OUR HISTORY IN MINING RUNS DEEP

Deep mines. Hard rock. Excavation pits. There’s nothing ordinary about the mining and construction business. In this challenging environment, we are proud to be the number-one independent partner to the world’s most demanding equipment suppliers and manufacturers – with a long history of developing superior quality engineering steel that provides a competitive edge.

With origins dating back 300 years, we are deeply rooted in the Nordic mining cluster. In fact, until 1977, we operated our own iron ore mine in Hofors, Sweden, an operation that had seen ongoing production since the 1300s. In the 1940s and 1950s, we even developed and manufactured our own rock drilling tools, and have continuously specialized in steels with exceptional fatigue strength and wear resistance ever since. So you could say we’ve learned every aspect of the world’s toughest applications – the hard way.

World leaders in metallurgy for mining & construction

Today we are the independent world leader in specialized steels for mining equipment, demolition and other construction applications. Our in-house R&D is responsible for a long line of industry firsts – whether it’s the world’s first active in-production steel hardenability controls or the first conventional steels with inclusion levels on par with single remelts. In addition to pioneering entirely new, cost-efficient materials, we continue to partner with top universities and research institutes to develop new tests that raise industry standards and better meet your future challenges.

Three mills for seamless productivity

Of course, your profitability depends on more than just the right materials and metallurgical expertise. This is why, over several decades, we’ve optimized our network of three mills to deliver the most cost-efficient formats and value-added services for the specific needs of manufacturers like you. Besides guaranteeing short lead times and optimal tolerances, fatigue strength and wear resistance, our unique production capabilities ensure that we can tailor the most cost- and capital-efficient logistics for your production and automation needs.

At our R&D center in Hofors, Sweden, we constantly test our products and develop steels to meet your future demands.
From top hammer shank to drill bit, DTH drilling components, hydraulic breakers and grinding media, you’ll find Ovako steel at construction and mining sites across the globe. Always delivering the highest level of performance, day in and day out.
Everything begins with a careful analysis of your components’ specific load case, processing requirements and cost profile. Once the ideal material properties for your end product are defined, we then help to select everything from the right steel grade, format and tolerance to heat treating, pre-machining and stocking solutions. The result of this close collaboration is a superior end product with the most cost-effective value chain.

Ovako offers a wide variety of grades engineered for the specific load cases of each individual rock drilling component. In addition to precisely controlling fatigue properties in our metallurgy, we simulate the load case by various testing methods to learn how our steel performs. These methods can include traditional RBF (Rotating Bending Fatigue) testing, along with methods that test the combination of impact and wear loads. This means you get the right wear resistance and the right fatigue strength for high-frequency impact. For several grades, we also offer the option of dual sourcing from both ingot cast and conticast routes. All to give you a wider range of price and performance choices tailored exactly to the load requirements of your components.

Our broad capabilities mean that we can go beyond your precise steel requirements to ensure that your investment pays off every step of the way. With minimal alloy variation, your processes can become more repeatable and automated. And thanks to high steel cleanliness and precise load case analysis, your component’s strength, toughness and fatigue properties are guaranteed. The end result is a superior end product that minimizes all unnecessary supply chain costs and performance risks.
HOW OUR CAPABILITIES STRENGTHEN YOUR BUSINESS

At Ovako, our ambition is to give you total control over every aspect of your production process – from specific steel properties and near-net-shape deliveries to optimized lead times, easy process automation and a superior end product tailored for your load case.

SUPERIOR COMPONENTS OPTIMIZED FOR YOUR LOAD CASE
Thanks to the right steel grade, engineered for your specific load case, your end components can achieve:
- Superior tool life
- Predictable life span optimized for load case, automated drilling and more
- The optimal cost/performance balance

MATERIALS ENGINEERED TO MINIMIZE PROCESSING TIME AND COSTS
The right combination of steel grade properties and customized services gives your processing operations the benefits of:
- Easy automation due to consistent chemical composition
- Repeatable heat treatment performance thanks to highly controlled alloy content
- Efficient machining with M-Steel® and other optimized machining steels
- Near-net-shape products to reduce machining and processing
- Easy production planning due to a range of customized services

CUSTOMIZED SERVICES FOR SEAMLESS LOGISTICS
With warehousing and sales operations worldwide, we can assist with everything from production planning to customized batch sizes and stocking solutions:
- EDI interface for efficient forecasting and order handling
- Optimized lead times with production and pre-production forecasts
- Comprehensive integrated stocking solutions at mills, sales companies and near you
- OvakoTrack extranet functions give you a full overview with order tracking, real-time stock levels and more
- Additional back-up stocks to ensure delivery in most cases from any of our three mills

TAILORED PRODUCT GEOMETRIES AND PRE-PRODUCED COMPONENTS
Whether you need heat-treated steels, cut blanks or finished parts, we supply and customize a wide range of product geometries and machining/cutting options with minimal lead times, including:
- Near-net-shape products to reduce unnecessary machining and processing
- Tight tolerances to help reduce waste and processing tool wear
- Pre-machined components, controlled and ready for assembly
- The right heat treatments to support your production requirements

A WIDE SELECTION OF OPTIMIZED STEEL GRADES
As the world’s largest independent supplier of high-performance mining and construction steels, we offer a superior range of steel grades that add value through your entire value chain:
- Material properties tailored for your heat-treating requirements
- IQ-Steel® for complex loads and fatigue strength on par with single remelt steels
- BQ-Steel® for demanding applications requiring longer performance and higher loads
- WR-Steel® for use in highly abrasive wear loads
- M-Steel combining superior machinability with exceptional toughness and fatigue strength
- Availability of both continuous casting and ingot casting for a wide range of steel grades

YOUR SUPERIOR END PRODUCT

YOUR PROCESSING NEEDS

OVAKO CUSTOMIZED SERVICES

OVAKO TAILORED PRODUCT GEOMETRIES

OVAKO MATERIAL CAPABILITIES

DRILL DOWN DEEPER:
For more information on Ovako steel grades, formats and capabilities within your application, take a deeper look into our mining and construction application brochures:
- Rock Drilling Steel
- Rock and Ore Processing Steel
- Steel for Mining and Construction Systems
**MORE CHOICES**

**MORE POSSIBILITIES**

In the mining and construction business, everything starts with the right steel – delivered in the right shape and dimensions. From material properties to delivery formats and service options, we’ve always got you covered.

### HEAT TREATMENTS FOR OPTIMIZED MATERIAL PROPERTIES

- Normalized
- Soft annealed
- Isothermal annealing
- Stress relief annealed
- Quenched and tempered
- Annealing in protective atmosphere
- Quenched and tempered
- Isothermal annealing
- Normalized

Conditions or combinations thereof: can be supplied in the following heat treated material properties. Our bars, tubes and rings options necessary to achieve your desired can support you with all the heat treatment Depending on your application needs, we

### SPECIAL PROPERTIES (SP) BAR

- Extremely tight tolerances. Scale thickness is generally reduced on size range: 13 to 50 mm.
- Hot-rolled round bars.
- Rolled bar characterized by close tolerances and excellent dimensional properties and surfaces.
- Forged bars for larger sizes.
- Standard size range: OD from 13 to 200 mm.
- Broad dimension range of hot-rolled flat bar.
- Circular cross section. Special sizes available on request.
- Tolerances: ±0.01 mm.
- Ground bar, standard execution (IT7).
- Fine ground bar, special execution (IT6).
- Surface removed and 100% tested and inspected to improve quality. Available in any size within OD range 11 to 55 mm.
- Drawn or cold-rolled in sizes ranging from 25 to 125 mm OD.
- Machining allowances.
- Precision cut to your specifications. Standard chamfer angle is 45°.
- Chamfered or blanks with radius.
- Blanks with sawn end surfaces, center-drilled and ground internally.
- Customized chamfering and radius according to your specifications. Standard chamfer angle is 45°.
- Sawn off and chamfered according to your specifications. Standard chamfer angle is 45°.
- Machining allowances.
- Precision cut to your specifications. Standard chamfer angle is 45°.
- Chamfered or blanks with radius.
- Sawn off and chamfered according to your specifications. Standard chamfer angle is 45°.
- Surfaces machined and threaded to your specifications.
- Standard chamfer angle is 45°.
- Chamfering and radius according to agreement.
- Standard items and stock program.
- As a service to our customers, we have a standard tube program offering smaller order quantities and shorter lead time than we normally require for a production run. Ovako has two such standard programs, both with the tubes stocked at our mill as well as at some of our sales companies and selected distributors.

### STANDARD ITEMS AND STOCK PROGRAM

- Ring diameter
- Ring weight

<table>
<thead>
<tr>
<th>Ring Diameter (mm)</th>
<th>Ring Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>170–380</td>
<td>10–20</td>
</tr>
<tr>
<td>200–750</td>
<td>20–85</td>
</tr>
<tr>
<td>350–1,200</td>
<td>55–250</td>
</tr>
<tr>
<td>550–4,000</td>
<td>150–4,000</td>
</tr>
</tbody>
</table>

### SURFACE MACHINED TUBES

- Precision cut to your specifications. Standard chamfer angle is 45°.
- Machining allowances.
- Chamfered or blanks with radius.
- Blanks with sawn end surfaces, center-drilled and ground internally.
- Customized chamfering and radius according to your specifications.
- Machining.
- See rolled and forged rings.

### PRE-COMPONENTS

- Pre-machined components allow you to minimize stock holding, crosscutting and machining.
- Chamfered or blanks with radius.
- Sawn off and chamfered according to your specifications. Standard chamfer angle is 45°.
- Customized chamfering and radius according to agreement.
- Center-hole drilled blanks.
- Blanks with sawn end surfaces, center-drilled to your specifications.
- Machining.
- See rolled and forged rings.

### GRINDING MEDIA

- Ovako grinding balls are delivered as-rolled or in the quenched and tempered condition. They are available in grade A810, or other grades upon request. Sizes from 20 to 70 mm. Grinding rods are delivered in the as-rolled condition in dimensions of 40 to 120 mm.

### ROLLED AND FORGED RINGS

- Cylindrical, profiled or machined rings, with a geometry close to the final shape. Full dimensional range from diameters 170–4,500 mm and weights: up to 5,000 kg.
- Small allowances and tight tolerances. Profiles offer interesting solutions for many manufacturing challenges. Near-net-shaped rings can be up to 50 % lighter than cylindrical equivalents. Rings are manufactured in five different ring mills and one forging press:

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Ovako develops high-tech steel solutions for, and in cooperation with, its customers in the bearing, transport and manufacturing industries. Our steel makes our customers’ end products more resilient and extends their useful life, ultimately resulting in smarter, more energy-efficient and more environmentally-friendly products.

Our production is based on recycled scrap and includes steel in the form of bar, tube, ring and pre-components. Ovako is represented in more than 30 countries, and has sales offices in Europe, North America and Asia. Ovako’s sales in 2015 amounted to EUR 834 million, and the company had 2,905 employees at year-end. For more information, please visit us at www.ovako.com