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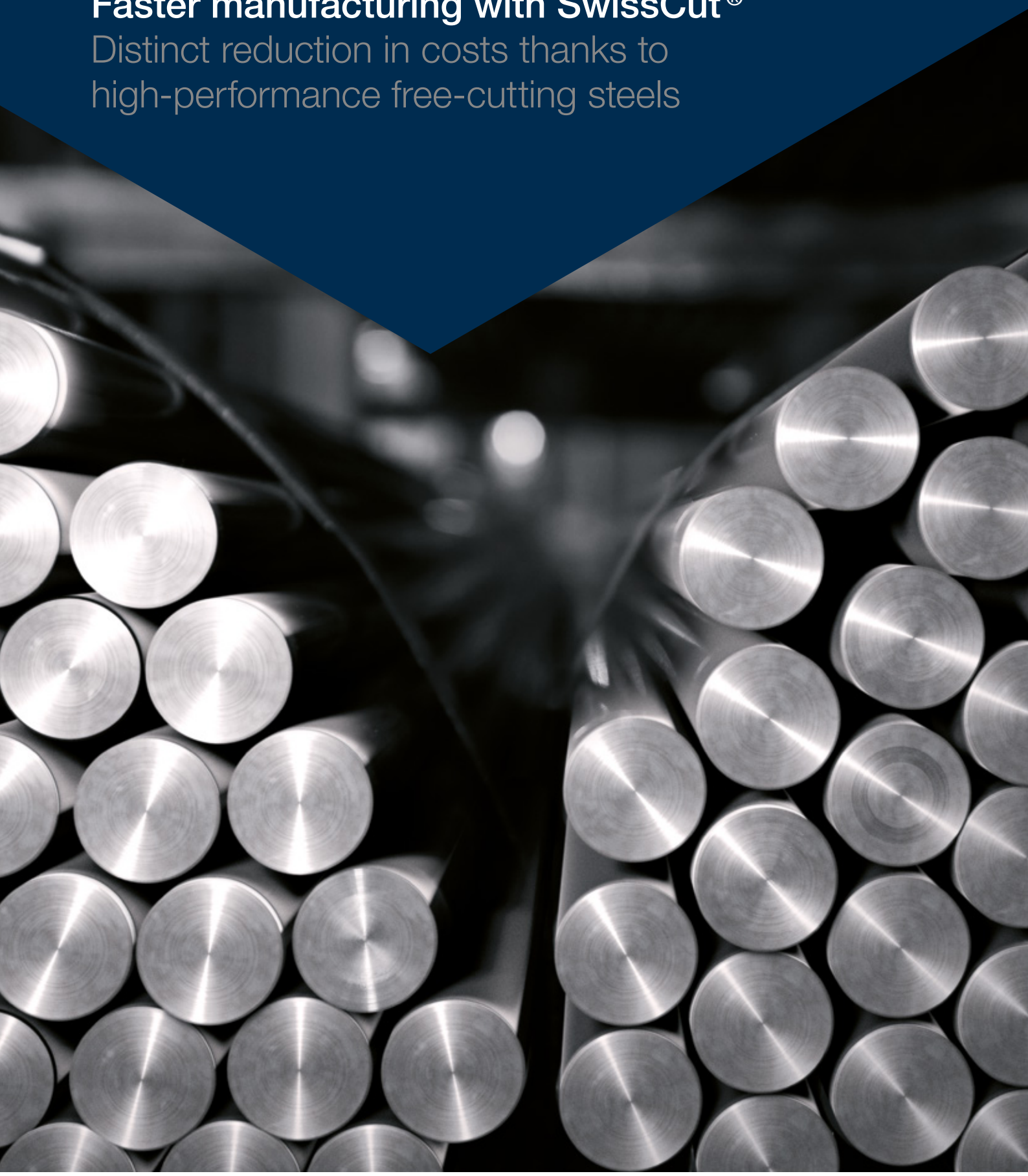
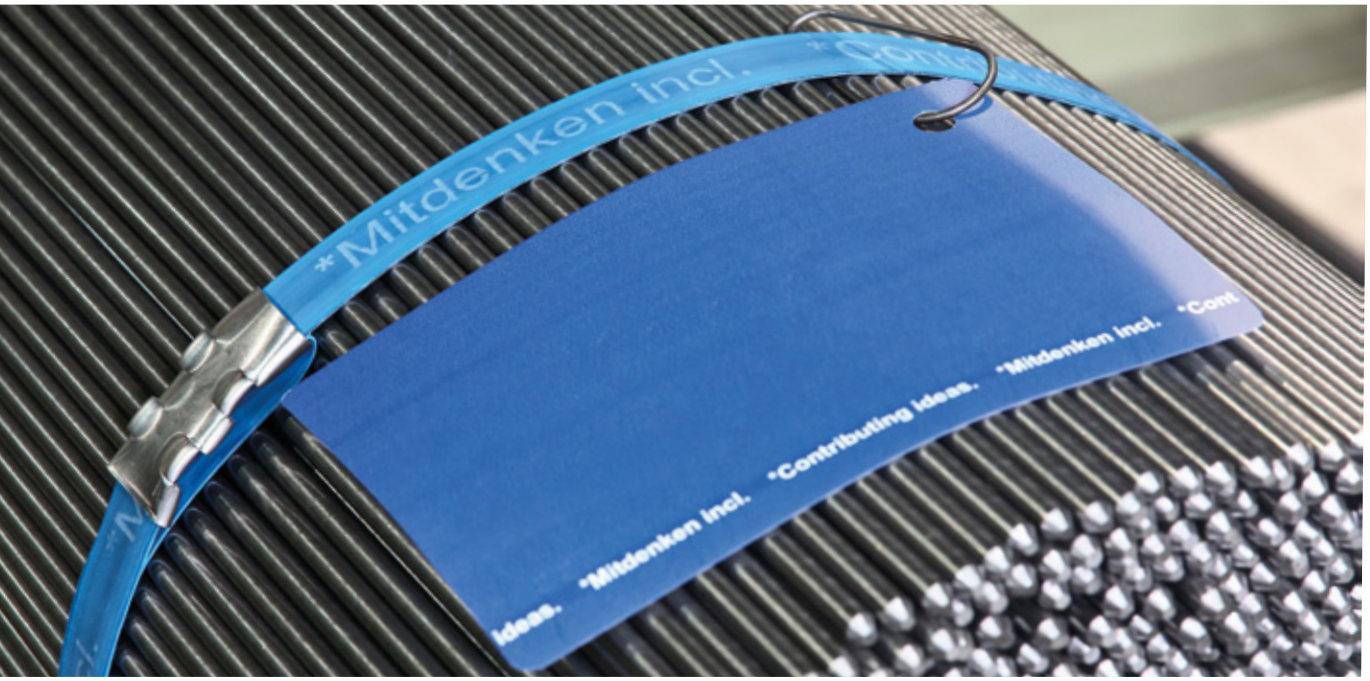
Faster manufacturing with SwissCut®

Distinct reduction in costs thanks to high-performance free-cutting steels



Member of Swiss Steel Group

Steeltec



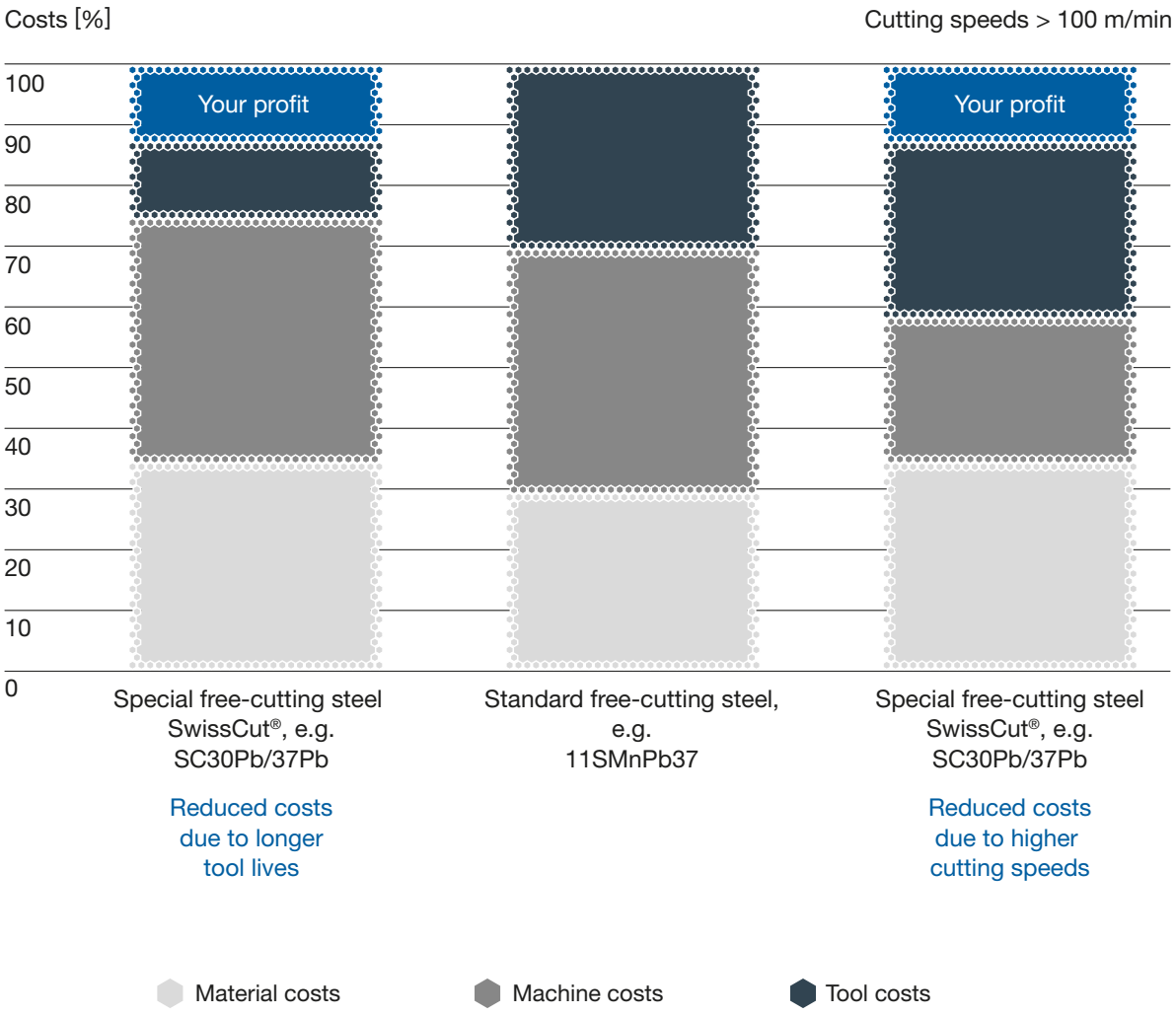
Distinct reduction in costs thanks to high-performance free-cutting steels

The rule of thumb for the lowest possible cycle times and lowest costs for parts in the automated manufacturing of series parts are cutting speeds of over 100 m/min. At the same time, long tool life is decisive. Since conventional free-machining steels often do not meet these requirements, Steeltec AG, a company of the SCHMOLZ + BICKENBACH GROUP, has developed an efficient alternative: the high-performance free-cutting steels of the SwissCut® family. They are optimized for chip cutting and provide Steeltec customers with a significant increase in productivity. A comparison of materials shows: the advantages are quantifiable. With SwissCut® steels, parts costs are generally 27 % lower.

In the mass production of precision parts, consistent material quality from batch to batch is a decisive factor for the high productivity of machine tools and the dimensional tolerance of components. „For maximum profitability in manufacturing, in addition to selecting the right material, we recommend optimizing the entire production process," explains Guido Olschewski, Head of Quality Management and Development at Steeltec. Consequently, the steel experts work with clients to determine the optimum tools, cutting speeds and depth, and feed rates - always keeping an eye on process reliability.

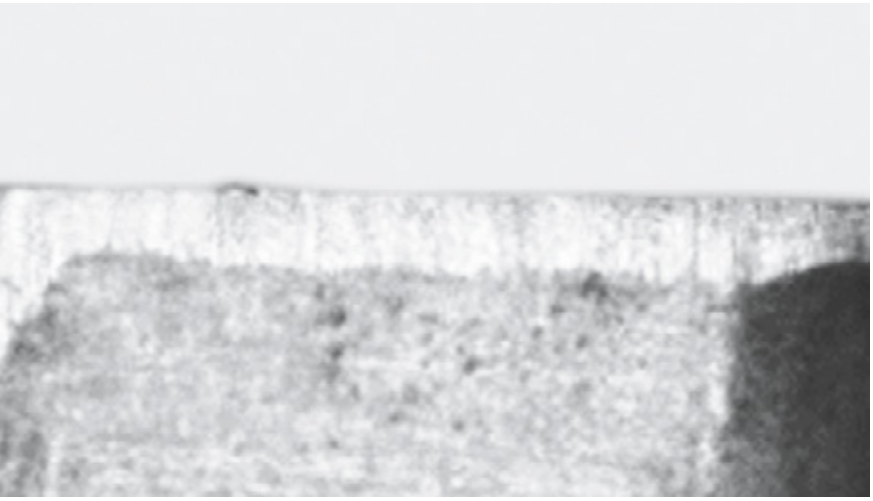
Targeted focus: Process Optimization

One example of the great potential of process optimization is the sophisticated components used in vehicle manufacturing. A precision component that is used in the injection systems of internal combustion engines is produced from bar steel with a diameter of 35 mm from which 65 % is cut away. The standard free-cutting steel 11SMnPb37 is widely used in these



applications as it was in the case of a specific process optimization project at a supplier to the automotive industry: „Our customer's CNC machine tool had already been optimized to assure reliable 12-hour production time without tool changes," according to Mr. Olschweski. „We achieved improved productivity by replacing the standard free-cutting steel 11SMnPb37 with our SwissCut® SC37Pb and optimizing the process parameters. With SwissCut® SC37Pb we were able to reduce the cycle time per part by 37 %."
The customer increased the cutting speed up to 377 m/min with SwissCut® SC37Pb for rough-cutting without excessive tool wear. „The use of wear-resistant indexable inserts and reliable chip breaking of the material means that unmanned ‚ghost' shifts can be run without supervision," reports Mr. Olschweski. „This further improves profitability." The standard free-cutting steel 11SMnPb37 can only be used at a maximum cutting speed of 240 m/min for the same machining operations despite optimized process parameters. The effects of the use of high-performance free-cutting steel is noticeable: Parts costs were lowered by 27 % when the Steeltec customer used the high-performance free-cutting steel SwissCut®. Other benefits are improved surface quality and the dimensional accuracy of precision components.

Replacing standard free-machining steel 11 SMnPb37 with SwissCut® SC37Pb reduces parts costs by at least 10 %.



In high-capacity cutting of SwissCut® SC37Pb, the indexable insert made of carbide exhibits much less wear than when used during the machining of conventional free-machining steel 11SMnPb37.

The recipe for success for high cutting speeds

The secret of the success of the SwissCut® steels is the intentional use of oxide inclusions. At cutting speeds of more than 100 m/min, the hard and abrasive oxides in the steel can be a problem for many conventional free-machining steels. They are formed during steel production as a product of deoxidization processes during melting and as the steel solidifies. At high cutting speeds, they cause substantial tool wear and limit chip production and thus productivity. To increase cutting speeds, Steeltec in cooperation with an affiliate, Swiss Steel, modified the oxide inclusions in the steel using selective melting and slag control. The result is a high-performance free-cutting steel with soft, non-crystalline inclusions that act as a lubricant during high-speed cutting operations.

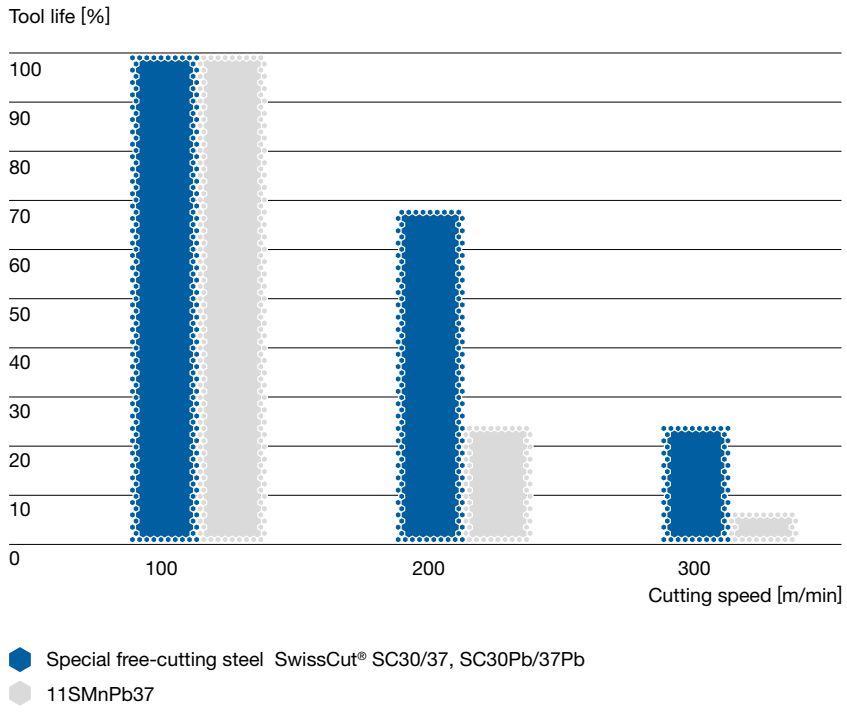
Drilling: it‘s all in the alloying

The use of SwissCut® SC37Pb has also proven effective for slow cutting operations such as drilling: the cutting tool drills fine holes in precision parts at a speed of under 100 m/min. „The biggest challenge in this case is the formation of the surface cutting edge at low cutting speeds,“ Mr. Olschewski explains. „It is why we rely on a reliable solution and add lead to the chemical composition of the high-performance free-cutting steel.“ The alloy provides the necessary lubrication at low cutting speeds. The leaded SwissCut® steel has optimum cutting properties over the entire range of cutting speeds.

They develop to their full potential at cutting speeds of over

100 m/min

Comparison of tool life

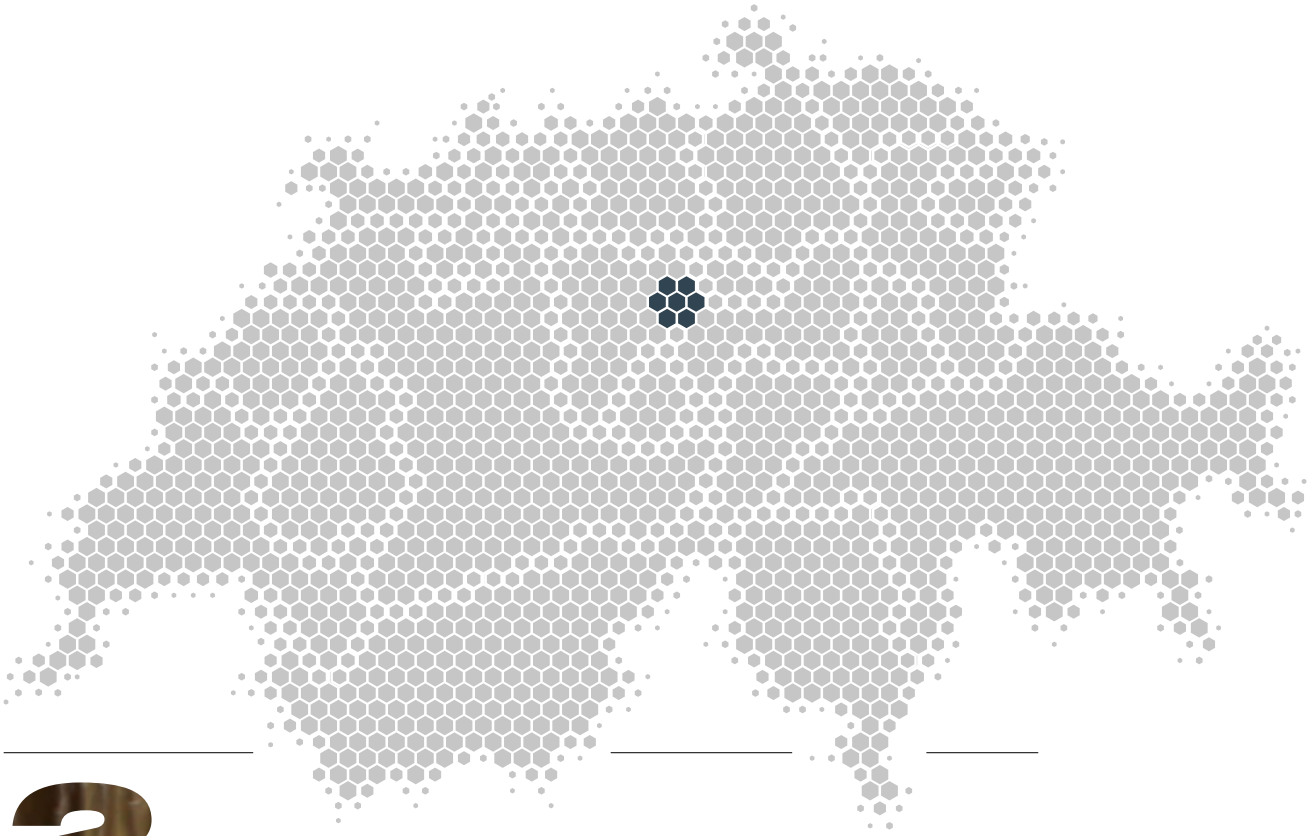


The lead-free SwissCut® SC30/SC37 and leaded SwissCut® SC30Pb/SC37Pb steels are available in dimensions of 10 to 36 mm. Steeltec delivers drawn rods in standard lengths of 3 and 6 m. The rod straightness is ≤ 0.3 mm/m.

At cutting speeds of 100 m/min and higher, Steeltec customers who use SwissCut® have a tool life four times longer than with conventional free-machining steels.

Summary

The high-performance free-cutting steels of the SwissCut® family are optimized for cutting applications and are an efficient alternative to conventional free-machining steels in the machining of series parts. They develop to their full potential at cutting speeds of over 100 m/min and improve the competitive strength of manufactured parts. Steeltec customers profit from longer tool life, higher component quality and lower parts costs overall.



2 Production facilities in Emmenbrücke (CH)

250 highly skilled employees

About Steeltec AG

Making good better! High-performance special steels tailored to meet customer requirements: high-value precision parts coupled with low manufacturing costs.

Steeltec AG is one of Europe's leading manufacturers of bright steels.
With a focus on high-strength and higher-strength special steels and special free-cutting steels, Steeltec has an establish position as an important partner to the automotive and hydraulic industries and the mechanical engineering sector. Steeltec works closely with customers, suppliers and research institutions to continually improve the production and engineering properties of steel, driving competitiveness across the entire value chain.
Working within these partnerships, Steeltec develops high-performance steel solutions that meet its customers' application needs.

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