

# Slurry Handling Solutions



**element**<sup>®</sup>  
Integrity in details



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# About the company

**Mining Element is a reliable manufacturer of spare and wear parts aimed at providing processing equipment with best-in-class quality and service.**

Slurry pumps and hydrocyclones are subjected to the most wear when it comes to the equipment used in technological processes. Highly abrasive slurry severely affects spare parts and the cost of replacement may exceed the initial cost of the equipment. Switching to alternative solutions allows one to save on average from 10% to 30% per object.

Mining Element's mission is to reduce clients' maintenance costs by offering high-quality parts with a long service life.

## Mining 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 and hydrocyclones
- Conveyor components
- Wear-resistant solutions
- Mill liners
- Industrial parts
- Bespoke parts





# Our product range

Mining Element produces a full range of wear and spare parts for slurry pumps and hydrocyclones produced by the Warman, FLSmidth and Metso brands\*.

\* Mining Element is not an owner or representative of the brands of the equipment specified in the brochure. Mining 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.

**We produce spare and wear parts for hydrocyclones and the following kinds of slurry pumps:**

- Medium Duty Pumps

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- Heavy Duty Pumps

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- Mill Discharge Pumps

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- High Head Pumps

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- Gravel Duty Pumps

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- Tailing Pumps

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- Vortex Flow Pumps

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- Froth Duty Pumps

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- Vertical Pumps

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# Wear parts for slurry pumps

**Mining Element manufactures alternative spare parts for slurry handling solutions with an operational time similar to or exceeding that of OEM parts.**

Mining Element produces more than 350 types of wet-end parts made of high-chromium white cast iron and rubber according to its own molds.

The application of alternative wear parts for pumps with an operating time at the OEM level reduces the OPEX on average by 20%. With an understanding of the lifetime of spare parts, there is no need to maintain large stocks, meaning that mining companies can invest in the development of other technological processes.

## **Case 1. Mining Element's spare parts have reached an operating time comparable to that of the OEM**

Mining Element supplied a set of wet-end parts to a large gold mining company in March of 2021.

The processing plant's equipment was impacted by high loads due to the type of solid ore. The average operating time of the OEM's wet-end parts was 1,100 hours and they complied with all of the customer's requirements. However, replacing these parts entailed high costs.

Mining Element offered wet-end parts made of a low-carbon alloy with a high content of chromium and white cast iron. As a result, the set served for almost 4 months and withstood 1,135 hours of pump operation, which corresponds to the availability of previously used OEM parts with significantly lower maintenance costs.

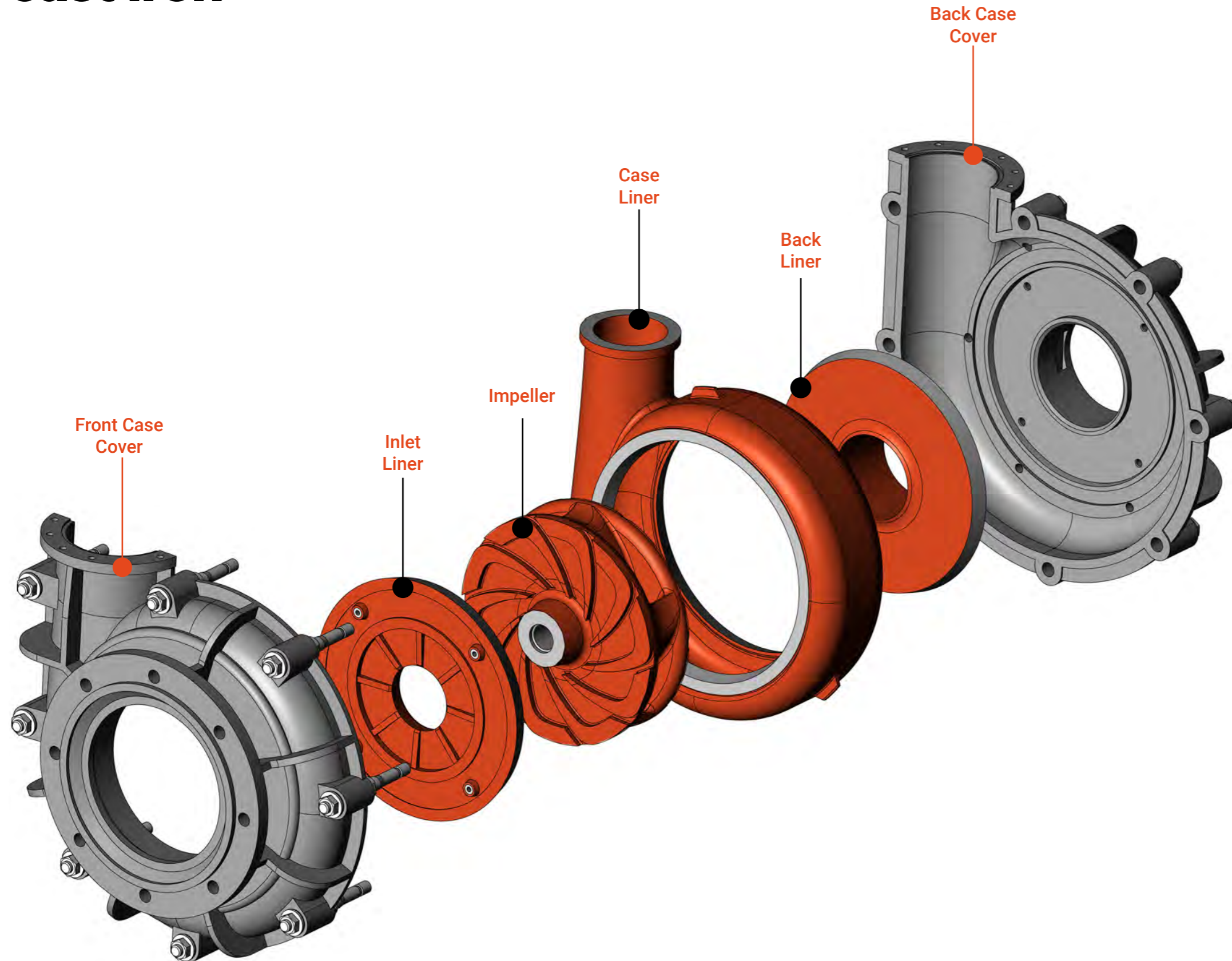
## **Case 2. The operating time was increased by 1.5 times**

One of the problems our customers come to us with is the quick wear of wet-end parts. That's why another large gold-processing plant assigned us the task of increasing the operating time of the case liners for the wear parts of a Warman 10/8 G-AH pump.

Mining Element's specialists visited the enterprise's site, studied the operating conditions, and found out that the problem of the liners' low operating time was associated with the wrong choice of wet-end part material. Based on the collected data, Mining Element's engineers suggested a replacement of the metal wet-end parts with natural rubber. As a result, the operating time was increased by 1.5 times, and the spare parts expenses of the processing plant decreased by 2.5 times.



# Wet-end parts from high-chromium white cast iron



## High-chromium white cast iron AR27

Standards: Class IIIA ASTM A128

Hardness (HBW): >600

Chromium content Cr (%): 27,0

Medium corrosion resistance with high erosion resistance. For operation with pH levels ranging from 5-12.

## High-chromium white cast iron AR28

Standards: Class IIIA ASTM A128

Hardness (HBW): >430

Chromium content Cr (%): 28,0

Good corrosion resistance. For operation with pH levels ranging from 3-14. Preferable for slurry with sulfuric acid, nitric acid or sodium hydroxide contents.

## High-chromium white cast iron AR30

Standards: N/A

Hardness (HBW): >650

Chromium content Cr (%): 30,0

High corrosion resistance. For operation with pH levels ranging from 3-14. Preferable for slurry with sulfuric acid, nitric acid or sodium hydroxide contents.

# Wet-end parts from synthetic rubber

## High-strength rubber based on natural rubber ER40/ER50

Internal standard: Element ME QP-09

Density (g/cm<sup>3</sup>): 1,05±0,05

Hardness (Shore A): 40±5; 50±5

Max. operating temperature (°C): 70

High wear resistance and medium chemical resistance.

## High-strength rubber based on poly-chloroprene (Neoprene) CR50/CR60

Internal standard: Element ME QP-09

Density (g/cm<sup>3</sup>): 1,35±0,05

Hardness (Shore A): 50±5; 60±5

Max. operating temperature (°C): 100

High wear resistance and high chemical resistance to trioxigen and oils.

## Chlorsulphonated polyethylene (Nypalon) CSM65

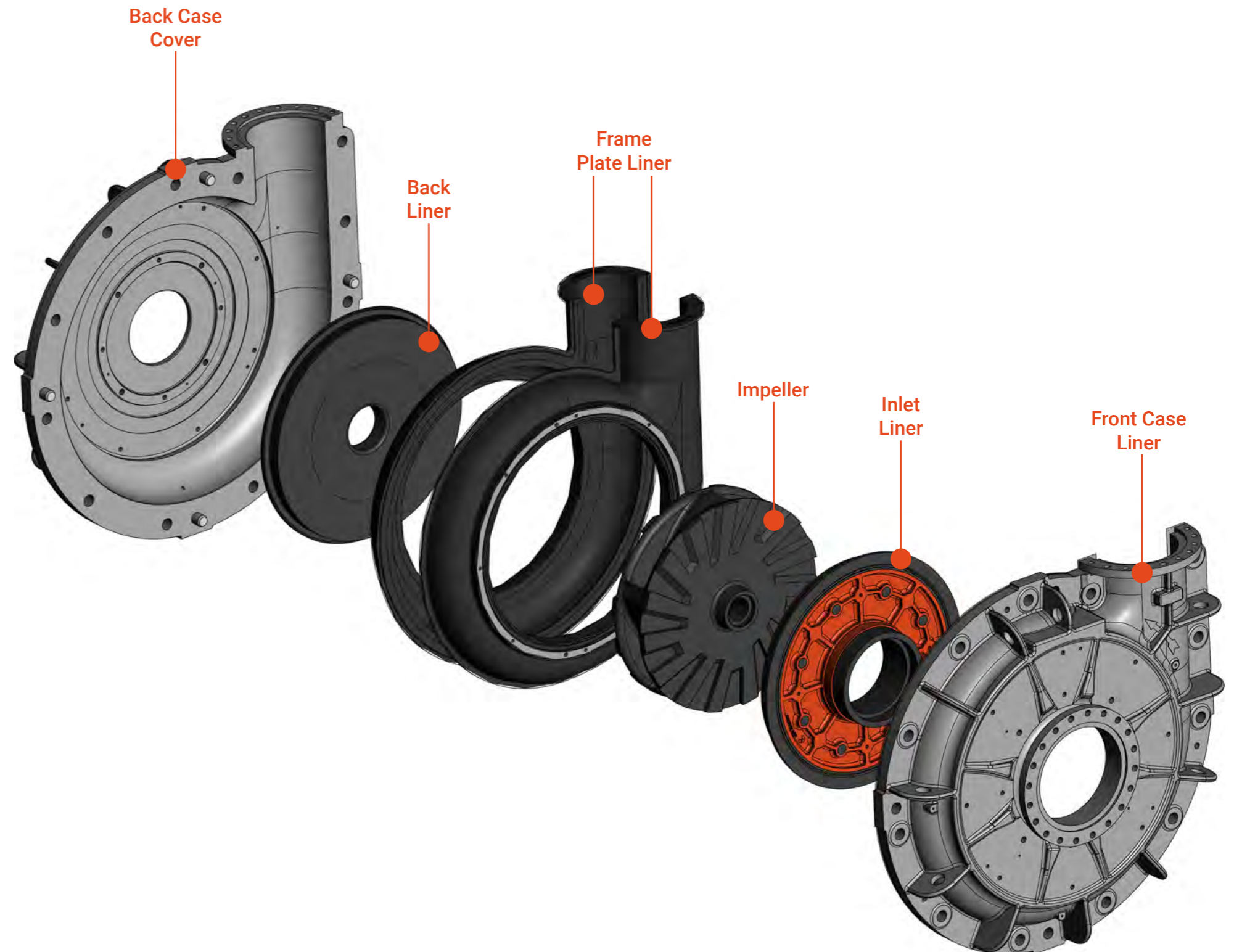
Internal Standard: Element ME QP-09

Density (g/cm<sup>3</sup>): 1,24±0,05

Hardness (Shore A): 65±5

Max. operating temperature (°C): 110

Medium wear-resistance and high acid-resistance.



# Gland seals

## Shaft sleeve

Stainless steel 420

Standard: DIN X39Cr13; EN 10088-1

Optional coated modifications:

1. Tungsten carbide coating
2. Anodic oxidation of aluminum

## Lantern restrictor

Bronze

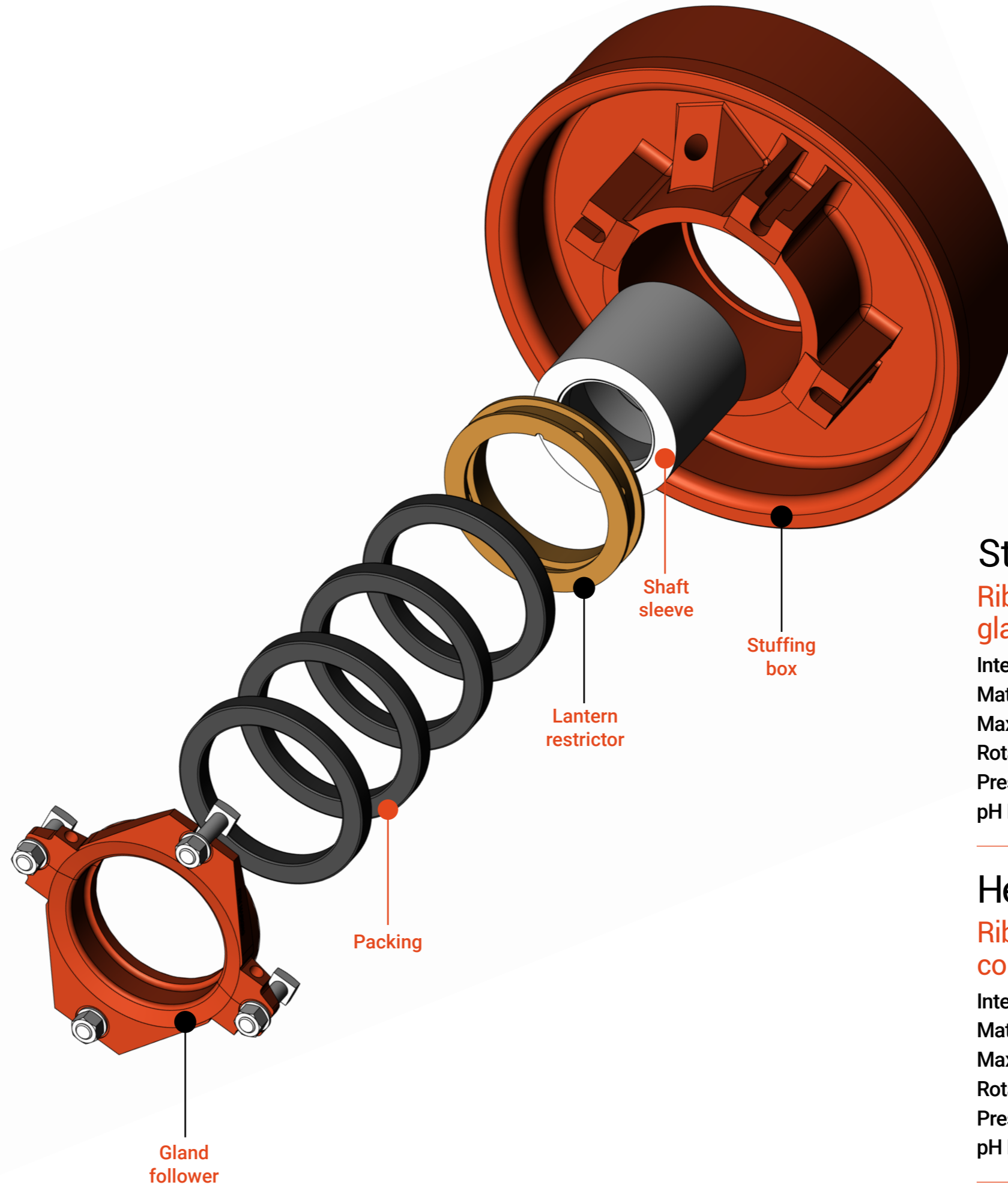
Tin bronze alloy casting is a widespread material due to its fair abrasion and acid resistance.

## Polytetrafluoroethylene / Polytetrafluoroethylene (PTFE)

Its resistance to chemical agents outmatches all known synthetic materials. No damage occurs under the influence of alkalis, acids and even a mixture of nitric and hydrochloric acids.

## Polyphenylene sulfide (PPS)

Products made of polyphenylene sulfide can function for a long time at high temperatures and are effective against a corrosive environment at temperatures of up to 235 °C.



## Standard gland packing

Ribbon PTFE yarn standard gland packing

Internal standard: PTFE GF ME QP-11

Material type: PTFE

Max. operating temperature (°C): 290

Rotation velocity (m/s): 10

Pressure (MPa): 14

pH Level range: 3-12

## Heavy duty gland packing

Ribbon PTFE yarn packing with corner aramid reinforcement

Internal standard: PTFE AF ME QP-11

Material type: PTFE + Aramide

Max. operating temperature (°C): 275

Rotation velocity (m/s): 20

Pressure (MPa): 14

pH Level range: 2-12



# Spare and wear parts for hydrocyclones

**Mining Element offers a range of spare and wear parts for hydrocyclones with operating times similar to that of OEM brands.**

Hydrocyclones are incredibly important equipment when it comes to the processing of minerals. A hydrocyclone is key in ore classification, thickening and deslurring processes. Through their use, constant contact with ore leads to damaged inlet head liners, cone liners, spray guard liners and vortex finders. Cone parts, fasteners and seals also have a high risk of failing after heavy use.

Mining Element provides a wide range of spare and wear parts for Cavex and Krebs FLS<sup>®</sup> hydrocyclones. The spare and wear parts catalogue is updated monthly with new items of popular brands. Mining Element also provides customized solutions. Our design engineers collect data and requirements from our customers, prepare design documentation and manage the final project. Afterwards, they approve the project with the customer and start the process of production.

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- A wide range of wear-resistant liners, from natural rubber to those made from composite materials

- Liners may be adjusted to the customer's conditions, with a technical audit, an analysis of equipment specifications and a custom design

- A wide range of apex insert and vortex finders on offer



# Materials for hydrocyclone parts



- 1. Cover Plate Liner
- 2. Inlet Head Liner
- 3. Vortex Finder
- 4. Cone Liner
- 5. Apex Insert
- 6. Spray Guard Liner

## Natural rubber

Hardness (Shore A): 50  
 Elongation at break (%): 600  
 Max. operating temperature (°C): 75  
 Max. particle size (mm): 20

The physical and mechanical properties of rubber provide resistance to the abrasive wear caused by slurry containing hard and sharp particles.

## Synthetic rubber

Hardness (Shore A): 50  
 Elongation at break (%): 700  
 Max. operating temperature (°C): 100  
 Max. particle size (mm): 10

As opposed to natural rubber, synthetic rubber is more resistant to high temperatures and oils.

## Polyurethane

Hardness (Shore A): 95  
 Elongation at break (%): 400  
 Max. operating temperature (°C): 70  
 Max. particle size (mm): 10

This material has a high-tensile strength.

## Silicon carbide

Hardness (Vickers): 2900  
 Density (g/cm<sup>3</sup>): 3.11  
 Max. operating temperature (°C): 200  
 Max. particle size (mm): 5-10

Fine-grained reaction-bonded silicon carbide. This material has a high resistance to corrosion and wear. It is produced in thin sections from 5 to 25 mm in length.

## High chromium white cast iron (HiCr)

Hardness (Brinell, HB): 650

Hypereutectic white cast iron with a high chromium content. Best used in conditions of increased wear.

# Design engineering

Our product line includes not only alternative parts for processing equipment by major manufacturers, but also products designed specifically for the needs of our customers.

Mining Element provides a bespoke project design service in cases where customers require the upgrade of spare part patterns which are currently in operation. This is relevant in situations where the pump at the processing plant is not suitable for current operational conditions. In this instance, geometry or material modifications improve the pump performance curve.

## Task 1. An increase in the repair interval.

At a gold mining site, the rubber inlet liner of a slurry pump was affected by excessive wear. The company's specialists replaced it with a HiCr inlet liner. This replacement allowed us to increase the operating time of the spare part and also to improve the repair interval of the equipment.

## Task 2. To increase a pump's efficiency.

Mining Element's specialists designed and developed an impeller with a larger diameter at a gold mining site. This modification was performed on an FLSmidth pump to increase the pump's capacity via work on the differential head. A similar modification was applied to the Warman 28/24UY-GHPP pump at the iron-ore site. In that case, our engineers designed a thickened inlet liner.

## Task 3. A modification of technical specifications.

In cases where it is impossible to adjust pump capacity to increase the operating time or change the technical specifications, Mining Element's specialists design and manufacture movable elements with modified geometry. Wet-end modification allows one to achieve improved hydraulic characteristics and optimize the maintenance costs of the equipment.





# Our benefits

## Design engineering

Mining Element is the only manufacturer of alternative spare parts for mining equipment offering quality comparable to that of OEM parts at a better price. One of the features of the company's work is not just the selection of suitable solutions, but also their development. If it is necessary to improve the quality of finished products or the service life of the parts, Mining Element will offer ready-made solution, a new material or part design compatible with the customer's equipment.

## Industrial trials

Mining Element's product specialists will calculate the benefits of using spare parts in percentages or capital equivalent for each specific customer. They will also offer industrial trials at the customer's processing plant, considering the equipment's operating conditions, the running time of the current liners and their wear factors.

## Warehouse profile

By virtue of an analysis of the installed equipment base of various companies, Mining Element supplies to its own warehouses the most in-demand products to minimize delivery time. In cases when parts are not available in warehouses, Mining Element accepts orders for the manufacturing of parts.

## A guarantee of efficiency

Mining Element guarantees the high quality of its supplied parts. Engineers can provide justifications for a payback time and provide information about our latest projects to demonstrate the economic efficiency of our spare and wear parts.

## Technical and service support

Mining Element's technical specialists provide technical and service support throughout the entire service life of spare parts. As part of the technical support service, Mining Element offers to optimize consumable parts based on operational experience and recommendations from the customer.

# Contacts

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