

ELMC

ELEMENT MINING
AND CONSTRUCTION



Spare and Wear Parts for Slurry Pumps.



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About the company

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

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 high-quality alternative solutions with a long service life allows our clients to significantly reduce maintenance costs.

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

- ✓ Spare and wear parts for crushing equipment
- ✓ Spare and wear parts for slurry pumps
- ✓ Custom-engineered parts



Our product range

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

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

- ✓ Medium Duty Pumps
- ✓ Heavy Duty Pumps
- ✓ Mill Discharge Pumps
- ✓ High Head Pumps
- ✓ Gravel Duty Pumps
- ✓ Tailing Pumps
- ✓ Vortex Flow Pumps
- ✓ Froth Duty Pumps
- ✓ Vertical Pumps

Wear parts for slurry pumps

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

Element produces more than 550 types of wet-end sets made of high-chrome 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 significantly reduces the OPEX. 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.



SUCCESSFUL CASES

ELEMENT PARTS REACHED AN OPERATING TIME COMPARABLE TO THAT OF THE OEM

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

Due to the high load of solids, as well as the very coarse and large size of ore after the primary mill, the equipment in the process plant experienced a significant wear rate at the mill discharge circuit. 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.

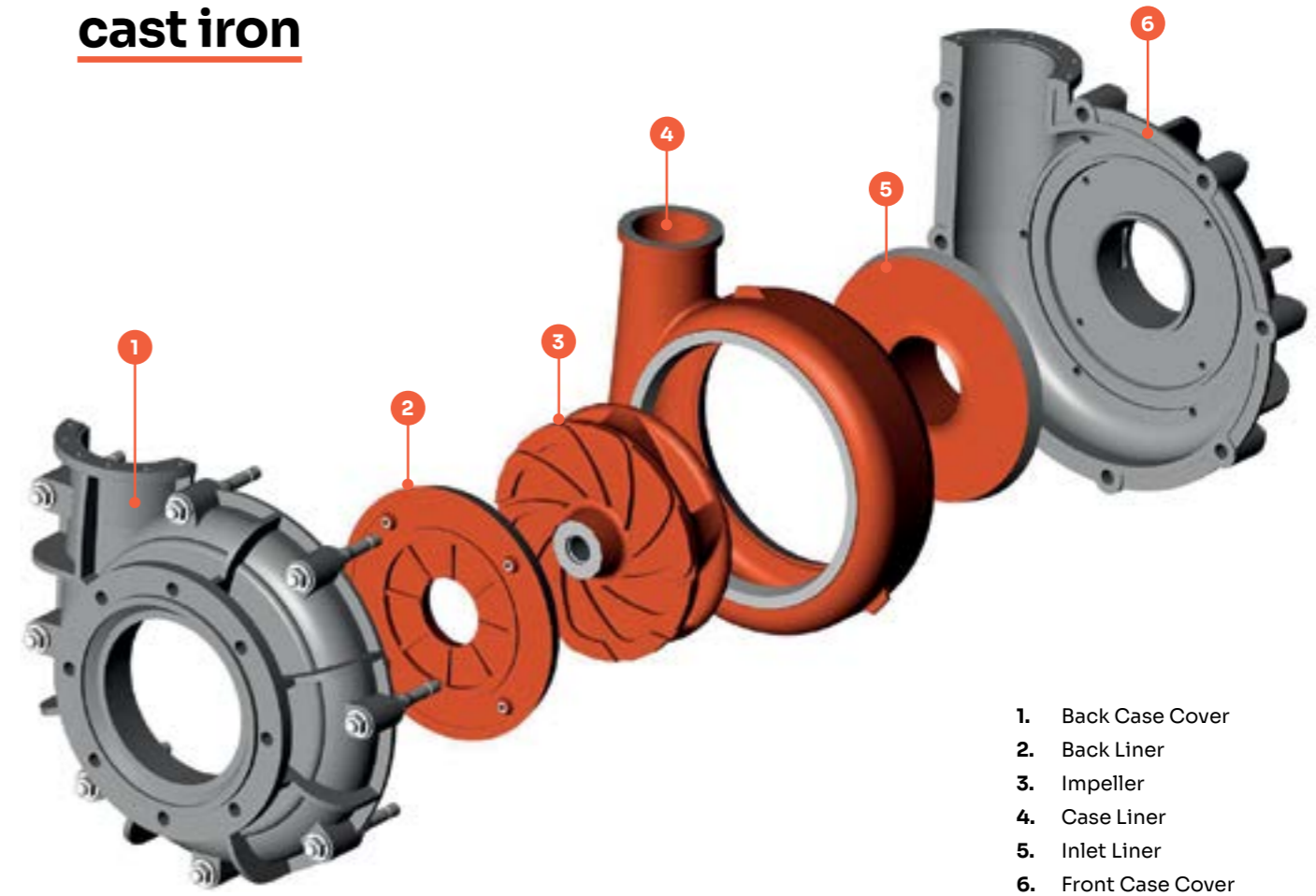
Element provided wet-end parts made from High Chrome White Iron in accordance with their material standard. As a result, the first set of parts lasted for 1200 hours of operation, and the second and third sets demonstrated the same lifespan. Consequently, the customer was able to achieve the same amount of operation time as with OEM parts while incurring significantly lower maintenance costs.

THE OPERATING TIME WAS INCREASED BY 1.5 TIMES

One of the challenges that our customers came to us with was the rapid wear of wet-end parts. A large gold-processing plant assigned us the task of increasing the operating time of the liners for their 10/8 slurry pump. Element's specialists visited the customer's site, examined the operating conditions, and determined that the liners' short operating time was due to an incorrect choice of wet-end part material. Based on the collected data from the pump installation and slurry data, Element's engineers proposed replacing the metal wet-end parts with natural rubber. This resulted in a 1.5-fold increase in operating time and a decrease of over 2 times in spare parts expenses for the processing plant.



Wet-end parts from high-chrome white cast iron



1. Back Case Cover
2. Back Liner
3. Impeller
4. Case Liner
5. Inlet Liner
6. Front Case Cover

HIGH-CHROME WHITE CAST IRON AR27

Standards: ASTM A532 Grade IIIA
 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-CHROME WHITE CAST IRON AR28

Standards: ASTM A532 Grade IIIA
 Hardness (HBW): >430
 Chromium content Cr (%): 28,0

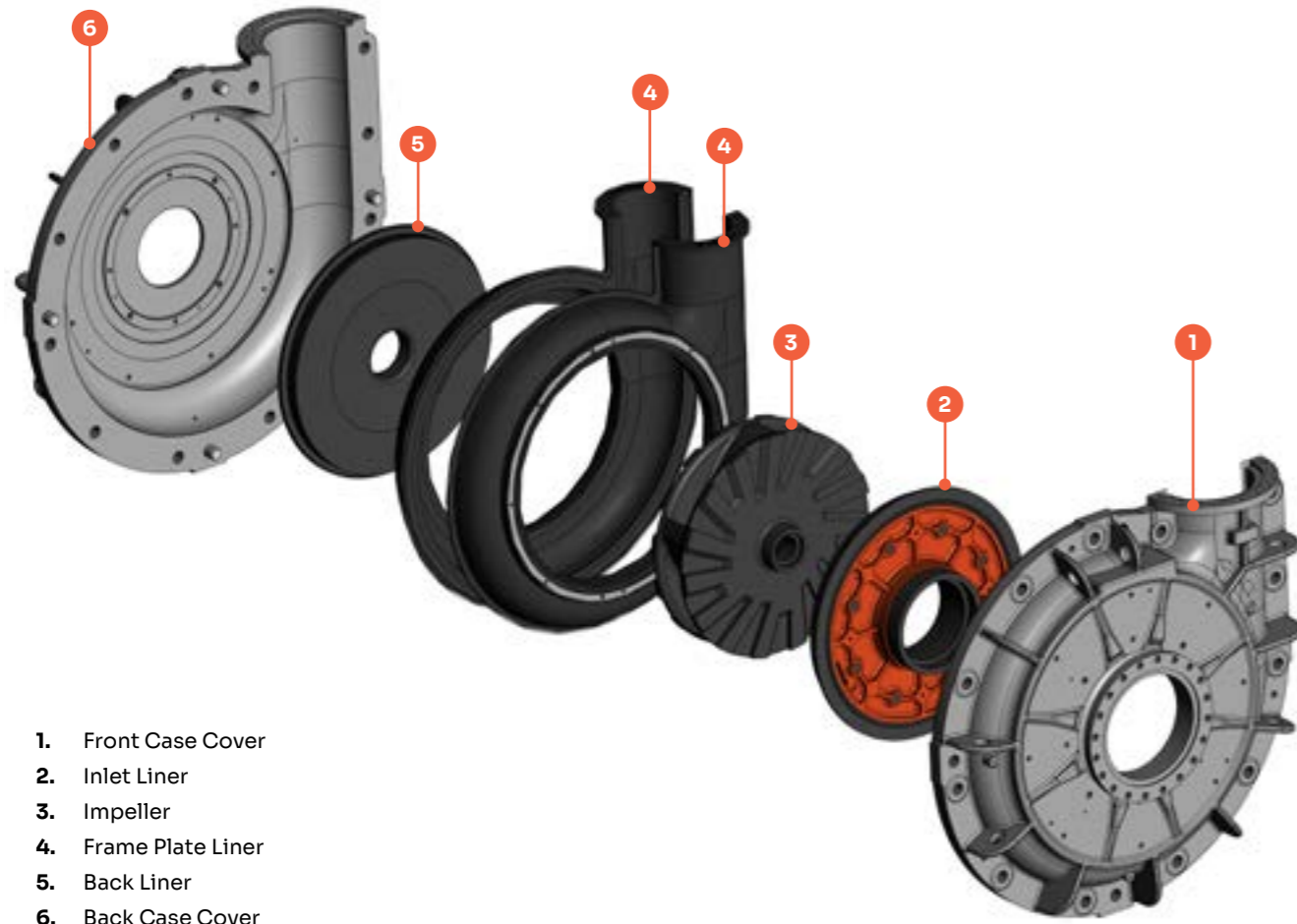
Adapted for use with acids and in corrosive environments. For operation with pH levels ranging from 3-14. Preferable for slurry with sulfuric acid, nitric acid or sodium hydroxide contents.

HIGH-CHROME WHITE CAST IRON AR30

Standards: N/A
 Hardness (HBW): >650
 Chromium content Cr (%): 30,0

Perfect erosion resistance for slurry with small and middle particles. For operation with PH levels 3-14. Mostly used in tailing applications or as an option to extend the lifetime of wet-end parts.

Wet-end parts from synthetic rubber



1. Front Case Cover
2. Inlet Liner
3. Impeller
4. Frame Plate Liner
5. Back Liner
6. Back Case Cover

HIGH-STRENGTH RUBBER BASED ON NATURAL RUBBER ER40/ER50

Standard: Element ME QP-09
 Density (g/cm³): 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

Standard: Element ME QP-09
 Density (g/cm³): 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

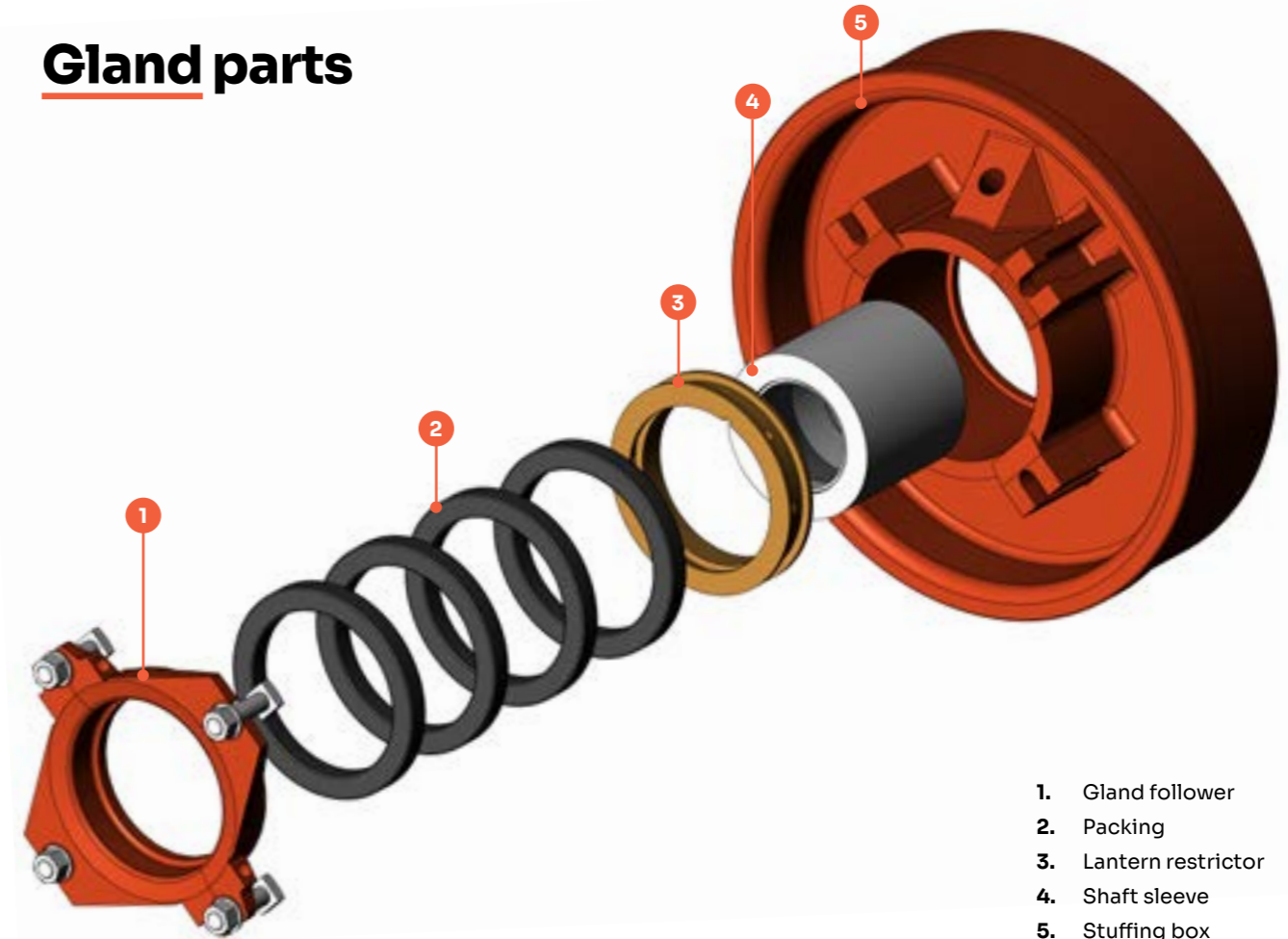
Standard: Element ME QP-09
 Density (g/cm³): 1,24±0,05
 Hardness (Shore A): 65±5
 Max. operating temperature (°C): 110

Medium wear-resistance and high acid-resistance.





Gland parts



1. Gland follower
2. Packing
3. Lantern restrictor
4. Shaft sleeve
5. Stuffing box

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

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.

Lantern restrictor

BRONZE

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

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.

Gland packing

RIBBON PTFE YARN STANDARD GLAND PACKING

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

RIBBON PTFE YARN PACKING WITH CORNER ARAMID REINFORCEMENT

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

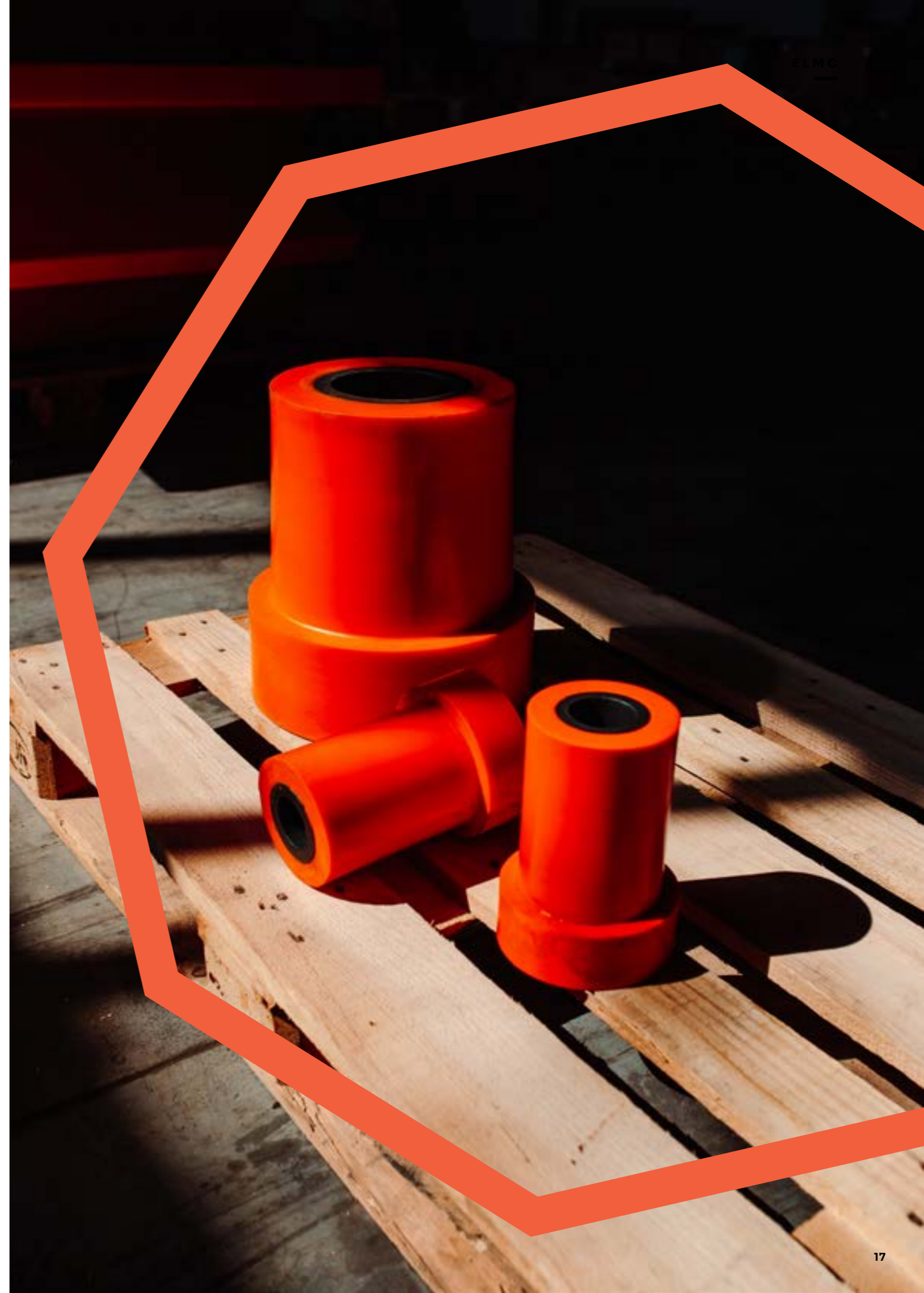
Element offers a range of spare and wear parts for hydrocyclones with operating times similar to that of OEM brands.

- ✓ A wide range of wear-resistant liners, from natural rubber
- ✓ 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

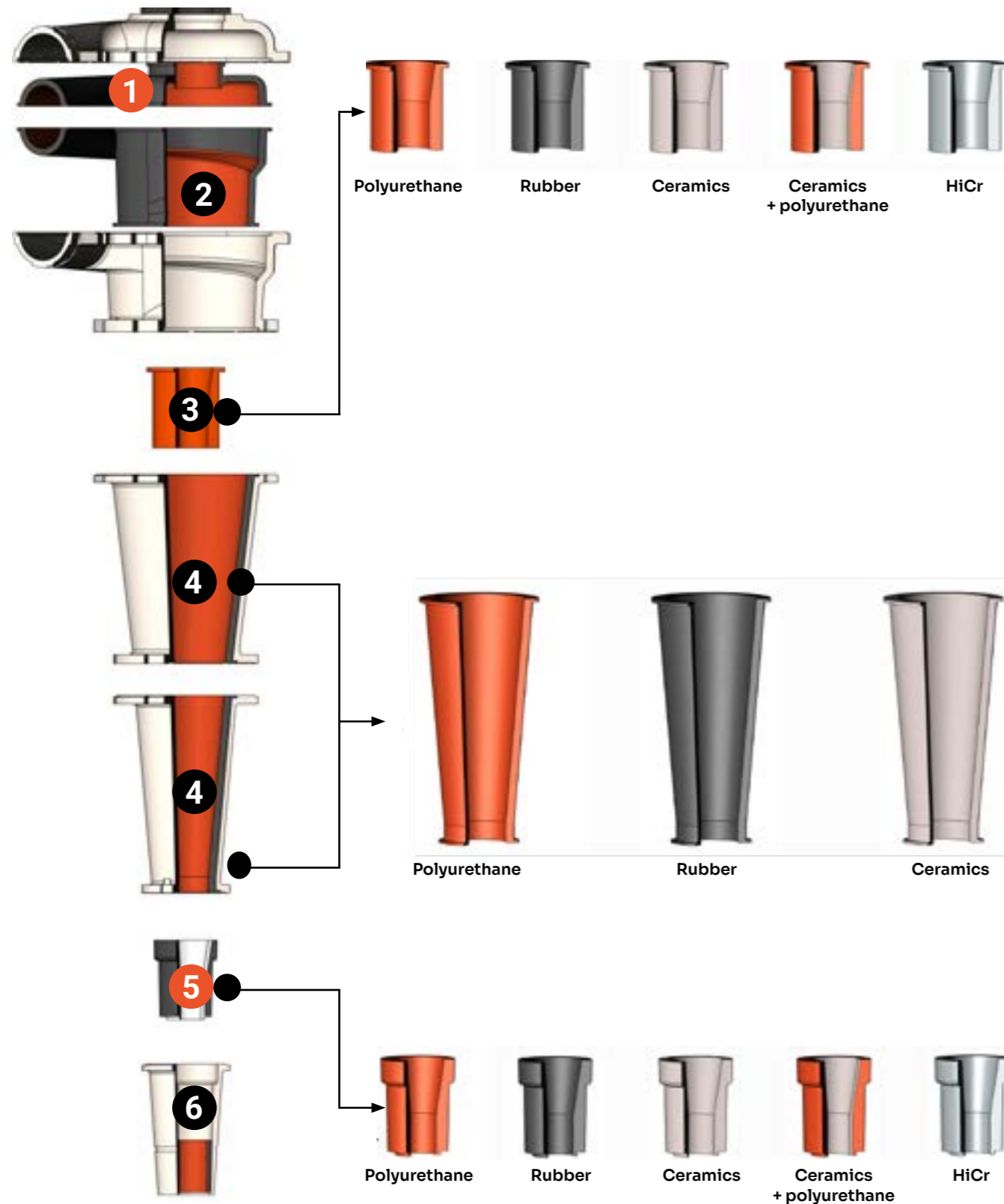
Hydrocyclones are incredibly important equipment when it comes to the processing of minerals. A hydrocyclone is key in ore classification, thickening and deslurping processes. Through their use, constant contact with ore leads to damaged inlet head liners, cone liners, apex spigot, and vortex finders.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

Element provides a wide range of spare and wear parts for Cavex and Krebs FLS* hydrocyclones. The spare and wear parts catalogue is updated monthly with new items of popular brands. 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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Materials for hydrocyclone parts



1. Cover Plate Liner
2. Inlet Head Liner
3. Vortex Finder
4. Cone Liner
5. Apex Spigot
6. Apex Spigot Holder

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/cm³): 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.

Engineering-to-order solutions

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

Element provides a bespoke project design service in cases where customers require the upgrade of spare parts 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.



CASE EXAMPLES

INCREASED 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.

CUSTOMIZED IMPELLER DESIGN

Our specialists designed and developed a larger diameter impeller for the mill discharge pump of their customer. The purpose of this modification was to decrease the current RPM on the motor shaft. The required duty point was wrongly estimated during equipment selection, resulting in a 2,000 kW motor with direct coupling working close to 60 Hz during normal operation. As a result, the motor would occasionally break down due to overheating. Increasing the impeller DN from 60' to 66' reduced the RPM at the same duty point to 48-50 Hz, enabling the motor to operate at its best performance level.

A MODIFICATION OF TECHNICAL SPECIFICATIONS

In case of a customer request for changes, our specialists take into consideration all aspects of the slurry pump application. This includes the installation scheme and pipe system. Additionally, they always examine the details of the slurry and any flow deviations during operation. This is necessary because the duty point can vary depending on the type of ore from one mine to another or different flow rates for different loads. Therefore, all possible operating modes must be taken into account. After analyzing all the information, we decide which modification options are available to extend the lifetime of the wet-end.



Element's advantages

Warehouse program

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

Guarantee of efficiency

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 efficiency of our spare and wear parts.

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. We don't simply select suitable solutions, we develop them. If it is necessary to improve the quality of the finished product or the service life of the parts, we will offer either a ready-made solution, or a new material or part design compatible with the equipment.

Technical and service support

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



**ELEMENT MINING
AND CONSTRUCTION OY**

Peltokatu 26,
33100 Tampere, Finland
+358 10 340 3980
info@elmc.com

WWW.ELMC.COM

@ elmcparts

f elmcparts

in elmc