



Outperform every time

A close-up photograph of a precision-machined metal component, likely a mold or a part of a machine. The metal has a brushed, silver-grey finish. A circular hole is visible in the upper left, and a rectangular slot is cut into the right side. The background is a warm, out-of-focus orange-brown.

Every project brings
pressure to deliver more:

Shorter lead times, exact tolerances,
fewer production risks and components
that last longer in service.

Toolox® is prehardened engineering and tool steel developed to help manufacturers meet that pressure. Its reliable properties, dimensional stability and durable performance help simplify production and achieve dependable results.



Consistency

Reliable properties. Predictable production

Toolox® is delivered prehardened with consistent material properties, helping reduce variation, avoid unnecessary process steps and create a more reliable route from material to finished component.

Precision

Confidence from machining to final application

Stable, machinable material helps manufacturers achieve accurate parts with fewer interruptions, less corrective work and greater control over the finished result.

Endurance

Performance that holds up under pressure

Toolox® combines strength, toughness and wear resistance to support long service life in demanding tooling and engineering applications.

Reliable properties. Predictable production

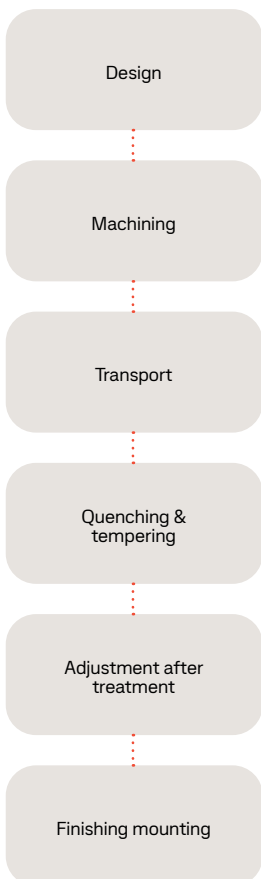
Consistency begins in the material. Toolox® is delivered prehardened, with carefully controlled properties throughout the steel. Its low-carbon, low-carbide composition supports efficient machining with conventional carbide tools.

This predictable behaviour can simplify production. By reducing the need for stress relieving, post-machining heat treatment and corrective work, Toolox® helps manufacturers shorten the path from plate, forged block or round bar to finished component.

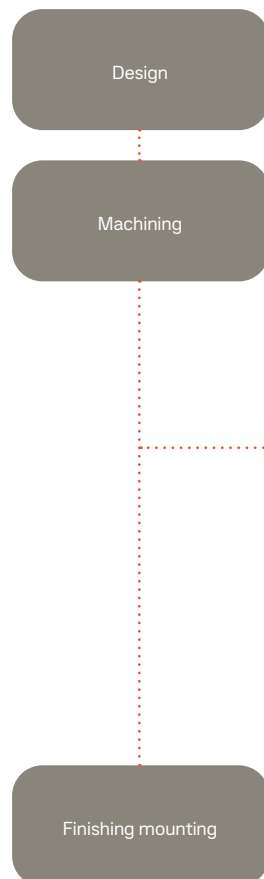
Switching to Toolox® can mean:

1. Shorter lead times
2. Lower processing costs
3. More available capacity

Standard production process



Toolox® production process



Avoid heat treatment and correction work

For tools conventionally machined before
quenching and tempering.

Ready to perform after machining

Toolox® is delivered already heat treated to its specified properties. Applications can be machined in their delivered condition and put into service without a separate quenching and tempering cycle.

The result is not only fewer process steps, but less transport, waiting time and post-treatment adjustment, while retaining the strength and toughness needed for demanding tooling applications.

► *A progressive die for refrigerator components previously used hardened 1.2363 steel. By changing to Toolox® 44, the manufacturer saved more than three days in die-making and eliminated the usual post-heat-treatment adjustments.*

After inspection at 150,000 parts, no visible wear was found; the same die went on to produce more than 1.5 million components.



Avoid stress relieving and re-machining

For precision machine components made from conventional engineering steel.

Standard production process

Design

Machining

Unclamping,
stress relieving

Machining

Finishing mounting

Toolox® production process

Design

Machining

Finishing mounting

Stable after heavy machining

Toolox® is produced and tempered to minimise internal residual stresses before it reaches your workshop. As material is removed during machining, there is less stress available to release and distort the component. The result is reliable dimensional stability, even after heavy machining.

Even when machining is concentrated on one side, Toolox® can remain extremely straight—helping reduce the need for stress relieving, straightening and secondary machining.

► *"The gear racks we made were absolutely straight: 0.004 mm sidewise deflection and 0.136 mm longitudinal deflection on 1.8 m measuring length."*

Tommy Petterson, Stena Stål

Confidence from machining to final application

Precision is more than a final tolerance. It is shaped by the material's response at every stage, from machining and finishing to surface treatment, fabrication and service.

Toolox® is tested against defined delivery requirements. Impact toughness, hardness, machinability, thickness, flatness and surface condition are guaranteed and measured, giving manufacturers documented confidence when selecting a grade and planning production.

The following data provides an overview of the Toolox® properties that support informed material selection and reliable component manufacture.

Scan the QR code for detailed technical data, processing recommendations and application guidance.



Hardness and toughness

Toolox® is supplied prehardened with hardness and toughness established throughout the material, not only at the surface. This allows material to be removed during machining without revealing a softer core.

Grade	Hardness	Toughness*
Toolox® 33	310 HBW	100 J
Toolox® 44	435 HBW	30 J
Toolox® 46	470 HBW	14 J

* Typical impact toughness, plate form

Did you know?

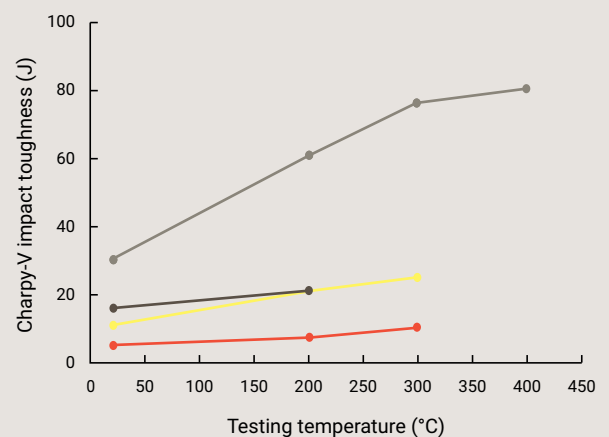
Toolox® has a fine grained tempered martensitic crystalline structure, a result of quenching at a high cooling rate. The fine grain size gives high toughness.



Heat resistance

Toolox® grades retain useful mechanical properties at elevated temperatures. Toolox® 44 is suited to demanding hot-work applications, while Toolox® 46 is developed for higher-temperature forging and extrusion tooling.

Impact toughness



- Toolox® 44
- W.Nr 1.2344 ESR (1)
- H13 ESR, upper (2)
- H13 ESR, lower (2)



Welding

The unique metallurgy of Toolox® delivers a favourable carbon equivalent, making welding easier and more reliable than in many traditional tool steels with comparable hardness levels.

Welding

MAG / MMA / TIG

Low-alloy or stainless consumables



Cutting

Toolox® can be cut using oxy-fuel, plasma or laser processes while maintaining excellent dimensional stability, enabling faster fabrication and fewer production challenges than conventional heat-treatable tool steels.

Cutting

Oxy-fuel / plasma / laser

Waterjet / sawing / machining



Machinability

The low-carbon, low-carbide composition of Toolox® supports machining in the delivered, prehardened condition using conventional carbide tools. The homogeneous structure is designed to provide predictable chip formation and insert wear.

Milling comparison with 1.2312 / P20

Toolox® 33

Insert life at the same cutting speed

Up to 3× longer

Milling speed at equivalent insert life

Up to 20% higher

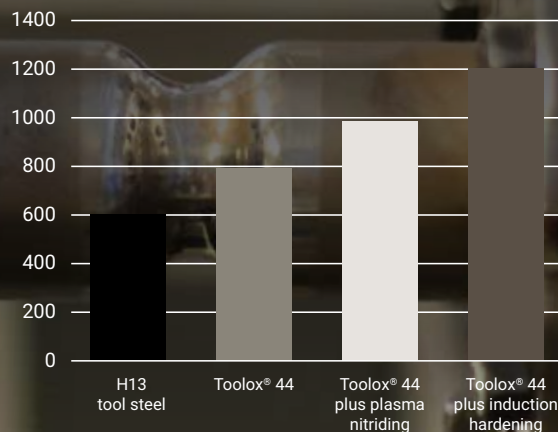
Results depend on the operation, tooling, machine capability, workpiece geometry and cutting parameters.



Fatigue resistance

The fatigue performance of a component is influenced by material cleanliness, core strength, surface finish and local geometry. Toolox® 33 and Toolox® 44 have been evaluated in fully reversed axial fatigue testing against SS 2541 / 4340 reference steel.

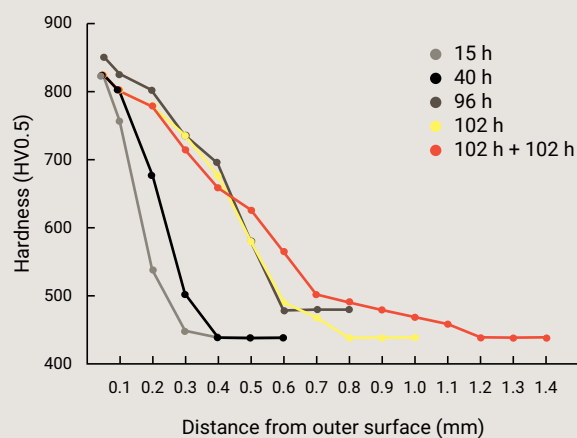
Fatigue limit for Toolox® 44 as tested by SWERIM. MPa (2x10⁶ cycles)



Surface treatment

Where additional surface hardness or wear resistance is required, Toolox® can be nitrided, laser hardened, induction hardened or coated. These treatments add performance at the surface while retaining the strength and toughness of the prehardened core.

Gas nitriding of Toolox® 44



Performance that holds up under pressure

Endurance is measured in service, and in the trust built over time.

When Toolox® helps a tool last longer, a component perform reliably or production run without interruption, it helps manufacturers outperform.

Proven across a wide range of industries and applications, Toolox® is used wherever performance must hold up under pressure, from demanding tooling and heavy engineering to manufacturing environments where downtime is not an option.

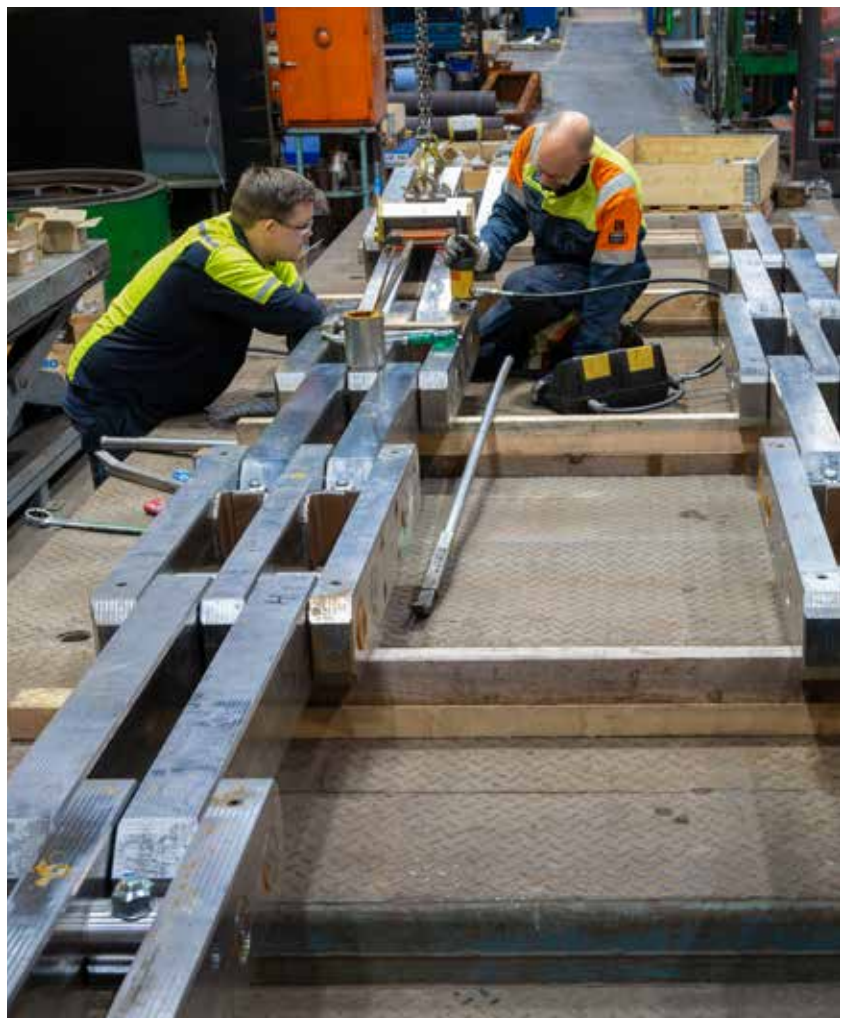
Strength and efficient machining for continuous casting chains

At SSAB's Oxelösund mill, the chains that drive continuous casting equipment need to perform reliably. When the mill needed a new set, it chose Toolox® 33 to replace the previously used 25CrMo4 steel.

Toolox® 33 offered a combination of yield strength, fatigue resistance and crack resistance suited to this demanding application. Its homogeneous structure and low carbide content also supported efficient machining of the 288 chain links.

The case shows how the choice of steel can address two needs at once: reliable performance in service and an efficient route to finished components.

Company: **SSAB**
Country: **Sweden**
Product: **Toolox® 33**





Company: Metistec Metal
Country: Turkey
Product: Toolox® 44

Longer plunger life in high-pressure die casting

In high-pressure die casting (HPDC), shot sleeves, plungers and plunger rings must withstand demanding operating conditions. Metistec combined Toolox® 44 with its hard PVD coating to improve the durability of these components.

The combination brings together dimensional stability, toughness and wear resistance. For the plunger, it resulted in a significant increase in service life, helping reduce replacements and improve operational efficiency.

This case illustrates how material selection and surface engineering can work together to extend component life in HPDC applications.



"A change in material specification can affect established ways of working, internal approval and customer expectations.

The right choice is therefore not simply the steel with the lowest purchase price, or the highest headline performance. It is the grade and production route that gives the best overall result for the application.

Toolox® provides a defined range for manufacturers who want to assess that choice carefully, from the first trial to broader adoption."

Consider the full value chain

Material cost is visible at the point of purchase. The cost of risk is often visible later: during qualification, production, delivery or service.

When comparing material options, assess:

Cost to manufacture — including the complete route to a finished part

Cost of uncertainty — variation, rework, delays and unplanned intervention

Cost in service — maintenance, downtime, replacement and output

Cost to customer relationships — the consequence when a tool or component does not perform as expected

A higher initial material cost can be justified when it reduces uncertainty across the full life of the tool or component.

Choose the Toolox[®] grade for the requirement

Toolox[®] 46

Select when the priority is

Performance at elevated temperatures

Typical fit

Forging, extrusion and demanding hot-work tooling

Toolox[®] 44

Select when the priority is

Higher strength, wear performance and fatigue resistance

Typical fit

Demanding tooling, dies and high-strength engineering components

Toolox[®] 33

Select when the priority is

Toughness, stability and versatility

Typical fit

Machine components, moulds, fixtures and general tooling

Download the latest data-sheets



Contact sales

Speak with our sales team about your requirements, product availability and the next steps for your Toolox[®] project.



Find a distributor

Our worldwide network of specialist distributors can help you source the Toolox[®] grades and dimensions you need.



SSAB is a global leader in premium steels, shaping a stronger, lighter, and more sustainable world. With high-strength and advanced steels, pioneering decarbonized offerings, and value-add services, we deliver unique customer value and accelerate customer competitiveness worldwide. A steelmaker since 1878, our teams in more than 50 countries set the standard for industry-leading performance. SSAB operates steel mills in Sweden, Finland, and the United States and is leading the transformation of the industry - dramatically reducing emissions from our own production. SSAB shares are listed on Nasdaq Stockholm, with a secondary listing on Nasdaq Helsinki.



SSAB
SE-613 80 Oxelösund
Sweden

T +46 155 25 40 00
contact@ssab.com

toolox.com

SSAB