

Parts for crushing and screening equipment

element[®]
Integrity in details





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About the company

Element – a manufacturer of spare and wear parts for mining equipment providing a high level of quality and service

Element's customers mine gold, iron and rare earth metals, they produce crushed stone, make cement and even mine chemicals for fertilizers – each enterprise grinds thousands of tons of rock every day.

The cost of crushing is more than 60% of the cost of the entire production cycle, and the most expensive process here is replacing worn out parts. Element's parts reduce the cost of production and increase the repair interval, thereby reducing equipment downtime.

Element offers the following alternative spare parts under its own brand:

- Spare and wear parts for crushing and screening equipment
- Spare and wear parts for slurry pumps
- Conveyor transport components
- Wear-resistant materials
- Mill linings
- Standard components and their fully-fledged analogues
- Custom-engineered parts



Range of parts

Element produces parts for the following types of equipment:

Jaw crushers

Cone crushers

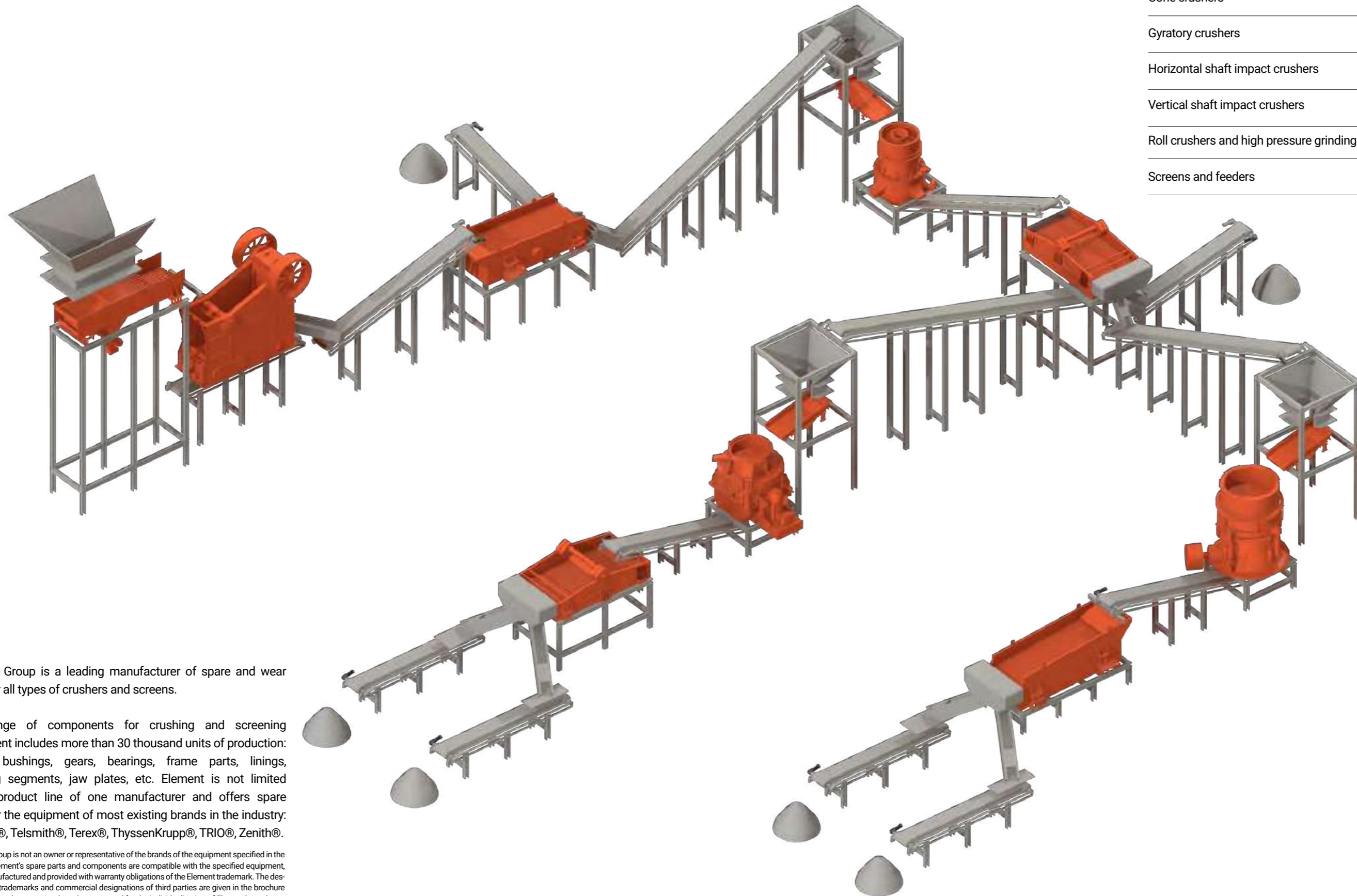
Gyratory crushers

Horizontal shaft impact crushers

Vertical shaft impact crushers

Roll crushers and high pressure grinding rolls

Screens and feeders



Element Group is a leading manufacturer of spare and wear parts for all types of crushers and screens.

The range of components for crushing and screening equipment includes more than 30 thousand units of production: shafts, bushings, gears, bearings, frame parts, linings, crushing segments, jaw plates, etc. Element is not limited to the product line of one manufacturer and offers spare parts for the equipment of most existing brands in the industry: Sandvik®, TelSmith®, Terex®, ThyssenKrupp®, TRIO®, Zenith®.

* Element Group is not an owner or representative of the brands of the equipment specified in the brochure. Element's spare parts and components are compatible with the specified equipment, and are manufactured and provided with warranty obligations of the Element trademark. The designations of trademarks and commercial designations of third parties are given in the brochure for informational purposes only and are not used for the individualization of Element's products.



Parts for jaw crushers

The replacement of wear parts for both jaw and other types of crushers is a significant expenditure for any crushing and processing plant. The more often a plant needs to carry out repairs, the less efficient its production processes will be, which ultimately leads to lower profits.

For crushers, Element produces cost-effective liners that can solve two tasks at once: firstly, they increase the wear lifetime, which means that downtime is reduced; secondly, they reduce the operating costs of the plant.

The range includes parts for crushers of various designs: with complex and simple jaw swings in addition to one, two and three-row crushing plate arrangements.

Case 1. Increasing the operating time of jaw plates

One of the problems that customers turn to Element for is an insufficient jaw plates operating time, due to the use of an unsuitable profile. One customer in particular faced such a problem.

Element's specialists studied the operating conditions and found out that the problem of low operating time was associated with a large amount of fines in the feed. Based on the drawings of the linings used by the customer and the feed parameters, our engineers developed jaw plates with improved material capture and screening of fines, and also selected an alloy more suitable for crushing hard and abrasive rocks. So, we managed not only to increase the operating time, but also to improve the quality of the finished product.

Case 2. Simplifying part assembly

Another problem that our customers have faced is the inconvenient installation and dismantling of plates. To solve this problem, our design engineers developed narrowed jaw plates and side liners.

In another case, we changed the number, configuration, and location of lifting holes to make installation and disassembly of jaw plates easier and more convenient.

Wear parts

Jaw plates

Element produces jaw plates made of manganese steel. The content of manganese, chromium and other alloying elements is selected depending on the strength and abrasiveness of the crushed rock.

Standard alloys

Mn13Cr2 – C – for non-abrasive rocks of small and medium strength

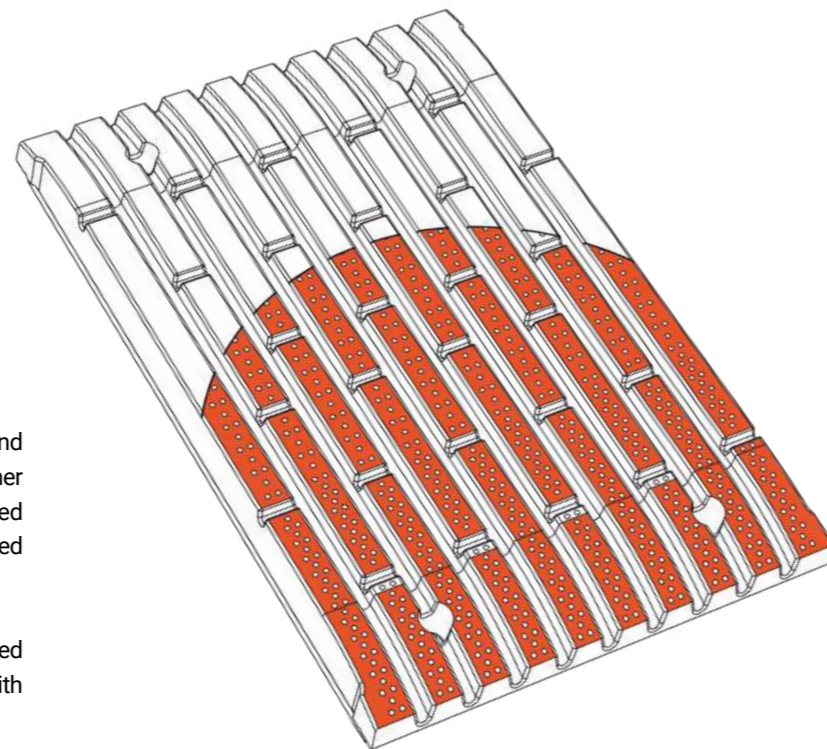
Mn18Cr2 – D – for general use

Mn22Cr – D1 – for the strongest and most abrasive rocks

Element TC

Element TC – linings made of standard alloys C, D, D1 and reinforced with titanium carbide inserts. They show higher resistance to shock loads and cracking. This effect is achieved by special casting processes and heat treatment of the finished product.

During the tests, the linings with inserts showed an operating time from 1.5 to 4 times more in comparison with classic manganese steel wears without inserts.



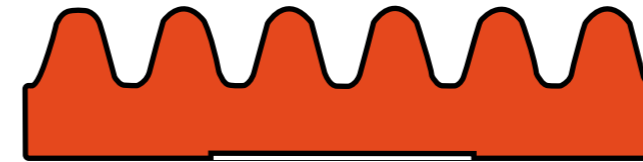
Element TC plates allows one to:

Increase the intervals between plates replacement

Reduce the number of maintenance stops

Reduce the unit production costs, per unit of the final product

Profiles



Corrugated

This profile is used for layered materials with a large amount of fines in the feed at small close side settings values.



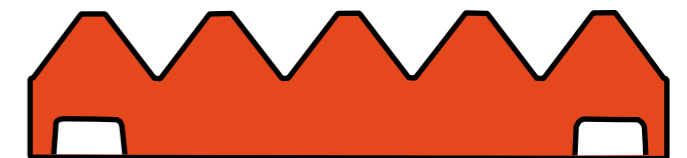
Coarse Corrugated

This profile is used for layered and abrasive materials with a large amount of fines in the feed at large close side settings values.



Universal

For general use, recommended for abrasive materials. The same lining with such a profile is suitable for both swing and fixed jaws.



Sharp Tooth

This profile is used for layered and abrasive materials with a large amount of fines in the feed. Provides better material grip in comparison with other profiles of crushing plates.



Quarry

For heavy duty conditions. This is used for crushing particularly hard and abrasive materials, and as a result, it has a high wear resistance. To improve the shape of the product, it is recommended to use it together with plates of the Coarse Corrugated or Sharp Tooth types.

Besides standard profiles, Element produces jaw plates according to the customer's drawings or an individual project developed by our design bureau.

Cheek plates, deflector plates and fasteners

The cheek plates of the frame and the deflector plate of the swing jaw are made of manganese steel or wear-resistant steel with a high Brinell hardness.

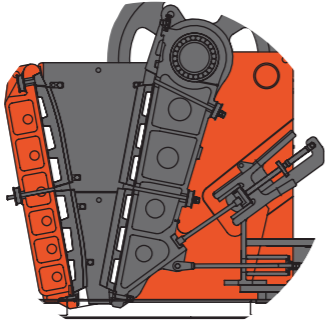


We offer standard fasteners – bolts, nuts, washers – and special fasteners: wedges, clamping and supporting strips.

Spare, emergency and capital parts

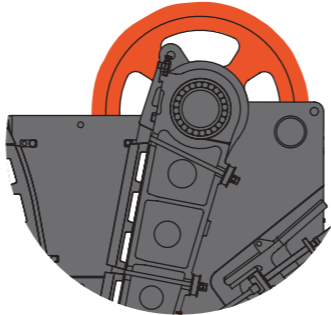
Frame parts

- Frame
- Frame walls
- Beams
- Bushings
- Supports



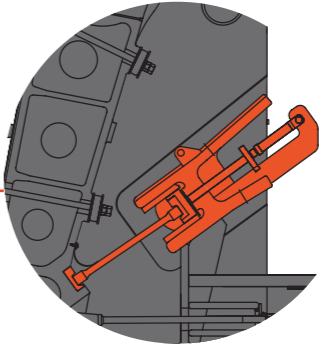
Elements of the V-belt transmission

- Flywheels
- Counterweights
- V-belts
- Taper bushings



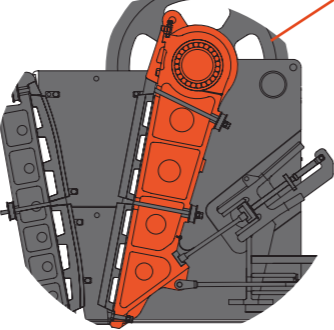
Adjustment parts

- Toggle plates
- Stoppers
- Holdings and retainers
- Wedges and pins
- Hydraulic cylinders



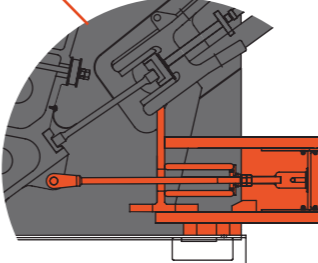
Swing jaw

- Pitman
- Eccentric shaft
- Bearing housings
- Spherical roller bearings
- Labyrinth seals
- Covers



Return rod

- Springs
- Guides
- Hydraulic cylinders
- Pins
- Brackets
- Pressure plate



Parts of cone and gyratory crushers

Element produces parts for spring cone crushers and hydraulic cone crushers, as well as for gyratory crushers.

Element manufactures the following types of parts for cone and gyratory crushers:

Wear parts

Mantles, bowl liners, arm guards, pinion shaft arm liners, top shell and bottom shell liners, feed cones and plates.

Spare parts

Bushings for various purposes, torch rings, head nuts, thrust bearings, supports, brackets, plates, seals, gaskets, springs, conical and spherical bearings.

Capital parts

Shafts, frame parts, gears, eccentrics.

Spare parts for cone crushers are more often than not considered as belonging to the 'emergency' category – parts whose failure cannot be predicted. For customers who are faced with a sudden failure of cone crushers, the availability of emergency parts and the ability to replace a faulty part in 1-2 days are especially important. Element has formed a warehouse program for the most popular brands and models of cone crushers, for which it regularly updates and replenishes stocks of emergency parts.





Wear parts

Element has developed a range of alloys for different application conditions: the mantles and bowl liners are usually made of manganese steels, grades A, C, D, D1, D2, and for heavy conditions we use additional alloying elements: molybdenum, nickel, titanium and others. For the remaining parts, manganese steels, wear-resistant steels with high Brinell hardnesses and high-chromium white cast iron are used.

Element selects lining materials for gyratory crushers depending on the load on the row of the crushing chamber. The lower rows are subject to more intense kinds of abrasive wear, so they are made of steels that are more resistant to this type of wear. For the upper rows, a material that has been well work hardened under shock loads is used.

Austenitic manganese steel A

Mn: 13%

Classic Gadfield steel. High structural strength, medium resistance to abrasive wear. Significantly increases hardness through work-hardening.

Austenitic manganese steel C

Mn: 13% Cr: 2%

For non-abrasive rocks of small and medium strength. Increased tensile strength at lower impact viscosity, better resistance to abrasive wear due to increased surface hardness before work hardening.

Austenitic manganese steel D

Mn: 18% Cr: 2%

For general application. An Improved formula with additional chromium alloying. A significant increase in hardness after heat treatment (up to 270HB), increased resistance to abrasive wear (up to 20% when compared to grade A).

Austenitic manganese steel D1

Mn: 22% Cr: 1%

Suitable for the strongest and largest of rocks. We recommend using this at the first stage of crushing. The alloying has increased the impact strength of the metal.

Austenitic manganese steel D2

Mn: 22% Cr: 2%

Suitable for the most abrasive of rocks. We recommend using this at the second or third stages of crushing. Possesses the highest resistance to abrasive wear among Element's line of manganese steels.

THOR technology

Element uses THOR technology for the production of liners for cone and gyratory crushers. The use of THOR wear-resistant linings directly affects the increase in the inter-repair period, reduces the specific production costs per unit of the final product and reduces the number of maintenance stops.

THOR – technology for modifying the structure of manganese steel

THOR series linings wear out less due to improved crystallization conditions, reducing the amount of non-metallic and gas inclusions in addition to harmful impurities. The life capacity of THOR linings, on average, is 30% more than standard wears. All standard A, C, D, D1, D2 alloys can be modified using THOR technology.

Characteristics of THOR linings:

Increased strength and hardness when compared to standard linings, which are made of austenitic high-manganese steels;

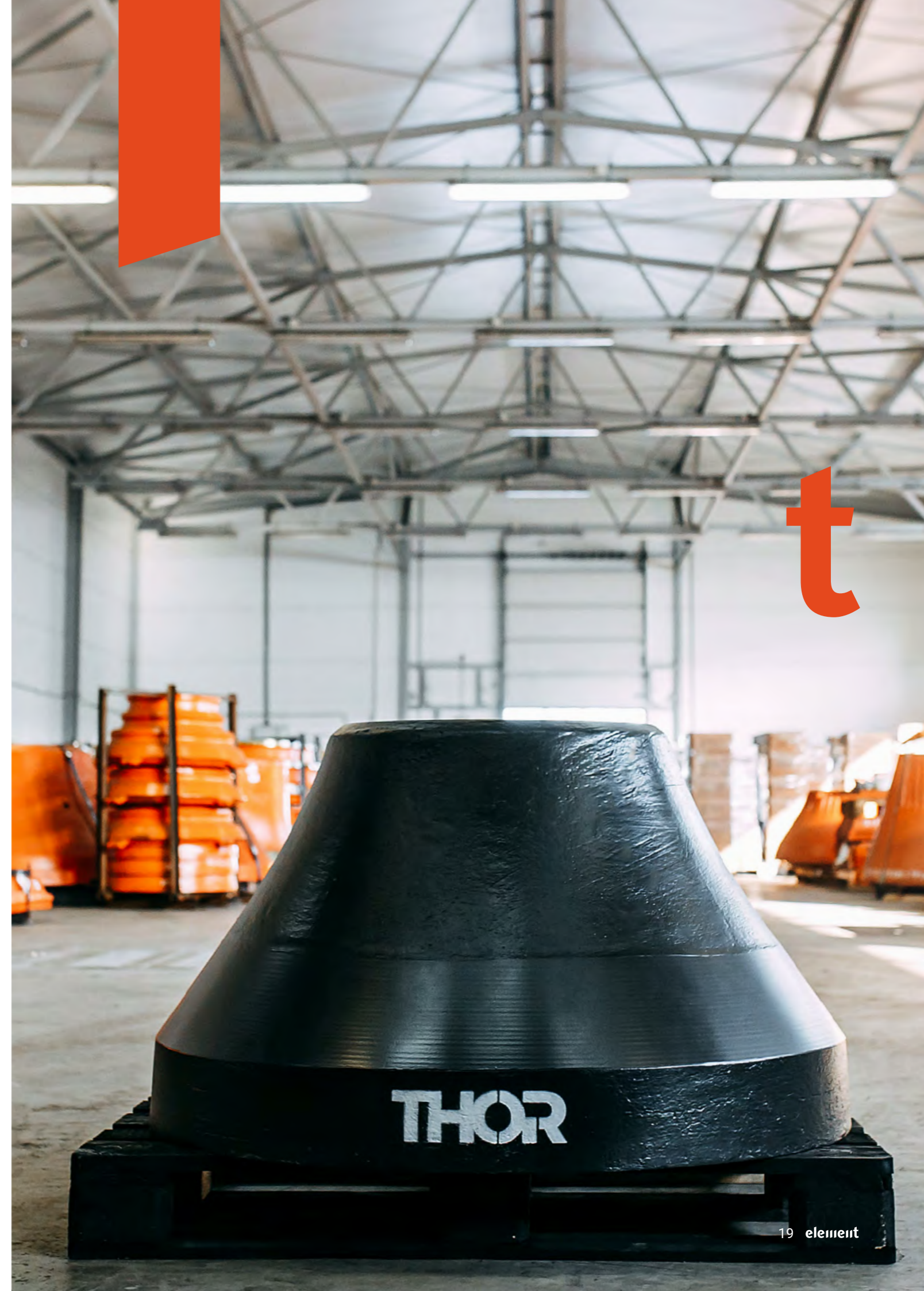
Better resistance to abrasive wear;

The ability to withstand high mechanical loads: high-strength and resistance to deformation.

Case study. THOR linings have increased the repair interval by 117%

The company in question installed a set of THOR linings on an large Symons type cone crusher cone crusher. The operating conditions at the quarry are extremely tough: the crusher processes albitofir with a size of 10-250 mm, crushing it into fractions of up to 80 mm.

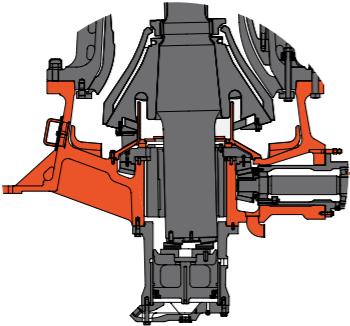
The THOR linings lasted 39 days, during which they processed 158,428 tons of stone. According to Element's analysis the lining's operating time was 117% higher than the average of ten previous sets before it, provided by other manufacturers over 2021. The average capacity of non-branded liners was 73,000 tons.



Spare, emergency and capital parts

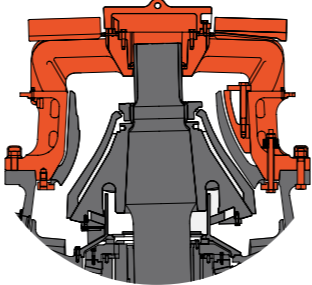
Bottom shell

- Bottom shell bushing
- Dust collar
- Fulcrum bar
- Seal
- Bottom shell lining



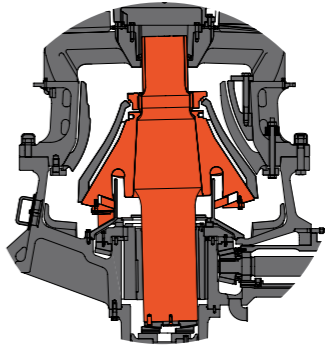
Top shell

- Top bearing
- Spider cap and arm guards
- Filler ring and support ring
- Top bearing seal



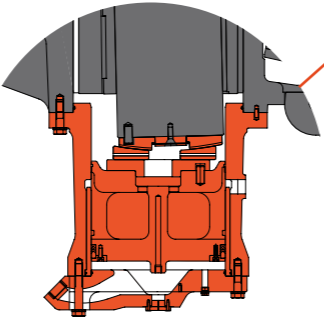
Main shaft

- Main shaft sleeve
- Head nut and torch ring
- Head centre
- Dust seal
- Scraper



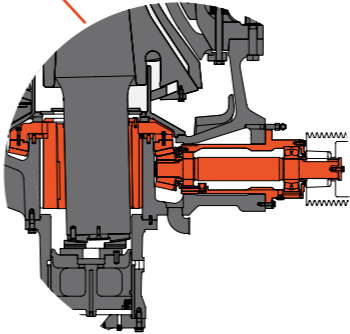
Hydraulic cylinder and thrust bearing

- Socket
- Piston wearing plate
- Piston
- Hydraulic cylinder bushing
- Chevron packing



Pinion shaft and eccentric

- Gear and pinion
- Pinion shaft housing
- Roller bearings
- Eccentric bushing
- Hub
- Eccentric wearing plate



NovaTHOR – a next-generation compound

To protect crusher parts from premature wear, the space between the linings, the cone and the frame is filled with a shock-absorbing filler. Element offers a solution that is superior to its counterparts in a number of parameters, and at the same time one that is cost-effective. Behold, the NovaThor® compound, based on an epoxy resin.

NovaTHOR is a two-component compound based on epoxy resin that works by filling the cavities between the surfaces of wear and body parts.

The product, based on an epoxy resin, is eco-friendly, safe and easy to use, and is as effective as zinc and lead fillers.

Filling the cavities between the elements is a necessary step in the relining of almost all cone and gyratory crushers. The function of the compound is to be a damper between the linings, the cone and the frame of the crusher. It reduces the impact load on the wear parts of the equipment and the negative impact on the capital parts of the units.

The epoxy compound is safe for the environment and the health of the employees at mining plants. An important advantage of the resin is its ease of application. It is enough just to mix and pour the mixture onto a clean surface. No lubrication is required for this.

Basic parameters

Nº	Parameter	Value
1.	The lifetime of the mixture (25 °C), min	15±5
2.	Curing time (25 °C), hour	<24
3.	Density, kg/m ³	1600±200
4.	Hardness (Shore D)	>80
5.	Impact strength, kJ/m ²	>7
6.	Compressive strength, MPa	≥120
7.	Shear strength, MPa	>15
8.	Shrinkage, %	<0,01

NovaTHOR vs zinc

Filling and storage conditions	Zinc	NovaTHOR
Special equipment is required	Yes	No
Emits harmful vapors	Yes	No
Is explosive	Yes	No
Special conditions required for disposal and storage	Yes	No
Temperature load on the wear parts	Yes	No
Risk of shrinkage and void formation during cooling	Yes	No





Wear parts for horizontal shaft impact crushers

The replacement of wear parts for horizontal impact crushers is comparable in cost to the maintenance of expensive cone or jaw crushers. The use of more modern and technologically advanced materials, selected taking into account the operating conditions, allows one to increase the repair interval and reduce the cost of maintenance by up to 30%.

Element produces for horizontal shaft impactors:

Blow bars and hammers

Element offers blow bars and hammers made of 15 types of alloys in three groups: manganese steel, martensitic steel, high-chromium white cast iron. Additionally, inserts made of ceramic or titanium carbide are used.

Element's specialists select the material of the blow bars and hammers by the hardness and abrasiveness of the processed rock. The size of the product, the moisture content of the rock, the speed of rotation of the rotor and the loading of the crusher are extremely important.

Linings for breaker plates and frames

Element uses high-chromium white cast iron and manganese steel to produce the breaker plate liners. The frame linings can be made of cast iron, manganese steel, as well as various types of wear-resistant steel with high Brinell hardnesses.

Case Study: Element increases the operating time of rotary crushers by 4 times

Operating conditions

Object: stone quarry
 Product: crushed stone
 Rock: granite, large, abrasiveness 900 g/t, destructibility 26%, density 2.66 t/m³

The original problem

The customer often had to change the blow bars for the crusher. Russian-made blow bars quickly wore out and were only able to process 15 thousand tons. Chinese analogues could handle 28 thousand tons.

Element's solution

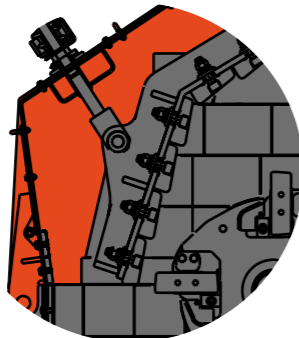
Martensitic steel with ceramic inserts. This combination gives additional abrasive resistance. This is suitable for the first or second stages of crushing.

Blow bars from Element	Average operating time of the set		
	Russian-made blow bars	Chinese-made blow bars	OEM blow bars
60000 (1st set)	15000	28000	42500
52270 (2nd set)			

Spare, emergency and capital parts

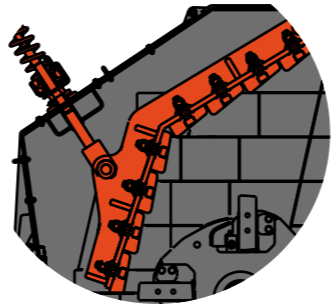
Movable frame

- Frame housing
- Access door
- Plates



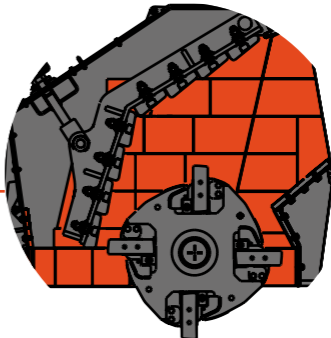
Breaker plate

- Breaker plate frame
- Cylinders
- Tension rods
- Springs
- Gaskets



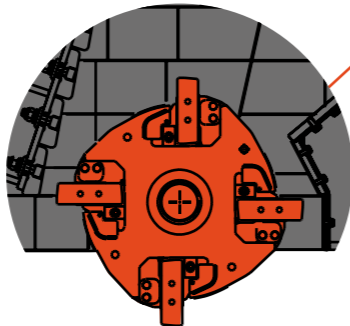
Frame lining

- Wear plates
- Fasteners



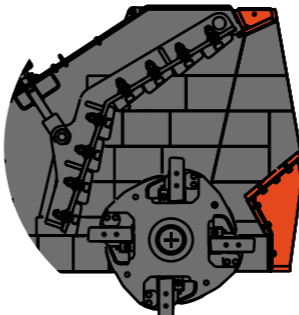
Rotor

- Rotor shaft
- Shaft housing
- Covers
- Roller bearings
- Sheave
- Thrusts
- Wedge



Fixed frame

- Frame housing
- Plates
- Beams
- Covers
- Flanges
- Axes



Wear parts for vertical shaft impact crushers

Impact crushers are used at secondary, tertiary and quaternary stages of crushing and often operate 24/7. Due to their effectiveness when it comes to fraction reduction, they are widely used in coal mining and in the non-metallic materials industry. However, with a low unit cost, impact crushers come with a fairly large consumption of wear parts.

The use of wear parts that are different in geometry and alloy provides the desired performance and characteristics of the finished product for each specific case.

Element produces the following parts for vertical shaft impact crushers

Rotor cavity wear plates and tips

The parts that are particularly susceptible to wear on vertical shaft crushers are the rotor cavity wear plates and the backup tips. Element makes them from steel using three types of tungsten carbide inserts.

Full range of wear parts

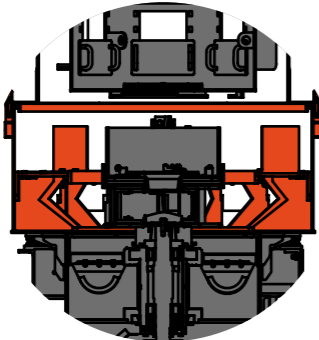
Impact crushers are characterized by a large number of wear parts. More than 10 types of parts are subjected to abrasive wear, and Element selects the appropriate material for each part.



Spare, emergency and capital parts

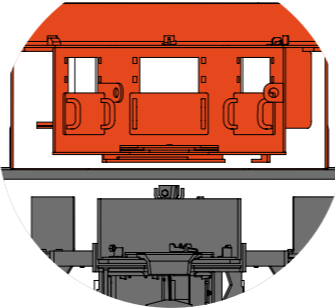
Crushing chamber

- Chamber
- Spider
- Feed assembly
- Pressure plate
- Lock ring
- Gussets



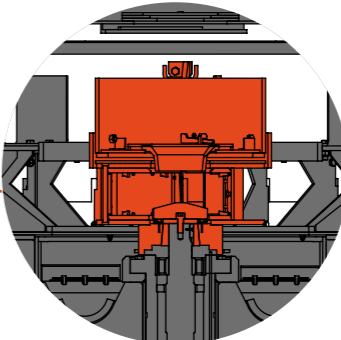
Feed hopper

- Hopper cover
- Control plates
- Control gate
- Distribution plate
- Wear ring



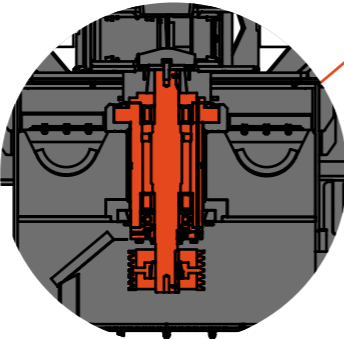
Rotor

- Rotor housing
- Hub
- Bushing
- Mounting plates



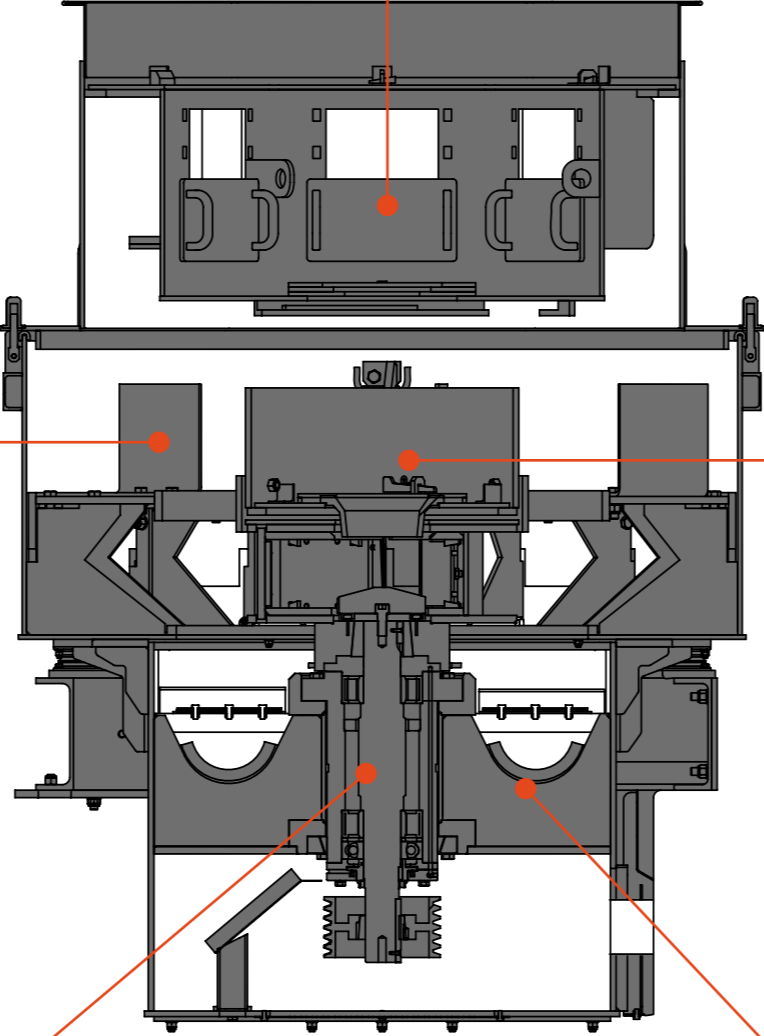
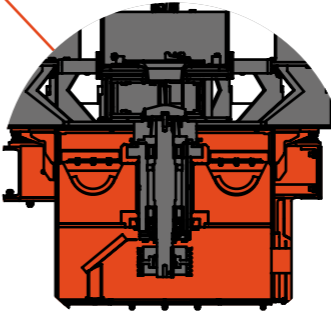
Shaft

- Bearing housing
- End cover
- Bearings
- Sheave
- Retainers
- Seals



Base

- Crusher base
- Brackets
- Plates
- Covers





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Wear parts for roll crushers and high pressure grinding rolls

Element produces wear parts for high pressure grinding rolls, as well as crushers with smooth, grooved and toothed rolls. Crushers with smooth and grooved rolls are more often used in the medium and fine crushing of hard rocks and rocks of medium strength, whereas models with toothed rolls are used for the primary and secondary crushing of soft materials.

Case study: Element reduces the cost of relining the roll crusher by 4 times

One company turned to Element with the following tasks: to reduce the price of a set of linings, to increase part lifespan and to reduce dependence on a single supplier of parts for their fine crushing roll crusher. The Element team took up the project and proposed not only the creation of an analog, but also to develop a new product – unique in design and operating principles.

To solve these tasks, Element's engineers studied the design of the original parts, the nature of their wear and designed a lining consisting of two components: a base and a set of six crushing segments. Element proposed a solution that reduced the cost of relining by up to 4 times while increasing the lifespan of the parts.

Client problem	Element's solution	Result
Low life capacity of the original linings (on average: 216,000 tons).	We have developed an alternative geometry of the crushing segment. The alloy was changed.	The lifespan of the first set was 288,034 tons.
High price	We reduced metal consumption: the customer changes only the worn-out part of the lining.	The cost of the entire relining procedure was halved, and the price for the remaining segments was a quarter of the price of the original part.
Uneven wear of the linings. Most of the worn part had to be disposed of due to tooth wear.	Separation of the integral part into the base and crushing segments, which are fastened with special bolts.	Only a set of crushing segments and fasteners are subject to regular replacement. The base segments need to be changed only as they wear out (1 time for ever 2-4 relinings).

Parts for screens and feeders

Element offers spare parts for screens and feeders of various brands represented on the market. According to a drawing, our specialists can produce any spare part of interest. We can also upgrade spare parts at the customer's request.

Element produces parts for screens and feeders of the following types:

Horizontal screens

Inclined screens

Multislope screens

Apron feeders

Grizzly feeders

Vibrating feeders

Roller feeders

Element produces the following parts for screens and feeders:

Spare parts

Bearing housings, grizzly bars made of wear-resistant steels, including those with bimetal surfacing, cross beams, crossbars, springs, bearings, linings, wear-resistant plates, dampers, labyrinth collars.

Screening surfaces

We make fine screens mainly from two synthetic materials – rubber and polyurethane. At the request of the client, we also produce wire fine screens and metal panels, including special versions, for example, those that are heat-resistant.



Engineering-to-order solutions

Our product line includes not only analogues of parts from equipment manufacturers, but also products designed specifically for the needs of our customers

The greatest effect that individual engineering gives is economic. The information obtained from the customer questionnaire allows us to determine what needs to be improved in the part to increase its service life. According to the collected data, Element's specialists select the optimal material and profile, including those that are not in the equipment manufacturer's line.

Task 1. Increase the lifetime capacity of linings

To increase the operating time of a part, Element's engineers change the geometry of the liners, and may select a new profile or an alloy.

One company turned to Element with the task of increasing the operating time of the linings of a large cone crusher. With the weight of the set being 12 tons, the task was to improve the resistance to abrasive wear without reducing the strength of the parts. Element's specialists have developed an alloy with additional alloyage, and according to the test results, the lifetime of the linings exceeded the expected operating time by 10%.

Task 2. Improve the quality of the finished product

This task is especially relevant for enterprises of the non-metallic industry, where it is necessary to reduce the number of dropouts, reduce the flakiness and strictly comply with all standards.

The client turned to Element with the problem of the wrong shape of the finished product. Element's engineers changed the profile on one of the jaw plates to a toothed one with an improved grip. As a result, Element's parts not only improved the quality of the finished product, but also achieved 18% more engine hours than the original wears.

Task 3. Simplify installation

To simplify installation, Element can lighten the weight of the part, change the number, configuration or location of holes for gripping and installing crushing plates or side linings.

Examples: to facilitate installation, Element's engineers divided the lining of the jaw crusher into segments – this allowed the lining to be rearranged during operation, depending on wear. Timely rearrangement increases the wear lifetime by up to 2 times, and the ease of installation reduces the downtime of the enterprise.



Element's advantages

Individual engineering

Element is the only manufacturer on the market of alternative spare parts for mining equipment, where the quality on offer is not inferior to that of OEM parts and the price is favorable. Element doesn't simply select suitable solutions, it develops them. If it is necessary to improve the quality of the finished product or the service life of the parts, Element will offer either a ready-made solution, or a new material or part design compatible with the customer's equipment.

Warehouse program

Thanks to an analysis of the database of equipment installed at mining enterprises, Element fills its own warehouses with in-demand products in order to minimize delivery time. If a part cannot be located in one of Element's warehouses, the company accepts orders for the bespoke production and delivery of parts.

Trials

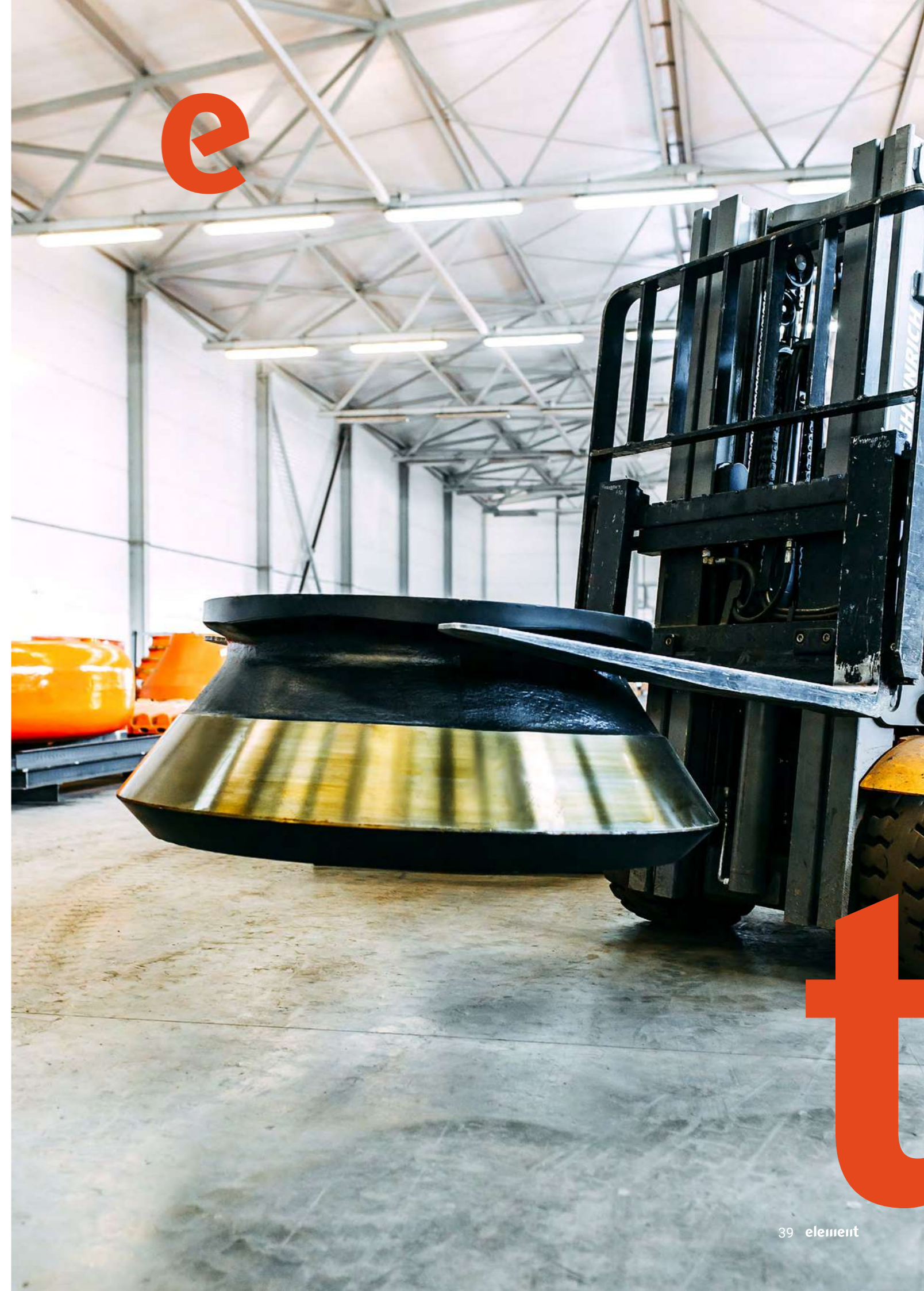
Element's product specialists will calculate the benefits of using spare parts as a percentage or in dollars or euros for each specific customer and will offer trials at the customer's production site, taking into account the operating conditions of the equipment, the current production of linings and their wear factors.

Guarantee of efficiency

Element guarantees the high quality of the delivered parts and provides a guarantee of operating time in hours or tons of processed ore. Engineers can provide a justification for the payback period and showcase the company's past projects that demonstrate the cost-effectiveness of Element's branded products.

Technical and service support

During the entire service life of the parts, Element's technical specialists provide consultation and servicing for customers. As part of the technical support on offer, Element offers to optimize wear parts based on operational experience and recommendations from the customer.



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