

TOOLOX[®] IN GEAR RACKS

Toolox[®] is a unique steel for the production of high performance machine components. Toolox[®] is based on the ultra-clean steel metallurgical concept which gives it extraordinary properties. Toolox[®] is delivered in the quenched and tempered condition and has guaranteed and tested mechanical properties.

Toolox[®] is available in 3 different strength levels with tensile strengths of 980, 1260 and 1450 MPa. A pre-hardened steel with very high strength is now an option to use. An example of this is seen in Fig. 1, a gear rack specified to have a hardness of minimum 400 HB. The alternative grade 34CRMo4 would have needed heat treatment.

The high strength of Toolox[®] also gives the potential to lower the size of the gear, making the equipment more compact.

Toolox[®] is based on a modern low-carbon content. Minimizing carbon and instead using more efficient elements such as molybdenum makes it possible to produce a steel that has a high crack and fatigue resistance. The lower carbon content also makes welding and hot cutting like oxy cutting easier by comparing the carbon equivalent (CEIIW) value of the different steels in Table 1.

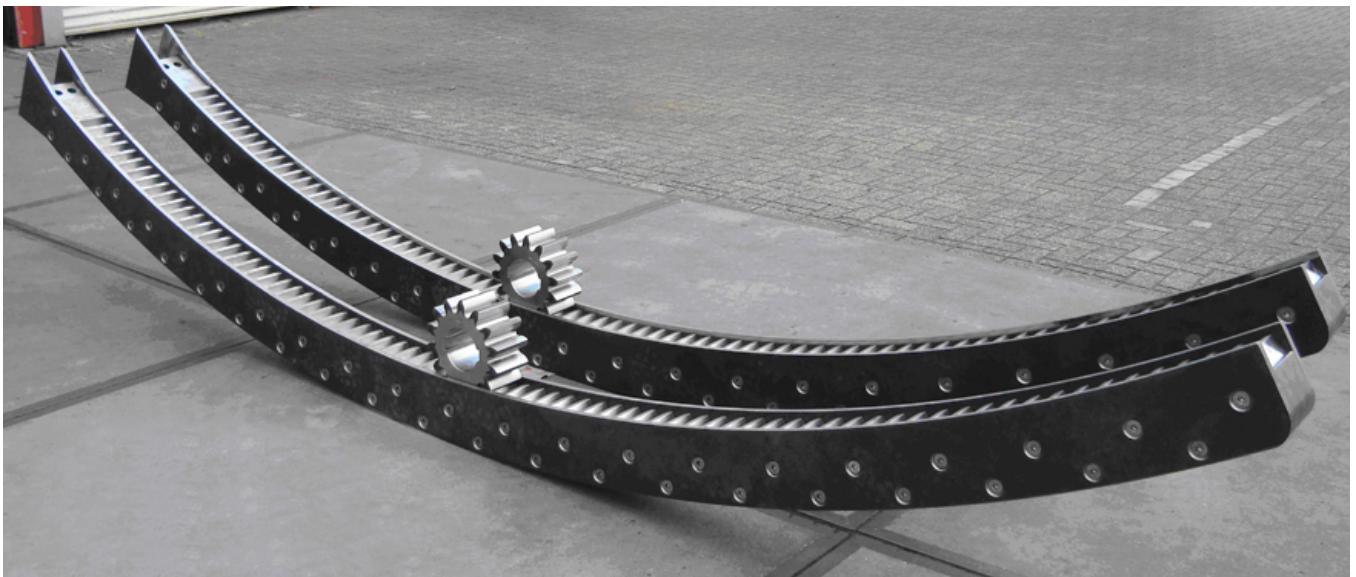


Fig. 1 Toolox[®] 44 gear rack for a bridge.

Photo: SANDERS Gears Castings Machining

Table 1. Typical mechanical properties and chemical composition

	R _{p0.2} (MPa)	R _m (MPa)	Toughness	C	Mo	P	CE _{IIW}
TOOLOX® 33	850	980	100 J @ RT	0.23	0.30	Max 0.010 %	0.66
42CrMo4/4140	550 - 800	850-1000	~ 60-90 J @ RT	0.42	0.22	Max 0.035	1.27
TOOLOX® 44	1300	1450	30 J @ RT	0.32	0.80	Max 0.010 %	0.96

Toolox® has other excellent workshop properties. Being tempered at 590°C removes all residual stresses from the steel, making it possible to obtain remarkable precision when machining. An example is shown in Fig 2. The rack was obtained with only 0.004 mm sidewise deflection and 0.136 mm longitudinal deflection on 1.8 m measuring length. Starting by plate material instead of the previous round bar also gave large productivity benefits.

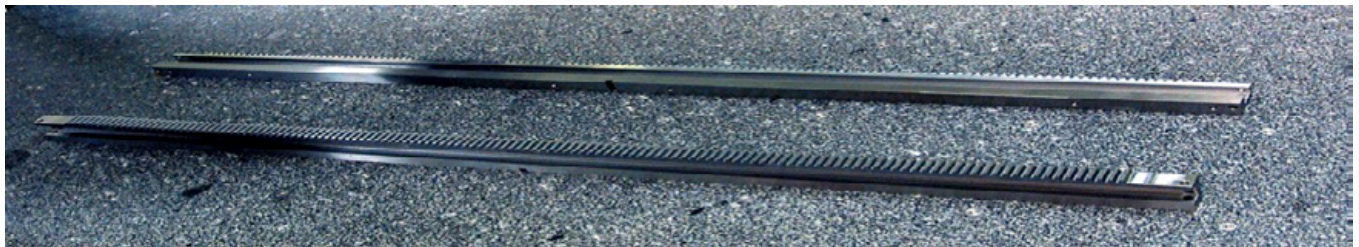


Fig 2. Toolox 33 precision machined gear rack

Toolox is an excellent base material for surface hardening such as nitriding, laser hardening and induction hardening. Its high yield strength and crack resistance minimizes all risks. Especially nitriding of Toolox is recommendable since it doesn't affect the mechanical properties and gives low deformations.

Availability

Plates from 6 – 130 mm. Bars between 21 and 172 mm with lengths up to 5000 mm. Toolox® is available from the local SSAB stock. Cut pieces of Toolox® can be obtained through the well-established global network of Approved Toolox® Distributors. Both SSAB and the distributors can provide you with good application support as well as technical guidelines.

Contact and more information

Contact your local sales representative to learn more, visit www.toolox.com or consult Tech Support at: help@ssab.com.