

Product specification

OvaX 800

General information

OvaX 800 is an ingot cast through hardening steel specially designed for applications with extremely high cleanliness demands and where isotropic properties are required. The steel has extremely low sulphur content in order to reduce the number of elongated sulphides. Furthermore, the size distribution of oxide inclusions has been reduced both in average and spread. Microsegregation is reduced by increased soaking time and increased top crop weight. Typical applications are high pressure fuel injection parts, highly stressed bearing components etc.

Nominal chemical composition

	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Cu %	Ti ppm	O ppm
Min	0.90	0.15	0.20			1.40					
Max	1.00	0.40	0.40	0.020	0.002	1.60	0.25	0.10	0.25	15	7
Mean	0.93	0.28	0.28	0.009	0.001	1.47	0.10	0.02	0.10	12	3.9

Nearest equivalent international standard

SAE	ISO	EN	DIN	AFNOR	JIS	GOST
52100	100Cr6	100Cr6	100Cr6	100Cr6	SUJ2	SchCh15

Steel cleanliness

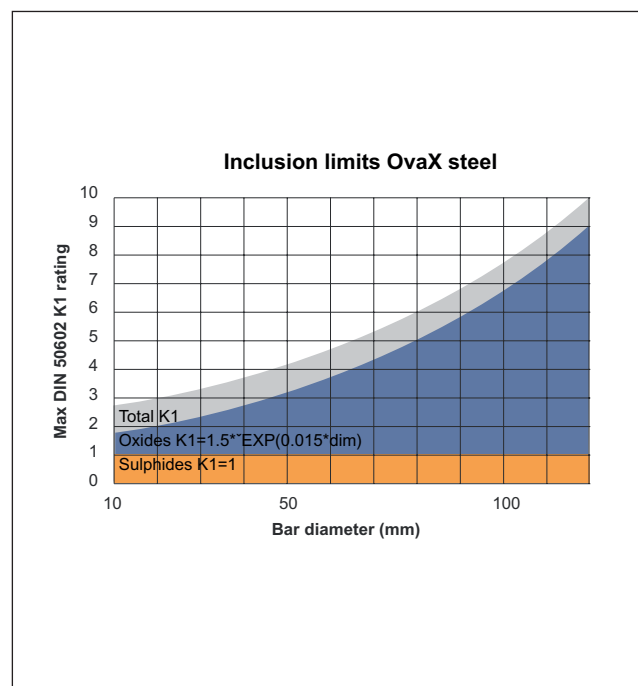
Internal quality class: IQ (Isotropic Quality)

Micro inclusions

Applied standard:	DIN 50602 K1
Sampling:	6 random sample from final product dimension.
Limits:	Dimension dependent. Average rating of 6 samples will not exceed limit in the right graph.

Macro inclusions

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

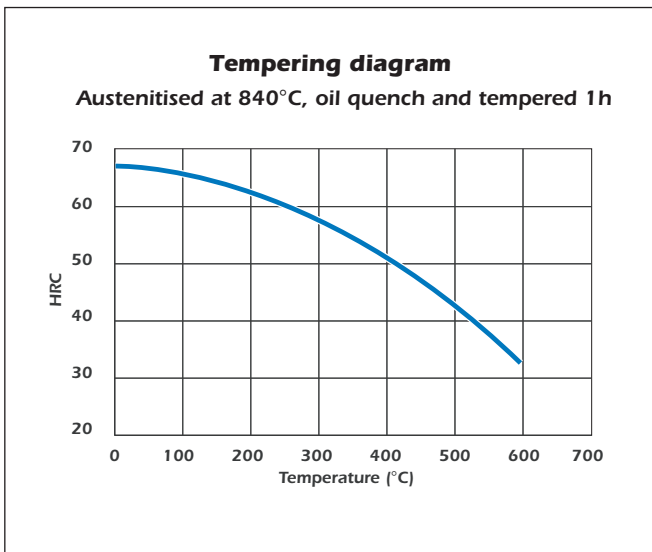


Microstructure and segregation (typical values)

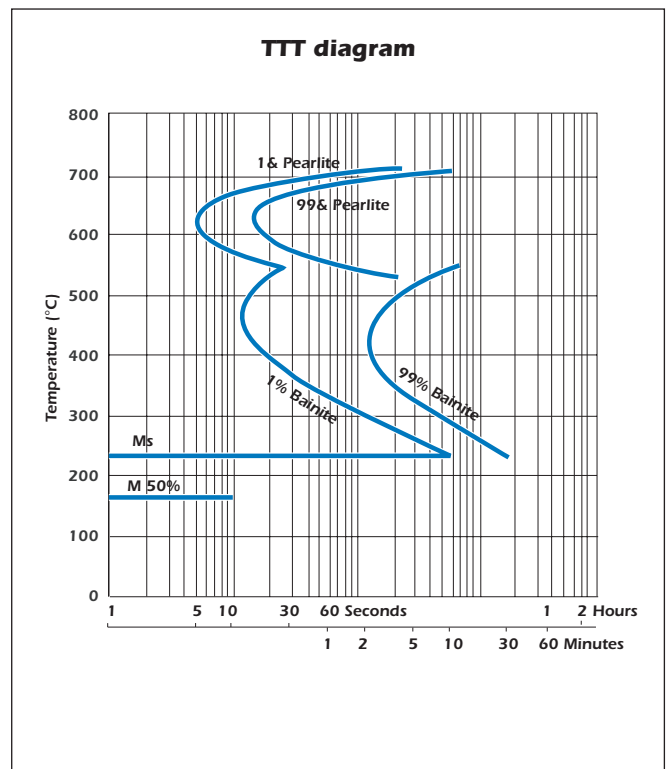
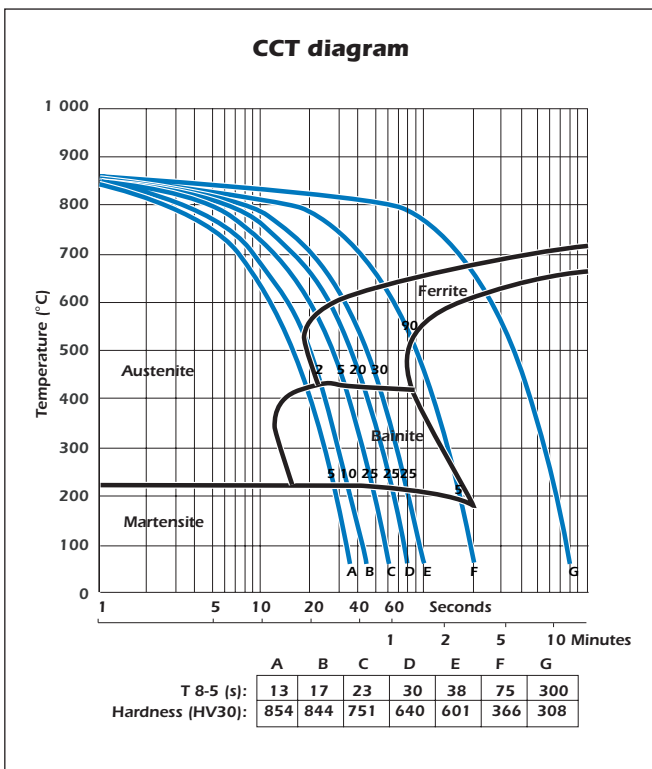
Standard	CG	PA	CN	CN5	CZ6	CZ7
SEP 1520	2.1	3.0	4.1	5.1	6.0	7.2

Heat treatment recommendations

Heat treatment	Temperature cycle	Cooling
Forging	800-1100°C	Air cool
Soft annealing (spheroidized)	RT⇒820°C 1 h 820°C 2 h 820⇒740°C 1 h 740⇒690°C 10 h	Air cool
Stress relieve annealing	550-650°C 1 h	Air cool
Martensitic hardening	830-870°C 10-60 min	Oil quench (+ tempering within 2hrs)
Bainitic hardening	850-875°C 10-60 min	Salt bath 220-250°C, 3-7 hrs
Tempering	160-500°C see diagram below	Air cool



Transformation diagrams

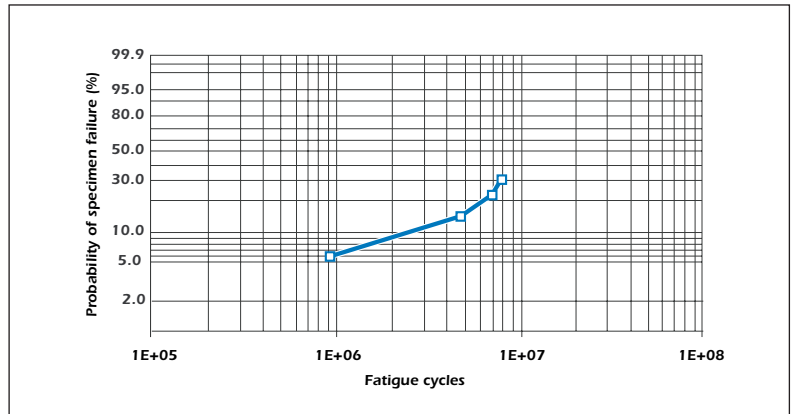


Mechanical properties (typical values)

Condition	Hardness	Yield strength $R_{p0.2}$ (MPa)	Ultimate tensile strength R_m (MPa)	Elongation A_5 (%)
Hot rolled soft annealed	195 HB	410	700	27
Cold worked	210 HB	700	880	13
Martensitically hardened	61 HRC	1700	2300	2

Fatigue properties

Test method: Rotating beam
 Stress level: Single stress 950 MPa
 Specimen: Hourglass shape \varnothing 9.5 mm
 Material: Heat R2569 \varnothing 90 mm
 Structure: Martensite
 Hardness: 61 HRC
 Fatigue life: L10 L50 L90
 Million cycles: 3 11 23



Other properties (typical values)

Young's modulus (GPa)	Poisson's ratio (-)	Shear modulus (GPa)	Density (kg/m ³)
210	0.3	80	7800

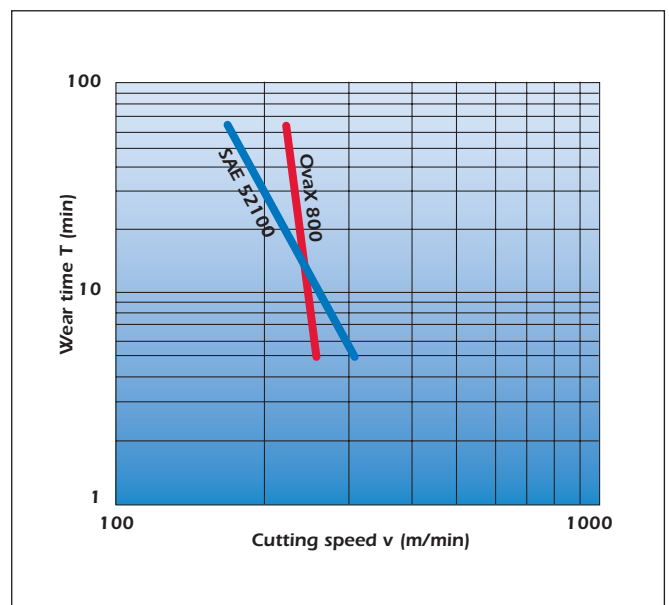
Average CTE 20-300°C ($\mu\text{m}/\text{m}^\circ\text{K}$)	Specific heat capacity 50-100°C (J/kg $^\circ\text{K}$)	Thermal conductivity Ambient temperature (W/m $^\circ\text{K}$)	Electrical resistivity Ambient temperature ($\mu\Omega\text{m}$)
12	480	45	0.22

Machinability

	SAE 52100	OvaX 800
v 5	259.2	309.2
v10	248.8	262.2
v15	242.9	238.1
v30	233.1	202.0
v60	223.7	171.3

α for SAE 52100
 = 0.43
 α for OvaX 800
 = 0.24

Test method: According to ISO 3685
 Material: Heat L5189, \varnothing 65 mm bar
 Heat treatment: Soft annealed
 Cutting depth: 2.5 mm
 Feed: 0.4 mm/r
 Tool wear criterion
 VB_b (average): 0.3 mm
 Cutting edge: SNMA 120408 in type P15



Product spec: PSF OvaX 800
Issue: 1
Date: 2005-10-01

Disclaimer

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