple design, low weight and low space requirement.

From top:

Crushing plant with a single-toggle jaw crusher in operation in Austria

Schematic diagram of the working principle of a single-toggle jaw crusher with a single-toggle system

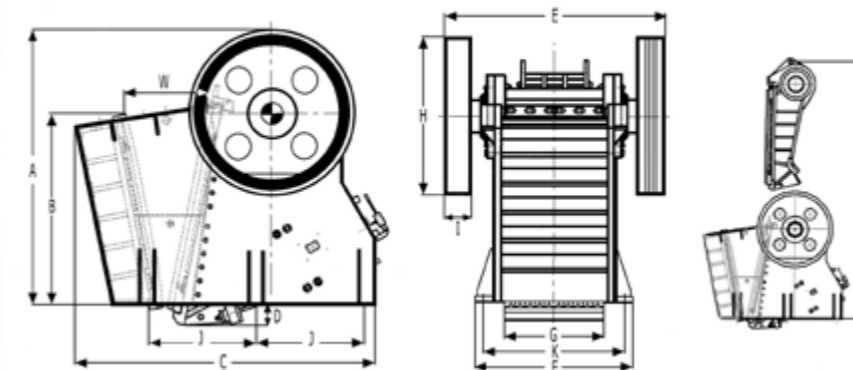
Left:

Single-toggle jaw crusher with main components

Technical data | Single-toggle jaw crusher

Crusher	Type	Feed opening width x feed opening length [mm x mm]	Total weight [t]	Crusher speed [r.p.m.]	Jaw opening min. ¹⁾ [mm]	Jaw opening max. ¹⁾ [mm]	Weight of flywheel [kg/unit]	Installed drive power [kW]	Speed of electric motor ²⁾ [r.p.m.]
EB 12-10 N		1,200 x 1,000	42	180 – 220	125	275	1,700	110/132	1,000
EB 12-10 H		1,200 x 1,000	48	180 – 220	125	275	3,120	132/160	1,000
EB 14-11 N		1,400 x 1,100	56	160 – 200	135	285	2,130	132/160	1,000
EB 14-11 H		1,400 x 1,100	62	160 – 200	135	285	3,980	160/200	1,000
EB 16-12 N		1,600 x 1,200	70	150 – 200	150	300	3,120	160/200	1,000
EB 16-12 H		1,600 x 1,200	85	150 – 200	150	300	4,350	200/250	1,000
EB 20-15 N		2,000 x 1,500	130	145 – 180	180	330	4,350	250/315	1,000
EB 20-15 H		2,000 x 1,500	150	145 – 180	180	330	6,200	250/355	1,000

Crusher	Type	Largest component	Heaviest component	Dimensions of largest component [m x m x m]	Weight of heaviest component [kg]	Max. weight of the crushing jaw [kg/unit]
EB 12-10 N		Housing	Housing	3.9 x 2.6 x 2.2	15,050	2,360
EB 12-10 H		Housing	Housing	3.9 x 2.6 x 2.2	17,200	2,360
EB 14-11 N		Housing	Housing	4.1 x 2.8 x 2.2	20,330	3,650
EB 14-11 H		Housing	Housing	4.1 x 2.8 x 2.2	22,500	3,650
EB 16-12 N		Housing	Housing	4.3 x 2.8 x 2.5	24,800	5,500
EB 16-12 H		Housing	Housing	4.3 x 2.8 x 2.5	29,280	5,500
EB 20-15 N		Swing jaw cpl.	Swing jaw cpl.	5.1 x 4.0 x 2.0	40,000	4,460
EB 20-15 H		Swing jaw cpl.	Swing jaw cpl.	5.1 x 4.0 x 2.0	46,000	4,460



¹⁾ with new crushing elements
²⁾ 1,200 r.p.m. possible

All data are intended as a guide only. The machine capacity depends on the grain distribution as well as the characteristics and the texture of the feed material. Binding data can be provided once the specific operating conditions are known. To keep pace with technical progress, we reserve the right to make improvements to the various machine types without prior notice.

Crusher	Type	A	B	C	D	E	F	G	H	I	n x J	K	L	W
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[Ø mm]	[mm]	[mm]	[mm]	[mm]	[mm]
EB 12-10 N		3,200	2,385	3,750	290	2,760	2,130	1,180	1,600	280	2 x 1,400	1,950	6,000	1,000
EB 12-10 H		3,340	2,385	3,750	290	2,900	2,130	1,180	1,900	350	2 x 1,400	1,950	6,000	1,000
EB 14-11 N		3,430	2,565	4,030	320	2,940	2,200	1,370	1,700	310	2 x 1,450	1,970	6,400	1,100
EB 14-11 H		3,680	2,565	4,030	320	3,040	2,180	1,370	2,200	360	2 x 1,450	1,970	6,400	1,100
EB 16-12 N		3,750	2,835	4,160	330	3,160	2,480	1,570	1,900	350	2 x 1,590	2,300	6,800	1,200
EB 16-12 H		3,950	2,835	4,160	330	3,220	2,480	1,570	2,300	380	2 x 1,590	2,300	6,800	1,200
EB 20-15 N		4,720	3,565	5,260	340	4,070	3,120	1,970	2,400	380	4 x 980	2,920	8,600	1,500
EB 20-15 H		4,870	3,565	5,260	340	4,110	3,120	1,970	2,700	420	4 x 980	2,920	8,600	1,500

Throughput rates and grain size distribution curves

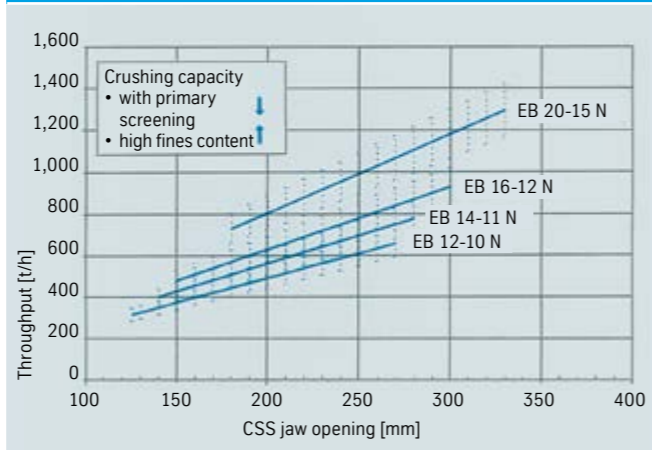
The throughput rates of the standard version of the single-toggle jaw crusher are based on easily crushable, medium-hard feed material. The throughput rates of the hard-rock version of the single-toggle jaw crusher are based on hard feed material that is difficult to crush.

The rates are based on theoretical calculations that have been verified by practical measurements. Deviations from the average throughput rate are dependent on: material, grain size, composition of feed material, hardness, tenacity, degree of purity and feed rate. The deviations that can normally be expected for common materials and jaw settings are shown in the diagram.

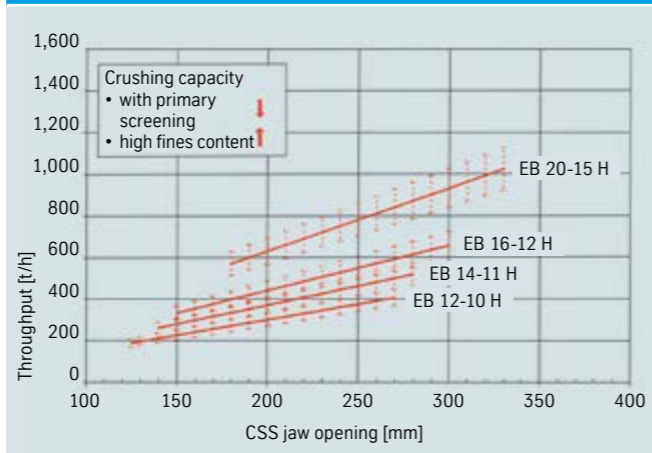
The grain size distribution curves of the product are only guidelines. Deviations in the percentage composition are dependent on the factors that also affect the throughput rate. The grain size distribution curves shown apply to dry, brittle granite. For a surface-moist, tenacious basalt the fines content will be slightly lower so the curves will shift to the right.

(Throughput by way of example based on a bulk density of 1.6 t/m³)

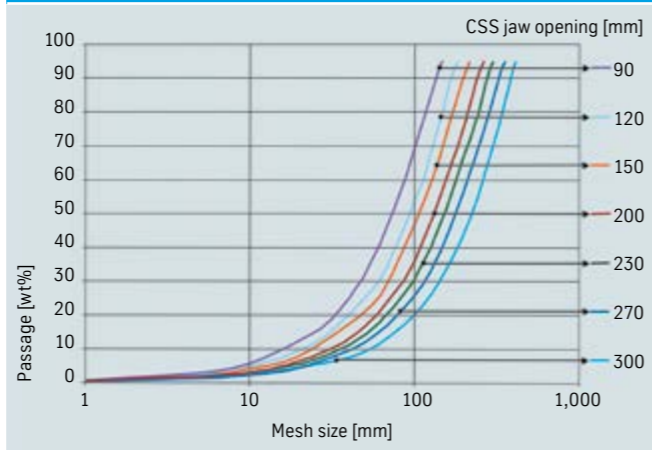
Average throughput rate of single-toggle jaw crusher, standard version, tolerance ± 10%



Average throughput rate of single-toggle jaw crusher, hard-rock version, tolerance ± 10%



Typical grain size distribution of the crushed product



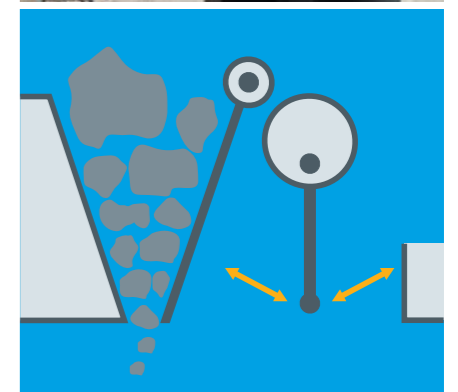
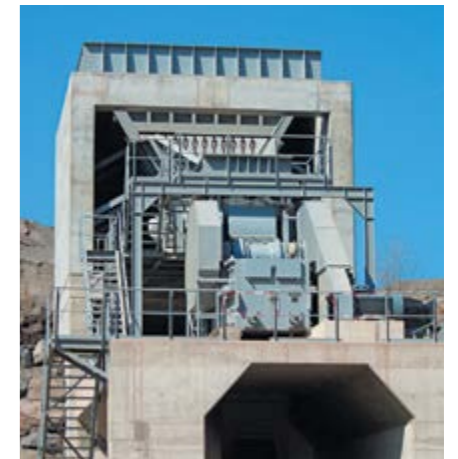
Double-toggle jaw crushers

Double-toggle jaw crushers are the ideal machines for the hardest and most tenacious materials.

Double-toggle jaw crushers are equipped with a double-toggle system, which is controlled by a pitman that moves up and down under the influence of an eccentric shaft, causing the toggle plates to alternately flex and stretch. As a result, the swing jaw oscillates.

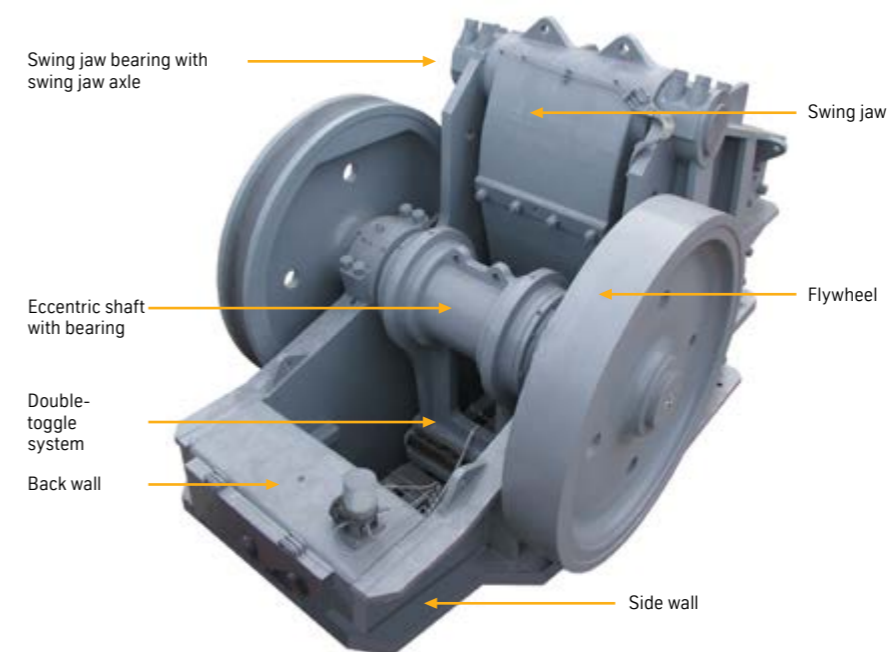
As the material to be crushed moves downwards due to the force of gravity, the pressure required to crush the material is generated as the crushing chamber narrows when the swing jaw moves forward. Serrated jaw plates enhance the crushing process. When the swing jaw moves back again, the material crushed to the size of the pre-selected jaw opening exits the crushing chamber at the bottom while new material flows in from the top.

The toggle system ensures very good power transmission from the drive unit to the crushing mechanism, making double-toggle jaw crushers ideal for crushing the hardest, most tenacious materials.



Double-toggle jaw crushers exhibit only minimum wear even when used for extremely abrasive materials.

Design



From top:

Double-toggle jaw crusher in use in a crushing plant

Schematic diagram of the operating principle of a double-toggle jaw crusher with a double-toggle system

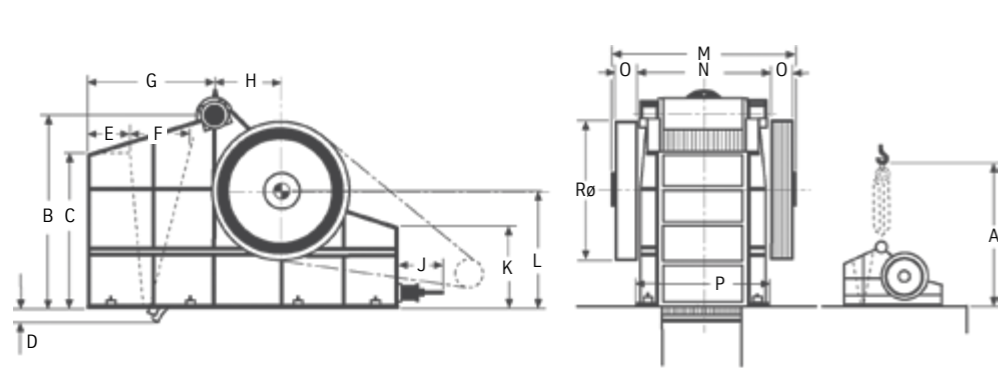
Left:

Double-toggle jaw crusher with its main components

Technical data | Double-toggle jaw crushers

Crusher	Type	Feed opening width x feed opening length	Total weight	Crusher speed	Jaw opening min. ¹⁾	Jaw opening max. ¹⁾	Weight of flywheel	Installed drive power	Speed of electric motor ²⁾
		[mm x mm]	[t]	[r.p.m.]	[mm]	[mm]	[kg/unit]	[kW]	[r.p.m.]
DB 6-4.2		600 x 425	10.6	275	60	90	750	30	1,500
DB 8-5.7		800 x 570	19.9	250	90	110	1,780	55	1,500
DB 10-8		1,000 x 800	35.5	250	110	190	2,630	75	1,500
DB 12.5-9		1,250 x 900	56.0	210	150	250	4,620	132	1,500
DB 15-12		1,500 x 1,200	117.2	200	170	280	6,780	160	1,500
DB 18-14		1,800 x 1,400	171.3	160	220	310	8,645	250	1,500
DB 21-16		2,100 x 1,600	217.8	135	220	340	13,750	315	1,000
DB 25-18		2,500 x 1,800	285.2	125	250	400	14,850	400	1,000

Crusher	Type	Largest component	Heaviest component	Dimensions of largest component	Weight of heaviest component	Max. weight of the crushing jaw
				[m x m x m]	[kg]	[kg/unit]
DB 6-4.2		Housing	Housing	2.60 x 1.67 x 1.08	4,590	425
DB 8-5.7		Housing	Housing	3.00 x 2.00 x 1.30	8,360	700
DB 10-8		Housing	Housing	3.90 x 2.65 x 1.57	17,600	1,600
DB 12.5-9		Housing	Housing	4.05 x 2.80 x 1.93	24,200	2,080
DB 15-12		Housing	Housing	5.60 x 3.90 x 2.40	59,070	4,290
DB 18-14		Side wall	Swing jaw	6.65 x 3.10 x 1.00	23,950	6,260
DB 21-16		Swing jaw	Swing jaw	5.40 x 3.10 x 1.50	28,710	8,030
DB 25-18		Swing jaw	Swing jaw	5.80 x 3.55 x 1.80	39,380	10,780



¹⁾ with new crushing elements
²⁾ 1,200 r.p.m. possible

All data are intended as a guide only. The machine capacity depends on the grain distribution as well as the characteristics and the texture of the feed material. Binding data can be provided once the specific operating conditions are known. To keep pace with technical progress, we reserve the right to make improvements to the various machine types without prior notice.

Crusher	Type	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Ø [mm]
DB 6-4.2		3,500	1,420	1,060	150	345	425	950	595	200	615	880	1,570	995	220	1,080	1,200
DB 8-5.7		4,200	1,780	1,350	150	350	570	1,040	780	200	700	1,010	2,020	1,280	320	1,300	1,650
DB 10-8		5,400	2,400	1,850	150	510	800	1,450	960	200	950	1,250	2,180	1,540	320	1,570	1,820
DB 12.5-9		5,700	2,510	2,000	200	480	900	1,635	880	250	1,050	1,380	2,730	1,930	400	1,930	2,100
DB 15-12		7,400	3,475	2,780	300	750	1,200	2,250	1,210	660	1,700	2,090	3,220	2,340	400	2,400	2,500
DB 18-14		8,700	4,200	3,200	250	865	1,400	2,750	1,280	135	2,020	2,490	3,830	2,830	500	2,960	3,000
DB 21-16		9,300	4,200	3,450	420	890	1,600	2,960	1,390	950	2,300	2,800	4,320	3,320	500	3,360	3,000
DB 25-18		10,250	4,860	3,900	420	1,080	1,800	3,460	1,500	1,100	2,250	3,060	4,960	3,860	600	3,820	3,500

Throughput rates and grain size distribution curves

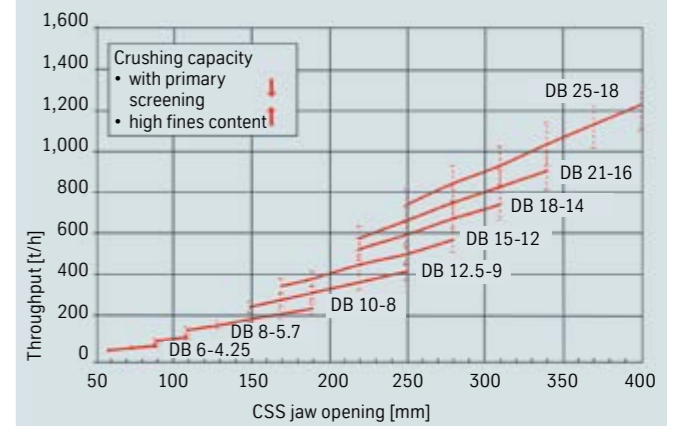
The throughput rates of the double-toggle jaw crusher are based on hard feed material that is easy to crush.

The rates are based on theoretical calculations that have been verified by practical measurements. Deviations from the average throughput rate are dependent on: material, grain size, composition of feed material, hardness, tenacity, degree of purity and feed rate. For example, a higher throughput can be expected for a dry, brittle granite feed of a near-mesh grain than for a surface-moist, tenacious basalt feed comprising mainly large lumps. The deviations that can normally be expected for common materials and jaw settings are shown in the diagram.

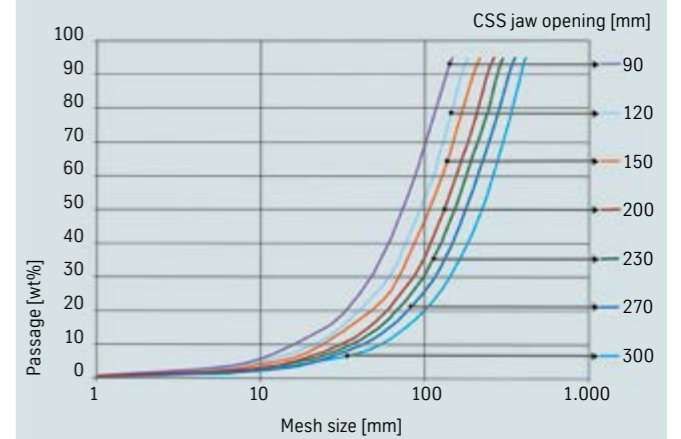
(Throughput by way of example based on a bulk density of 1.6 t/m³)

The grain size distribution curves of the product are only guidelines. Deviations in the percentage composition are dependent on the factors that also affect the throughput rate. The grain size distribution curves shown apply to dry, brittle granite. For a surface-moist, tenacious basalt the fines content will be slightly lower so the curves will shift to the right.

Average throughput rate of double-toggle jaw crusher, hard-rock version, tolerance ± 10%



Typical grain size distribution of the crushed product



Research, development and services

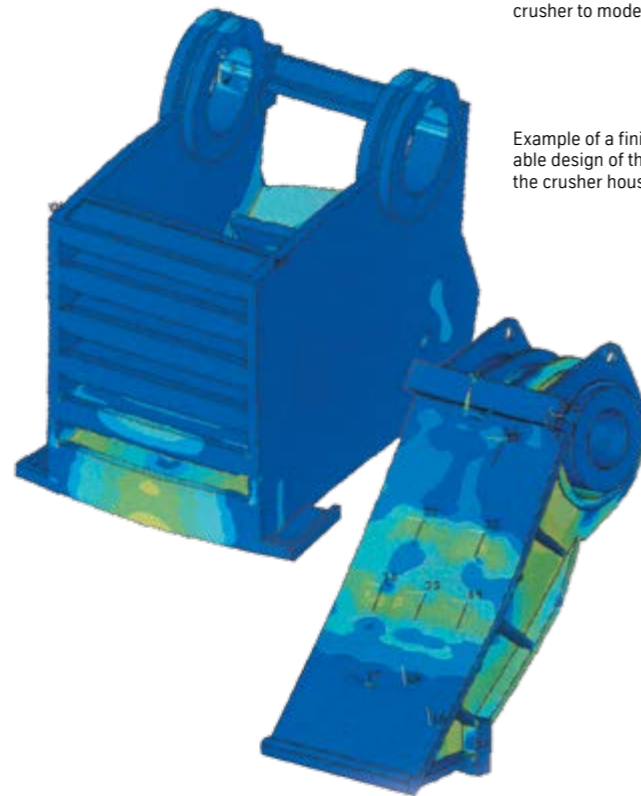
At thyssenkrupp we attach great importance to research and development. With our dedicated employees, experience and the ability to tread new paths as well as our innovative drive, flexibility and know-how, we make the perfect partner for our customers.

Our services range from establishing the technical parameters to performing measurements on new and old crushers.

Establishing the technical parameters also allows us to tailor the crusher, e.g. to design the individual components to suit your needs by means of a finite element analysis.



Installing a heavy-duty single-toggle jaw crusher to modernize a quarry



Example of a finite element analysis for reliable design of the main components, such as the crusher housing and swing jaw

Our services keep things running smoothly!

We offer our customers not only optimum, customized technical solutions, but also comprehensive, tailored service ranging from the engineering of individual crushers and entire plants to their operation, and modification if needed.

We usually start out by analyzing the storage areas and the feed material. Using state-of-the-art processes we characterize the respective material, which forms the basis for selecting the right crusher and any customer-specific adaptations that may be required. Then we perform testing under field conditions using a clever control and diagnostic system to check the main operating parameters again.

Whenever you need us, the maintenance and repair crews from thyssenkrupp Industrial Solutions are on hand to cater to your needs, from specialist advice, inspections and modifications through modernizations and performance enhancement to damage analyses and repairs, which are performed exclusively by our highly qualified assembly personnel using high-quality, certified spare parts. If necessary, we will maintain and repair your crusher at one of our service centers. You can call on these services not only for crushers from our own production lines, but also for machines manufactured by other suppliers.

Increase the productivity of your machines and plants! Call on our service team today.

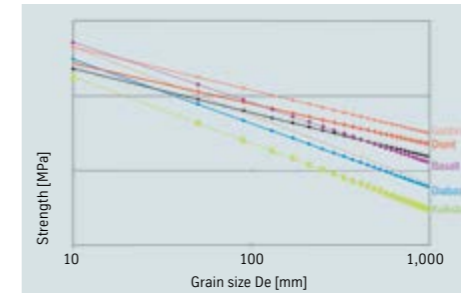


From left:

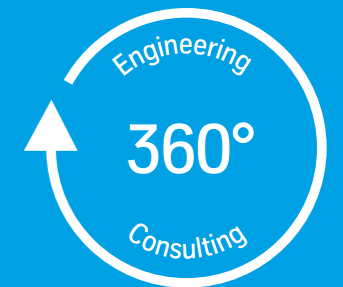
Equipment for material analysis

Control and diagnostic system, screenshot of the recording of the main operating data

Material assessment with regard to its strength as a reliable means of selecting the optimum crusher



One-stop-shop service



-  Asset Management
-  Spare Parts Supply & Management
-  Service Center & Field Services
-  Revamps

Industrial Solutions

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