

Steel grade specification

OvaX 600

General information

OvaX 600 is an ingot cast through hardening steel that is specially designed for air hardening or gas quenching and for applications requiring isotropic properties and very high cleanliness levels. The steel is made according to a new process that modifies the inclusion morphology, i.e. a lower number of elongated sulfides and reduced size and distribution of oxides, both in average and in spread. This provides OvaX 600 with superior fatigue resistance in both the longitudinal and in the transverse directions. Furthermore, the micro segregation is reduced by increased soaking time and increased top cropping.

By using air-hardening or gas quenching it is possible to reduce the amount of quenching distortion. Additionally the use of quenching medias such as oil and salt can be avoided, which improves both safety and environment.

Nominal chemical composition

	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %
Min	0.63	1.40	1.35			1.00		0.23
Max	0.70	1.60	1.55	0.025	0.002	1.20	0.25	0.27

Steel cleanliness

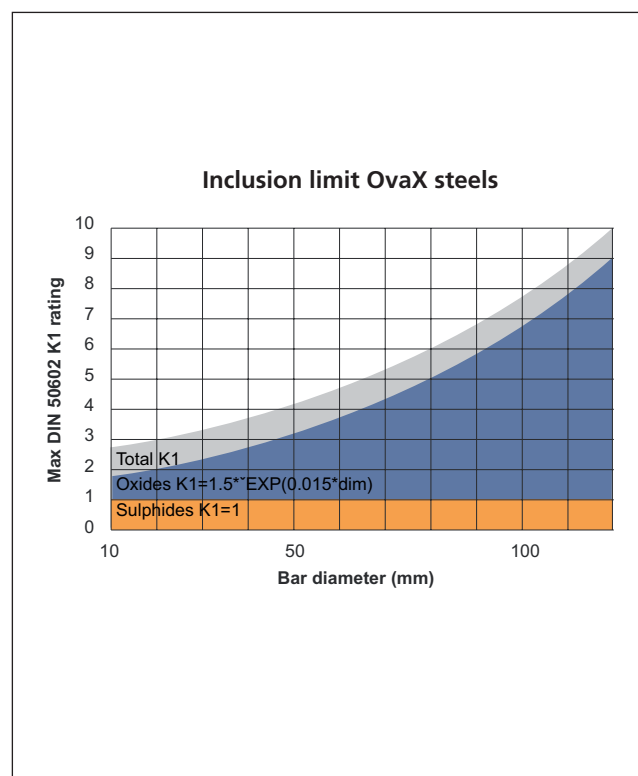
Internal quality class: IQ

Micro inclusions

Applied standard:	DIN 50602 K1
Sampling:	Six random sample from final product dimension.
Limits:	Dimension dependent, the average rating of six samples will not exceed the limits in the right graph.

Macro inclusions

Applied standard:	ISO 3763 (Blue fracture)	10 MHz UST (internal)
Sampling:	Statistical testing on billets. Three samples per tested heat	
Limits:	<1 mm/dm ²	Max 18 defects/dm ³ >0.2mm FBH



Heat treatment recommendations

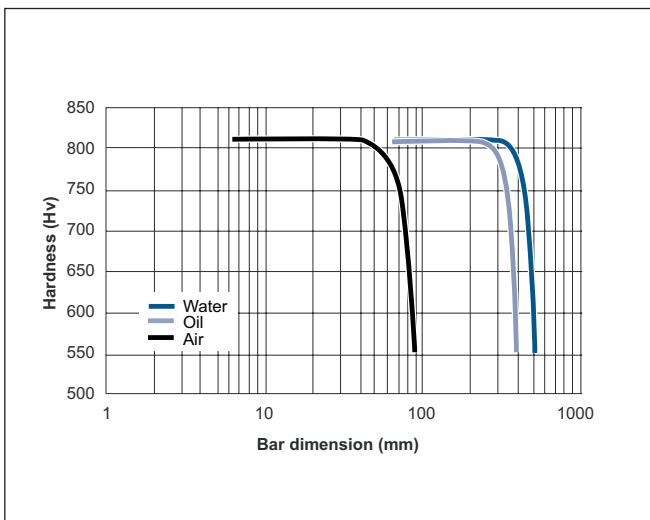
Heat treatment	Temperature	Cooling/quenching
Hot forging	900-1200°C	Slowly or in air
Soft annealing	750°C/1h	Slowly to 650°C in 8h
Hardening	880-1000°C	Directly hardened in air or by gas quenching
Tempering	150-710°C	In air

Typical mechanical properties

Condition	Hardness	Yield strength R _{p0,2} (MPa)	Ultimate tensile strength R _m (MPa)	Elongation A ₅ (%)
Soft annealed	220 HB			
Hardened	61 HRC	1700	2300	2

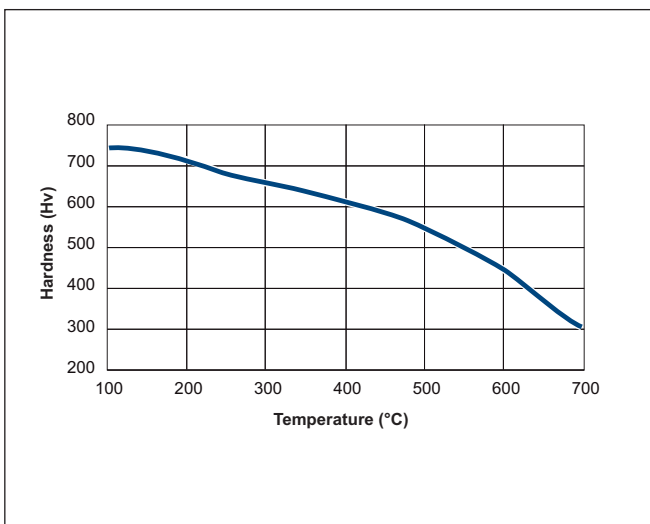
Hardenability

The hardenability describes the steel's ability to harden during cooling. It is generally measured as the steel's hardness versus cooling rate or dimension.



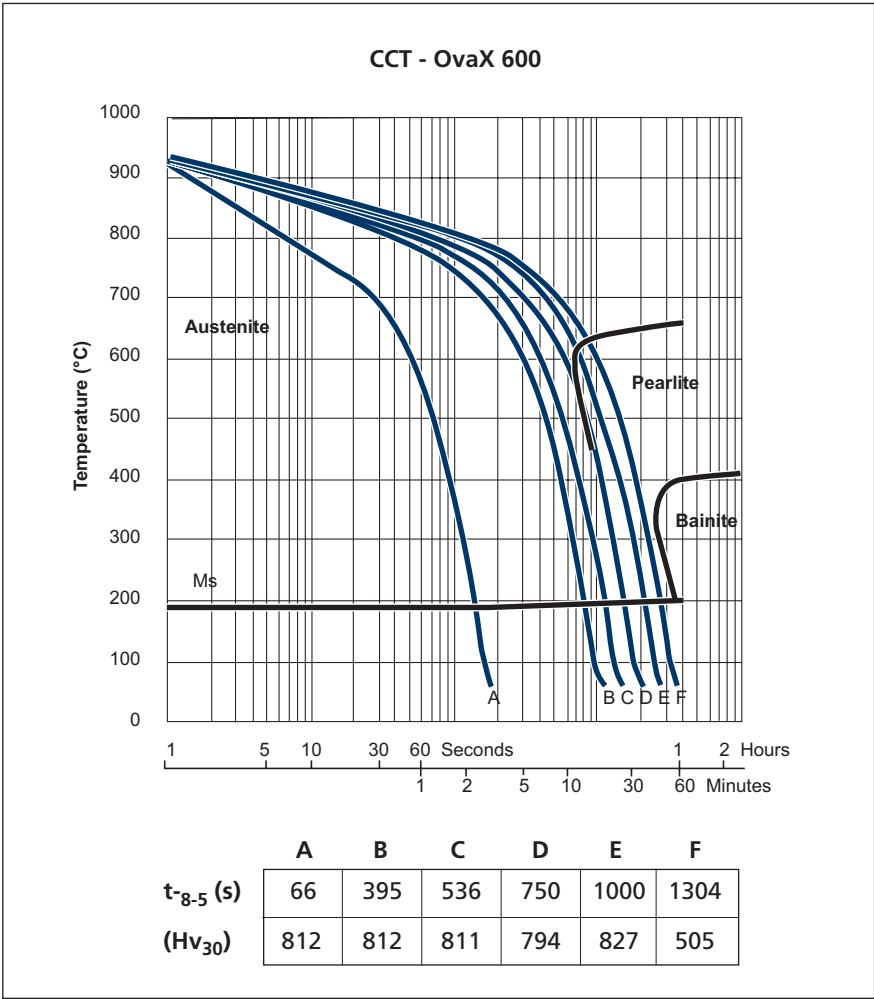
Hardenability of OvaX 600 calculated from CCT measurements and two-dimensional quenching of a bar. Each curve corresponds to different cooling medias.

Tempering response



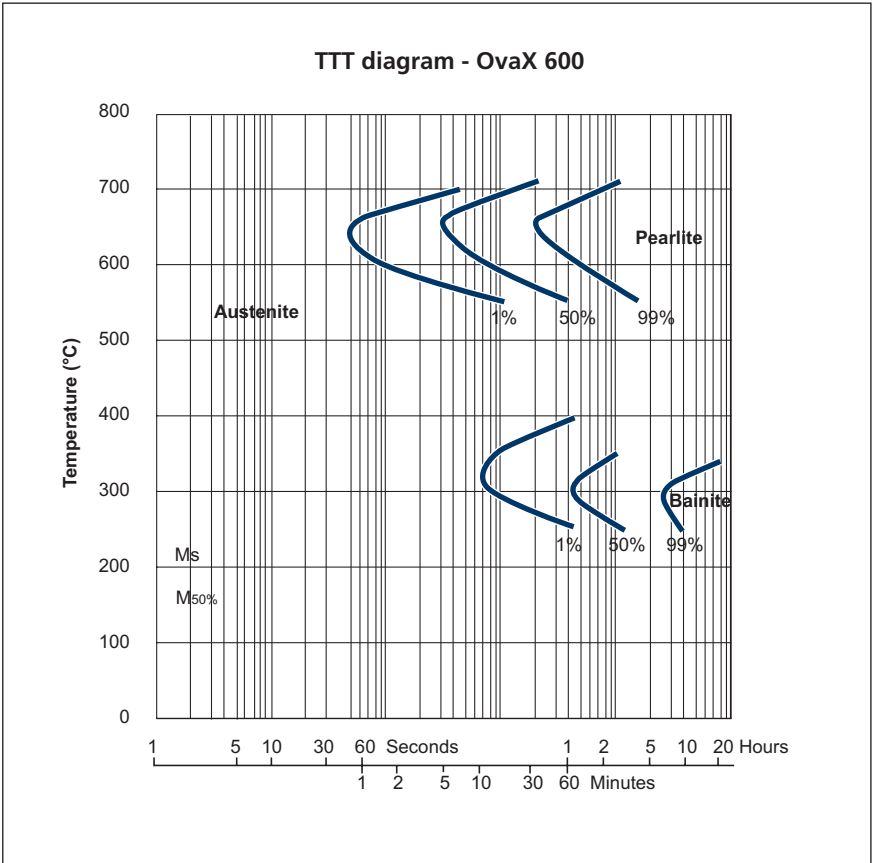
Tempering response for OvaX 600. Austenitized at 900°C for 30 min and hardened in air. Tempered one hour at each tested temperature level. The tested heat is K6874.

Transformation diagram



CCT diagram of OvaX 600 made by dilatometry. Samples were austenitized at 930°C for one hour. Then linear cooled with different $t_{-8.5}$ (cooling time between 800°C and 500°C). Heat number used was R7001. Hardness and $t_{-8.5}$ value are given in the table.

TTT diagram



TTT diagram of OvaX 600 made by dilatometry. Samples were austenitized at 930°C for one hour. Then linear cooled with different $t_{-8.5}$ (cooling time between 800°C and 500°C). Heat number used was R7001. Hardness and $t_{-8.5}$ value are given in the table.

Product spec: PSF OvaX 600
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Disclaimer

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