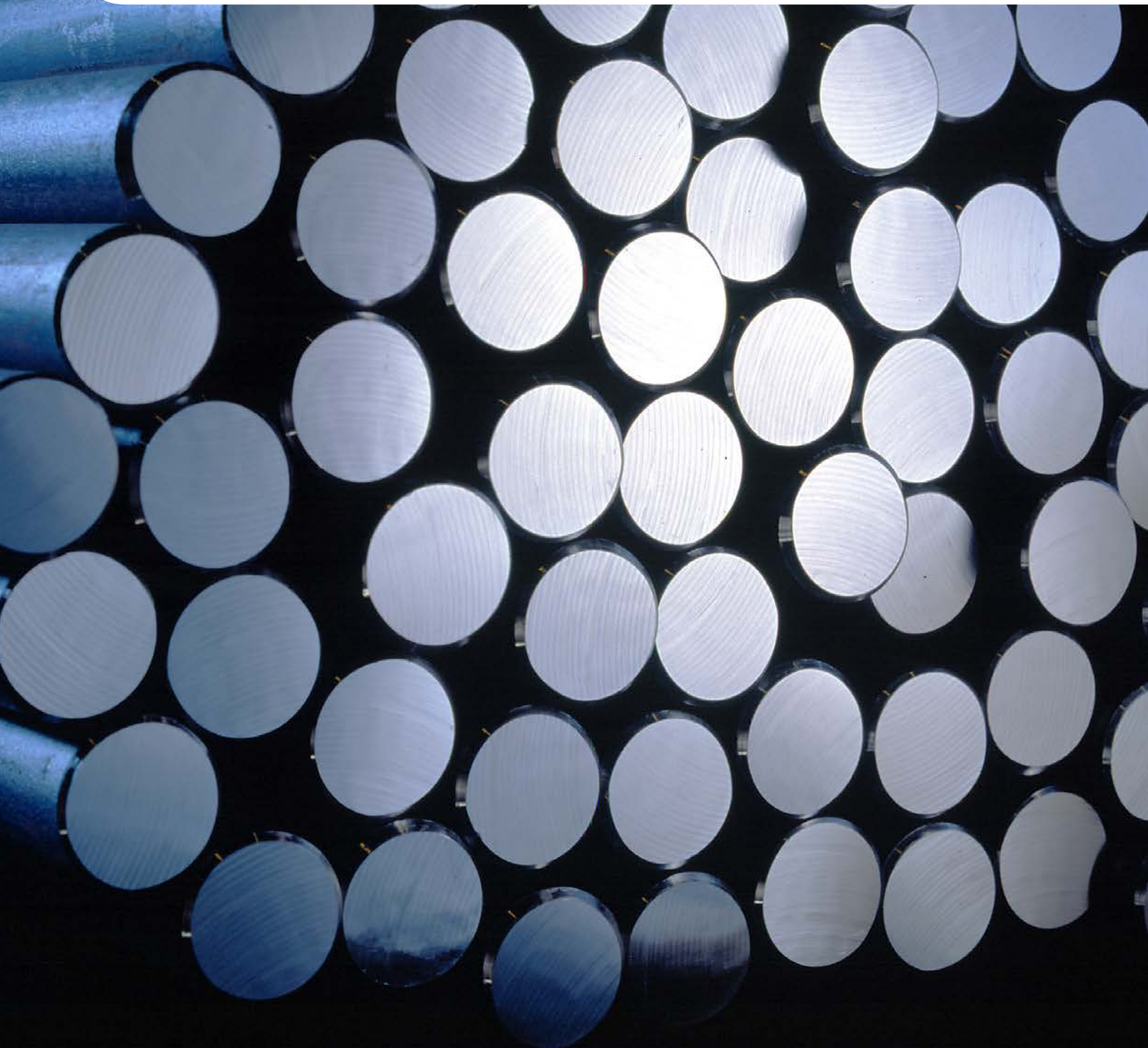


**CUSTOMIZE
YOUR STEEL –
SP-BAR**



"SP-Bar takes Ovako's hot-rolled round bar to a whole new level. Our capability to modify its three key properties with precision is unique. And we offer this solution with potentially significant cost savings for our customers."

**Adam Hylén,
VP and Head of Sales & Marketing Smebox, Ovako**



Design the round bar you need

No more compromises! Whether your products are rail clips, stabilizers or high-impact bolts for sub-zero climates, you can order customized round bar that meets your specific requirements and, at the same time, lowers your costs.

Let's say you want steel characteristics that will extend the fatigue life of your component. Or ensure greater impact strength. Or to produce more components out of the tonnage you buy. Or, in some cases, replace drawn or peeled bars, to name a few examples. Ovako's Special Property Bar (SP-Bar) delivers on these objectives. And more.

Tweak three key properties to your specifications

SP-Bar is a highly-advanced and flexible concept based on the ability to modify three key properties – tolerances, mechanical properties and surface quality – to meet your requirements. Prior to an order, our engineers work closely with you to plan and calculate the rolling operation to achieve the properties that are most important to you.

Every contract reviewed

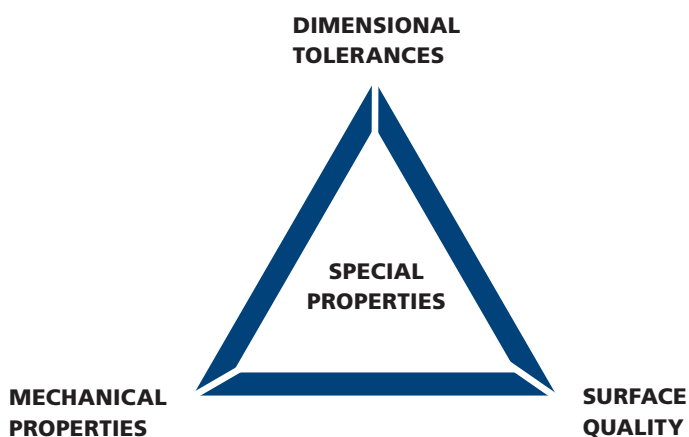
We do a thorough review of every contract and since we have a IATF 16949 certification we can deliver according to existing requirements.

Sizes ranges

SP-Bar can be delivered in diameters from 14 to 52 mm and in lengths up to 12 m.

Benefits

- Tighter dimensional tolerances that deliver increased yields and repeatability as well as material savings.
- Improved mechanical properties that provide longer fatigue life and greater impact strength.
- Better surface quality that reduces scale and results in cleaner quenching tanks and an improved environment



SP-Bar Tolerances

Ovako's hot-rolling techniques produce round bars with very tight tolerances, helping customers achieve significant material savings, as well increased yields and repeatability.

More cost-effective than peeled or cold-drawn bar

In many cases, the tight tolerances of SP-Bar are close to those generated by peeled or cold drawn techniques, which are both costly processes. In fact, some manufacturers of stabilizer bars for trucks are replacing components made from peeled bars with SP-Bar.

Furthermore, residual surface stress levels in SP-Bar are lower than in cold drawn bars due to reduced deformation in the straightening process. SP-bars can also be delivered in a non-straightened format.

Get more from your tonne!

Tight SP-Bar tolerances allow customers to decrease the dimensions of bars and get more manufactured pieces from each tonne of bar they purchase.

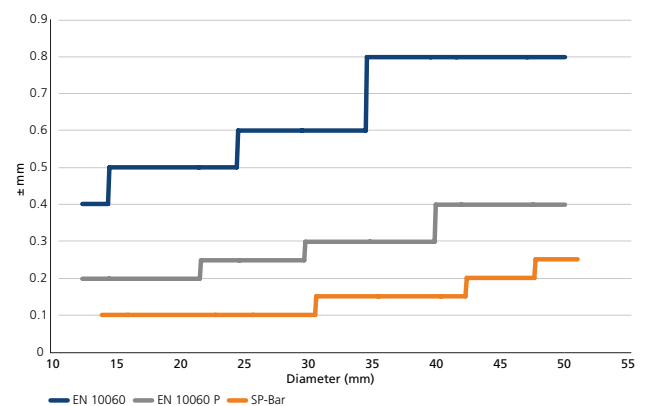
Increased yield

By using SP-Bars for cutting blanks in the forging operation the weight variation of the blanks is reduced, resulting in less burr and more efficient deburring after forging. If a peeled surface is required, the excellent roundness of SP-Bar can minimize the amount of material removed. The product can be offered in combination with M-Steel® from Ovako for improved machinability, making the peeling operation even more effective.

Repeatability

Tight dimensional tolerances provide consistent bar diameter and tight ovality control, allowing for predictable and repeatable processes.

DIMENSIONAL TOLERANCES OF SP-BAR



AVAILABLE TOLERANCES (1/4 EN 10060)

Ø 14–30	± 0.10
Ø 31–42	± 0.15
Ø 43–47.5	± 0.20
Ø 48–52	± 0.25

Mechanical Properties

The fatigue life and impact strength of many steel grades (although not all) can be further enhanced with the SP-Bar process, which is being continuously developed at our mill.

Grain size

The SP-Bar process can be optimized to achieve a very fine-grained material structure. Grain sizes frequently reach the maximum levels of 11-12 according to the ASTM E-112:13 rating. A small grain size is achieved by very precise control of the thermal parameters throughout the complete rolling process. This fine grain size is the foundation for superior fatigue life and impact strength.

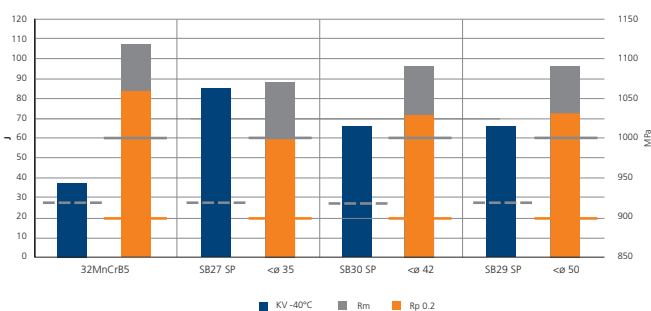
Fatigue strength

Fatigue life is a very important property in applications with cyclic loading such as spring applications. By applying the SP-Bar process, and controlling the prior austenite grain size, also yields a finer martensitic structure. This improves the fatigue strength for quenched and tempered bars, as well as the as-rolled bar. The process also gives our customers the opportunity to downsize the dimensions of their bar or to replace peeled bar.

Impact strength

One of the challenges in low temperature applications, such as high-strength bolts for windmills, is securing high-impact strength levels. By using the SP-Bar process involving quenching and tempering, the steel can achieve superior impact strength levels combined with high tensile strength. See figure below.

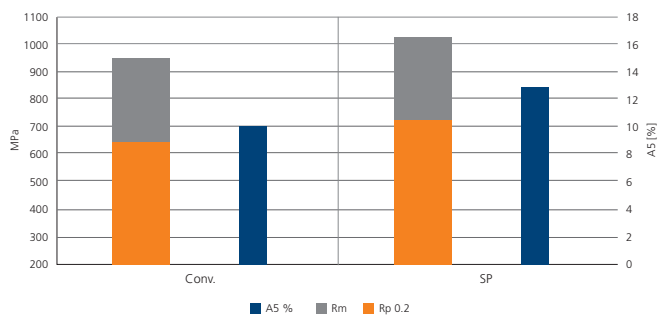
BORON STEEL (Q & T)



Optimizing steel chemistry

The improved tensile strength and toughness of SP-Bar makes it possible to replace more expensive alloyed steel grades or reduce the amount of alloy content in the existing steel grade. Weldability also improves with reduction in alloying. Moreover, the enhanced properties of SP-Bars enables customers in the construction industry, for example, to use less steel, reducing overall weight

42MNV7



Eliminate costly annealing

To meet the specified hardness requirements, certain steel grades require an additional annealing operation because of the high alloy content. Depending on the grade SP-Bar can enable customer to avoid this costly process.

Surface Quality

Scale thickness is generally reduced on SP-Bar by up to 50 % compared to conventional hot rolling. This is particularly important in subsequent heat treatment or cold forming processes, resulting in cleaner quenching tanks and a better work environment.

Testing guarantees quality

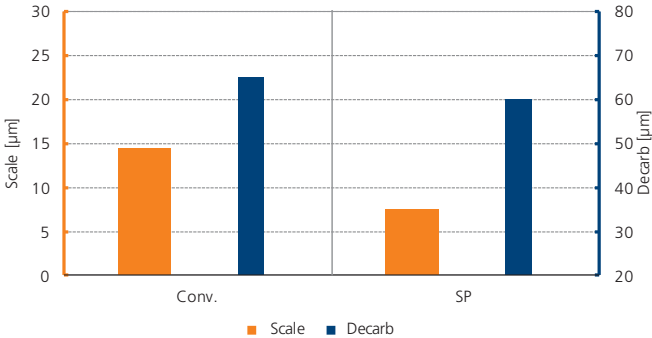
Ovako uses several ways to test the quality of round bar. One of these is non-destructive testing (NDT), which carefully inspects the bars in state-of-the-art flux leakage crack detection equipment. This equipment works with high frequency alternating current that does not cause any residual magnetism, ensuring that customers get the quality of bar they have come to expect from Ovako.

Decarburization

Accurate control during reheating of billets prior to hot rolling ensures a low level of decarburization of the bars, which is important for the mechanical properties.



SI-SPRING STEEL



"We started using SP-Bar in 2019 because of its unusually tight dimensional tolerances and near-perfect roundness. Because there is minimal variation in the bar's diameter, we have been able to reduce waste and improve our production yield."

Victor Asensio, BSA France



Reducing machining waste

BSA Groupe, a supplier of cold-formed steel in Vougy, France has become more efficient after selecting Ovako's SP-Bar as the raw material for its peeled bar.

BSA is a supplier of steel and other alloys to the automotive, pharmaceutical, construction, aerospace, nuclear and defense industries. Its workshop buys steel bar and other products and carries out machining processes such as peeling, grinding, cutting, chamfering and marking. As a result, its customers can source material in the grades, quality and dimensions they need and therefore simplify their own production processes and focus on high-value operations.

It chose SP-Bar for its peeled bar because of its tight dimensional tolerances, which have enabled the workshop to reduce machining allowances to enable faster production with less waste.

"Peeling removes imperfections and oxides from the surface of steel bar," says Victor Asensio, CEO and owner of BSA Groupe. "We have three peeling lines and process around 18,000 tons of bar per year in diameters from 8 to 100 mm. The process provides a flawless surface so that machine builders and OEMs can build high precision into their equipment."

"We started using SP-Bar in 2019 because of its unusually tight dimensional tolerances and near-perfect roundness. Because there is minimal variation in the bar's diameter, we have been able to reduce waste and improve our production yield."

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, rings and pre-components. Ovako has around 2,700 employees in more than 30 countries. Ovako is a subsidiary of Sanyo Special Steel and a member of Nippon Steel Corporation group, one of the largest steel producers in the world with more than 100,000 employees globally.

For more information, please visit us at www.ovako.com, www.sanyo-steel.co.jp and www.nipponsteel.com.

CONTACT US

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