

The Ovako logo consists of the word "OVAKO" in a bold, blue, sans-serif font. A thin orange horizontal line is positioned directly beneath the letters.

OVAKO ROCK & ORE PROCESSING STEEL

OPTIMIZED STEEL FOR PROFITABLE PERFORMANCE



THE SHORTEST ROUTE TO LONG-LASTING PERFORMANCE

From light to extra heavy-duty applications – and all types of wear in between – Ovako is a longstanding supplier of leading steel grades for ore grinding media, as well as for wear parts in crushers and screens. This means we can tailor the optimal steel to extend your equipment life, and deliver in a format that minimizes machining costs and yield loss.

When it comes to manufacturing the toughest components for ore and rock processing equipment, our customers have big ambitions. To meet real-world demands in the field, they need grades tailored to the precise type of abrasive, adhesive or erosive wear their equipment will face. In production, they demand flawless chemical consistency for repeatable hardening processes, along with special profiles and soft bars for easy machining and highly controlled quenching and tempering. This is why every batch we deliver is engineered to meet your exacting requirements in terms of load case and manufacturing productivity.

Load case

The right wear-resistant steel for your load case

One of the keys to achieving the optimal balance of performance and cost-efficiency is to better understand each individual load case. To do this, we turned to the independent Swerea KIMAB Test Facility to simulate extreme conditions and see how we measure up against other hardening and pre-hardened steels. Based on that experience, we then built our own wear testing rig to optimize our grades for superior performance in each load case. As a result, we now can offer a selection of grades from our wide range of wear-resistant steel, WR-Steel®, to ensure optimal reliability for your components, even in the toughest conditions. It also gives us the knowledge to push the limits and develop new products as your needs evolve.

Processing needs

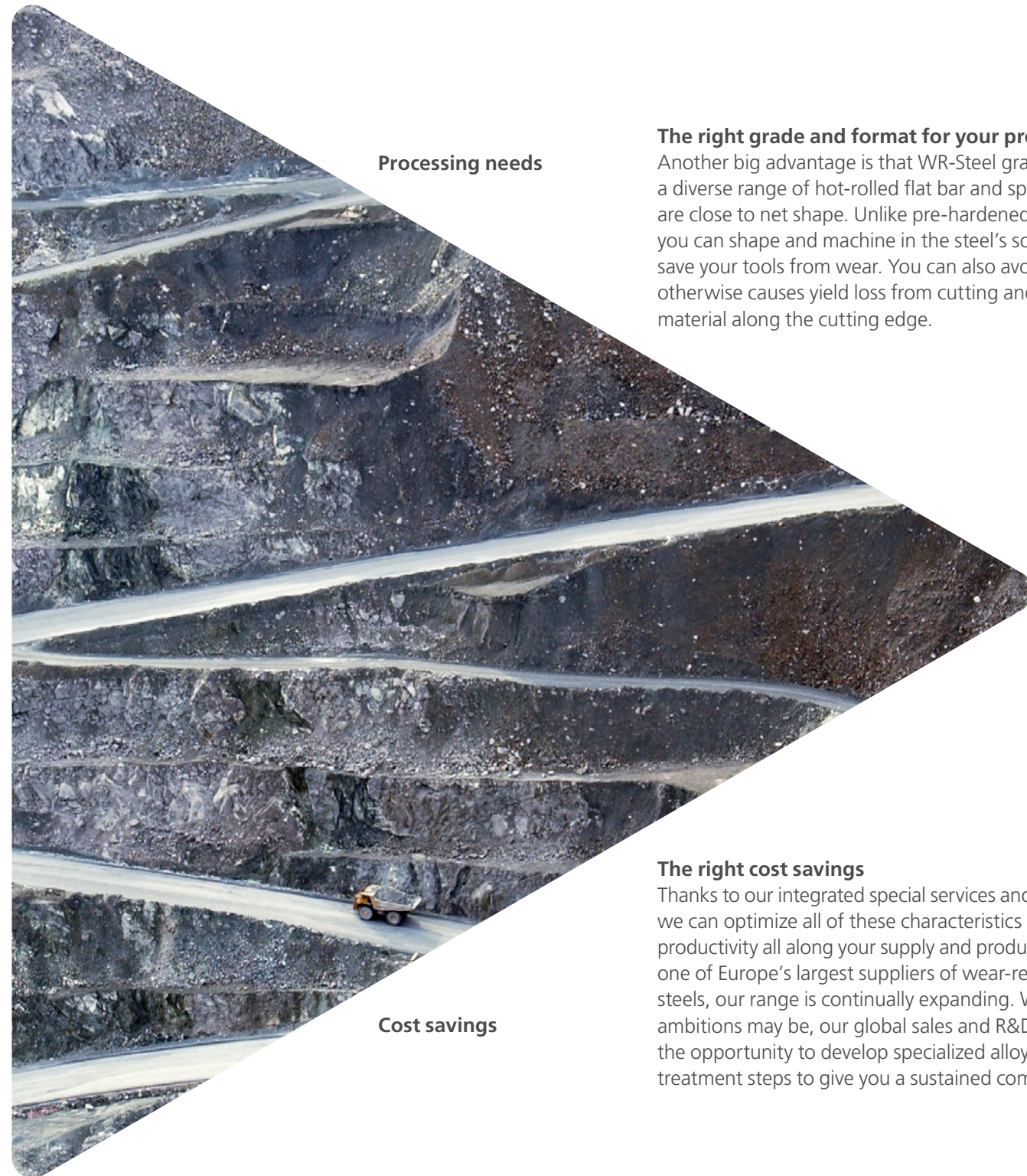
The right grade and format for your processing route

Another big advantage is that WR-Steel grades are available in a diverse range of hot-rolled flat bar and special profiles that are close to net shape. Unlike pre-hardened steels, this means you can shape and machine in the steel's soft condition to save your tools from wear. You can also avoid gas cutting that otherwise causes yield loss from cutting and weakens the material along the cutting edge.

Cost savings

The right cost savings

Thanks to our integrated special services and logistics offerings, we can optimize all of these characteristics and more to boost productivity all along your supply and production chain. And as one of Europe's largest suppliers of wear-resistant processing steels, our range is continually expanding. Whatever your ambitions may be, our global sales and R&D teams welcome the opportunity to develop specialized alloys or improved heat treatment steps to give you a sustained competitive edge.



HOT-ROLLED BARS PROFILED TO YOUR NEEDS

Wear lining. Screen bars. Hammer crushers. In the world of wear parts, there's never a one-size-fits-all solution. That's why we've developed an industry-leading range of flat, round and profiled bars designed to give you just the right wear-resistant steel grade in the shape, width and profile you need.

Regardless of shape or size, Ovako bars for crushers and screens are mainly delivered in as-rolled condition. This softer steel makes final drilling and additional machining simpler and more flexible, with just a fraction of the wear and tear on your tools. In the following quenching and tempering stages, you can then optimize hardness for your specific requirements.

Add to this extremely tight tolerances and near-net-shape special profiles, and it's easy to see how we can help bring your machining costs down to a bare minimum. Even basic profiles, such as flats with welding chamfers and rounded corners, can amount to considerable cost savings when compared with slitting of plate and machining the edges.

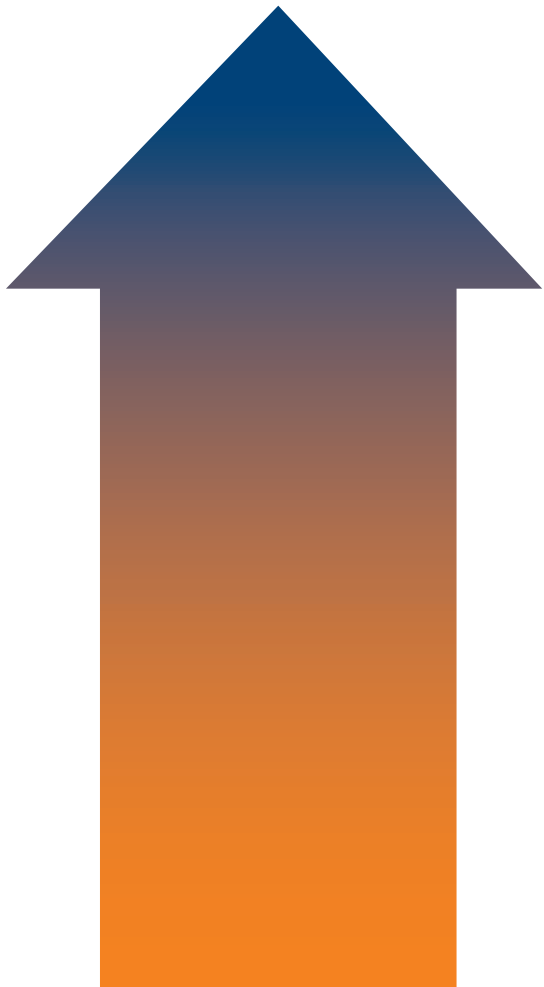
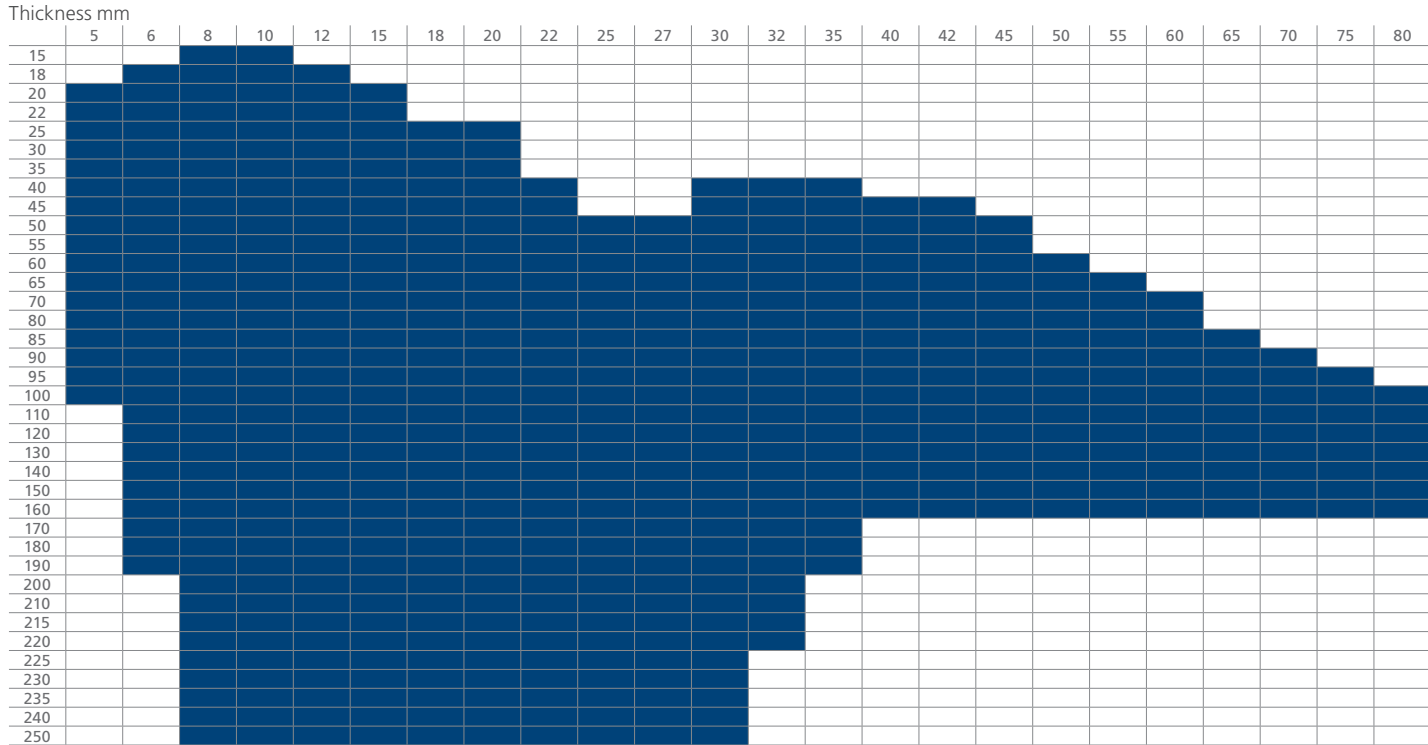
HOT-ROLLED FLAT BARS

Whether you need to produce crusher hammers or wear plate for lining the crusher's wear zone, Ovako can supply flat bars in a broad dimension range. The bars are characterized by excellent straightness and shape as well as good surfaces and low decarburization.

The rolled shape is generally flat bars with square corner edges. It can also be rolled as flat bars with different corner radiuses on request. The most common bar length is 6 meters, but lengths ranging from 2.8 to 21 meters are available. Bars can also be delivered sawn to exact lengths.

DIMENSIONS, HOT-ROLLED FLAT BAR

The diagram below provides an overview of the width and thickness of our hot-rolled flat bar.



YOUR SUPERIOR END PRODUCT

YOUR SUPERIOR END PRODUCTS

- Extended life time and wear resistance
- Competitive margins due to improved productivity

YOUR PROCESSING NEEDS

YOUR MINIMIZED PROCESSING TIME AND COSTS

- Cost-efficient machining with special profiles
- Avoid slitting of wide plates and subsequent yield loss
- Soft machining for improved efficiency
- Optimized hardness after quenching and tempering

OVAKO CUSTOMIZED SERVICES

OVAKO CUSTOMIZED SERVICES

- Simplified supply chain
- Optimized lead times
- Integrated stocking solutions
- Complete status overview with OvaTrack

OVAKO TAILORED PRODUCT GEOMETRIES

OVAKO TAILORED GEOMETRIES AND PRE-PRODUCED COMPONENTS

- Near-net shape and special profile bars
- Wide range of sizes and formats
- Flat bar delivered in soft condition
- As-rolled hardness for optimized hardening

OVAKO MATERIAL CAPABILITIES

WIDE SELECTION OF OVAKO OPTIMIZED STEELS

- A broad range of WR-Steel grades
- Material properties tailored for your processing route
- Tight chemical consistency for reliable, repeatable processes

HOT-ROLLED ROUND BARS AND SPECIAL PROFILE BARS

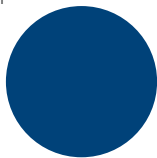
Ovako offers both round and profiled bars to support your design specifications. Of course, these are also suitable for use in forging shops to produce hammers and other special wear components. Our hot-rolled round bars are characterized by close tolerances, excellent straightness and roundness, good surfaces and low decarburization. The standard size range is 13–120 mm.

SPECIAL PROFILES IN STOCK

Grouser bar



Hot-rolled round bar
OD 13–120 mm



By tailoring hot-rolled special profile bars to your specific needs, we make it possible to lower your costs by reducing multiple manufacturing steps. Special profiles include both symmetrical and asymmetrical shapes, such as the grouser bar shown here.

Profile	Size	Steel grade	Length
P7-0019	30 x 16	SB 24M13B	6100
P7-0020	40 x 22	SB 27M12CB	6100
P4-0020	42 x 24		6100
P4-0019	50 x 27		6100
P4-0018	65 x 30		6100
P4-0017	68 x 37		6100

GRIND YOUR WAY TO NON-STOP PRODUCTIVITY

Every day, our hot-rolled grinding media is hard at work in the most demanding ore and mineral grinding mills and recycling plants. Delivering non-stop, consistent performance across a range of applications.

Whether you're processing the toughest iron ore or softer recyclable waste, even the smallest variations in the hardness or microstructure of your grinding media can make a huge difference in wear resistance. This is why we've devoted decades of experience to ensuring that our high-carbon grinding balls and tailor-made grinding rods meet the highest levels of reliability. As a result, we can offer you long-lasting grinding media, tailored to the dimensions, hardness and grade your operations require.

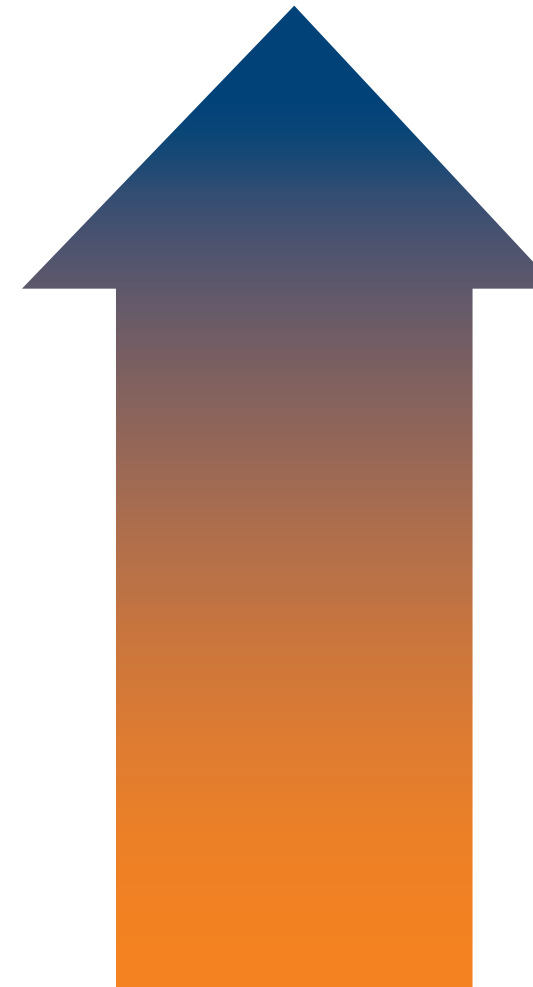
All of this is due to our combined know-how from in-house steel making and the manufacturing of hot-rolled grinding media. This means we can offer a wide selection of steel grades and treatments in order to optimize performance under working conditions ranging from wet grinding of minerals such as iron, copper, gold and other metal minerals to grinding of recycling materials such as slag, glass and used carbide tools.

GRINDING BALLS

Grinding balls are delivered as-rolled or in the quenched and tempered condition. The standard grinding ball steel is A810, with hardness in the quenched and tempered condition. A810 grinding balls maintain the same wear resistance from start to finish. Grinding balls in other steel grades can be supplied upon request.

GRINDING RODS

Grinding rods are delivered in the as-rolled condition, or in our newly developed induction-hardened condition. Grinding rod steel is available in types CHA, C100 or C100mod. The dimension range is \varnothing 40–120 mm, and the hardness range is 300–400 HBW.



YOUR SUPERIOR END PRODUCT

- YOUR SUPERIOR END PRODUCTS**
- Extended life time and wear resistance
 - Superior hardness and reliability

YOUR PROCESSING NEEDS

- YOUR MINIMIZED PROCESSING TIME AND COSTS**
- Consistent rolling, tempering and quenching
 - Optimized hardening with as-rolled rod grinders
 - Reliable processing due to consistent chemistry and microstructure

OVAKO CUSTOMIZED SERVICES

- OVAKO CUSTOMIZED SERVICES**
- Simplified supply chain
 - Optimized lead times
 - Integrated stocking solutions
 - Complete status overview with OvaTrack

OVAKO TAILORED PRODUCT GEOMETRIES

- OVAKO TAILORED GEOMETRIES AND PRE-PRODUCED COMPONENTS**
- Grinding balls with a range of weights, sizes and surfaces
 - Rods ranging from 10–120 mm and hardness from 300–400 HBW
 - Optional straightening for grinding rods

OVAKO MATERIAL CAPABILITIES

- WIDE SELECTION OF OVAKO OPTIMIZED STEELS**
- Tightly controlled chemical consistency and microstructure
 - Tailored steel grades available upon request
 - As-rolled or quenched and tempered grinding balls



THE DIMENSIONS AND HARDNESS TO KEEP YOUR MILL ROLLING

GRINDING BALLS

Nominal standard diameter					
Ø mm	Weight per ball g	Theoretical weight kg/m ³	Number of ball/ton balls	Surface area/ball cm ²	Surface area/m ³ m ²
20	33	4,520	~31,000	12.6	1,738 x 10 ³
25	64	4,520	~16,000	19.6	1,390 x 10 ³
30	110	4,520	~9,100	28.3	1,158 x 10 ³
35	175	4,520	~5,700	38.5	993 x 10 ³
40	261	4,520	~4,000	50.2	869 x 10 ³
50	510	4,520	~2,000	78.5	695 x 10 ³
60	882	4,520	~1,100	113	579 x 10 ³
70	1,400	4,520	~700	154	497 x 10 ³

Hardness	
Surface	62-66 HRC
Core	60-65 HRC
Average volumetric hardness	61-65 HRC

GRINDING RODS

Mechanical properties			
Chemical composition	Condition	Bar diameter Ø mm	Hardness HBW
CHA	As-rolled	40-120	300-400
C100	As-rolled	40-120	340-400
C100 mod	As-rolled	40-120	330-400

PROCESSING STEEL GRADE OVERVIEW

For further information about these and other Ovako grades grades, see our Steel Navigator on www.ovako.com

Application area	Part	Ovako grade	Similar intl std	Steel grade info	Attribute brand	Casting method
Crushers and Screens	Wear parts	SB17M10B		Boron	WR-Steel	CC
	Wear parts	SB21M10B	20MnB5	Boron	WR-Steel	CC
	Wear parts	SB24M13B	24MnB5F	Boron	WR-Steel	CC
	Wear parts	SB27M12CB	27MnCrB5-2	Boron	WR-Steel	CC
	Wear parts	SB30M12CB	30MnCrB5-2F	Boron	WR-Steel	CC
	Wear parts	SB33M13CB	33MnCrB5-2	Boron	WR-Steel	CC
	Wear parts	SB38MnB5	38MnB5	Boron	WR-Steel	CC
	Wear parts	SB43M14B	43MnB6-3F	Boron	WR-Steel	CC
	Grinder	Grinding balls	A810/A809B		Through hardening	WR-Steel
51CrV4				Micro alloyed		CC
Grinding rod		C100		Through hardening	WR-Steel	CC
		CHA		Through hardening	WR-Steel	CC
		A810		Through hardening	WR-Steel	CC
		C100 mod		Through hardening	WR-Steel	CC

Chemistry (typical) %												
Ovako grade	C	Si	Mn	S	Cr	Ni	Mo	V	Similar intl std	Steel grade info	Attribute brand	Casting method
A809B	0.8		0.8		0.3					Through hardening	WR-Steel	CC
A810	0.8		0.8		0.3					Through hardening	WR-Steel	CC
51CRV4	0.5		0.95		1.1			0.15	51CrV4	Micro alloyed		CC
C100	1		0.3		1.4					Through hardening	WR-Steel	CC
C100 mod	1		1.1		1.5					Through hardening	WR-Steel	CC
CHA	0.9		0.7		0.7					Through hardening	WR-Steel	CC
SB17M10B	0.17	0.25	1.0		0.4					Boron	WR-Steel	CC
SB21M10B	0.21	0.25	1.0		0.2				20MnB5	Boron	WR-Steel	CC
SB24M13B	0.24	0.25	1.3		0.2				24MnB5F	Boron	WR-Steel	CC
SB27M12CB	0.27	0.25	1.2		0.5				27MnCrB5-2	Boron	WR-Steel	CC
SB30M12CB	0.30	0.30	1.2		0.6				30MnCrB5-2F	Boron	WR-Steel	CC
SB33M13CB	0.33	0.3	1.3		0.6				33MnCrB5-2	Boron	WR-Steel	CC
SB38MnB5	0.38	0.3	1.3		0.3				38MnB5	Boron	WR-Steel	CC
SB43M14B	0.43	0.3	1.3		0.3				43MnB6-3F	Boron	WR-Steel	CC

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

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