MATERIAL DATA SHEET

STEEL GRADE

Last revised: Fri, 17 Jan 2025 10:38:40 GMT

OVAKO

22NiCrMo12-5* All

General Information

22NiCrMo12-5* is a group of carburizing steel with high hardenability. High strength combined with excellent toughness and high fatigue strength makes them well suited for applications in the mining industry. Tight alloying windows provides the grades with excellent hardenability and strength control. Can be delivered as rolled, annealed or austenitized and air hardened.

253A - Standard variant with high hardenability and controlled sulphur content for improved machinability.

253R - Variant with reduced sulphur content to meet the clean steel BQ (Bearing Quality) requirement for improved fatigue properties.

253L - Variant with increased carbon range for increased core hardness after carburizing. Controlled sulphur content for improved machinability.

253S - Variant with slightly increased carbon range for increased core hardness after carburizing. Controlled sulphur content for improved machinability.

4722 - Continous cast variant with slightly increased carbon range for increased hardness after carburizing.

BQ-Steel®

BQ-steel® is a bearing quality clean steel optimized for fatigue strength and is also ideal for new design solutions outside the bearing industry.

For additional Heat Treatment Data, please visit the Heat Treatment Guide.

** Designation followed by "*" is not an official EN standard grade but named according to the rules in EN 10027.*

Similar designations

9317, 14NiCrMo13-4, 23NiCrMo12-5, 25NiCrMo12-5, 19NiCrMo11-5, EN27

Chemical composition

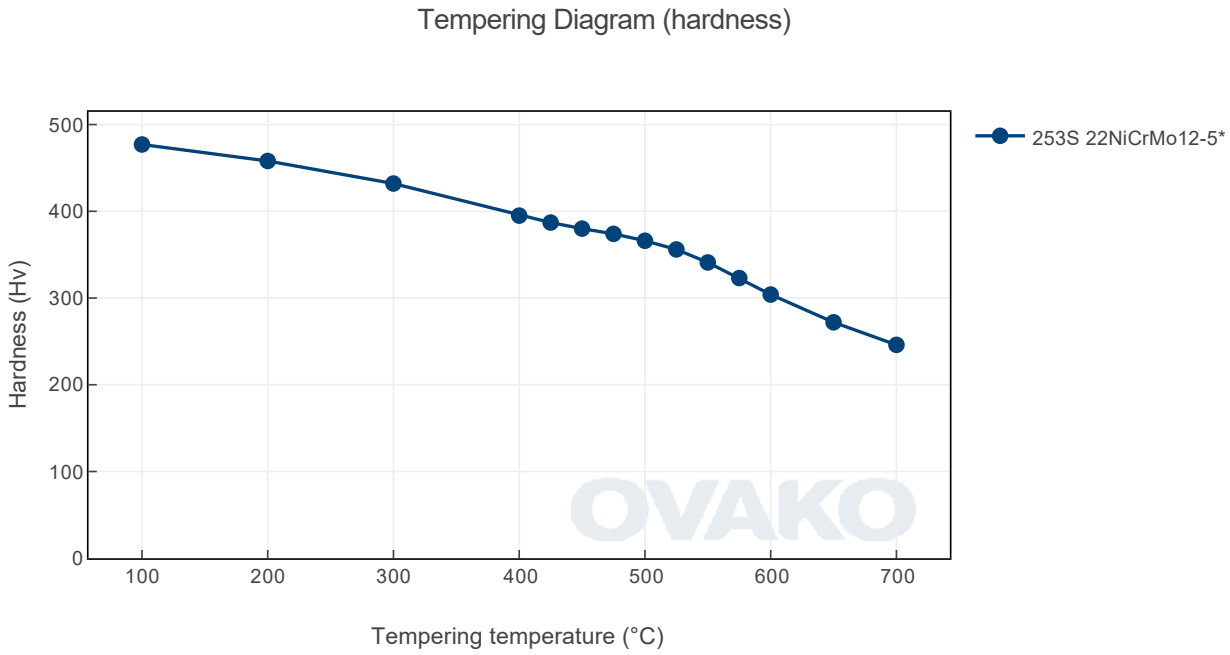
Variant	Cast	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %
253S	IC	CEV 0.75_{max}	Min	0.22	0.20	0.70	-	0.015	1.27	2.85	0.22
		Pcm 0.45_{max}	Max	0.24	0.35	0.75	0.020	0.025	1.35	3.00	0.26

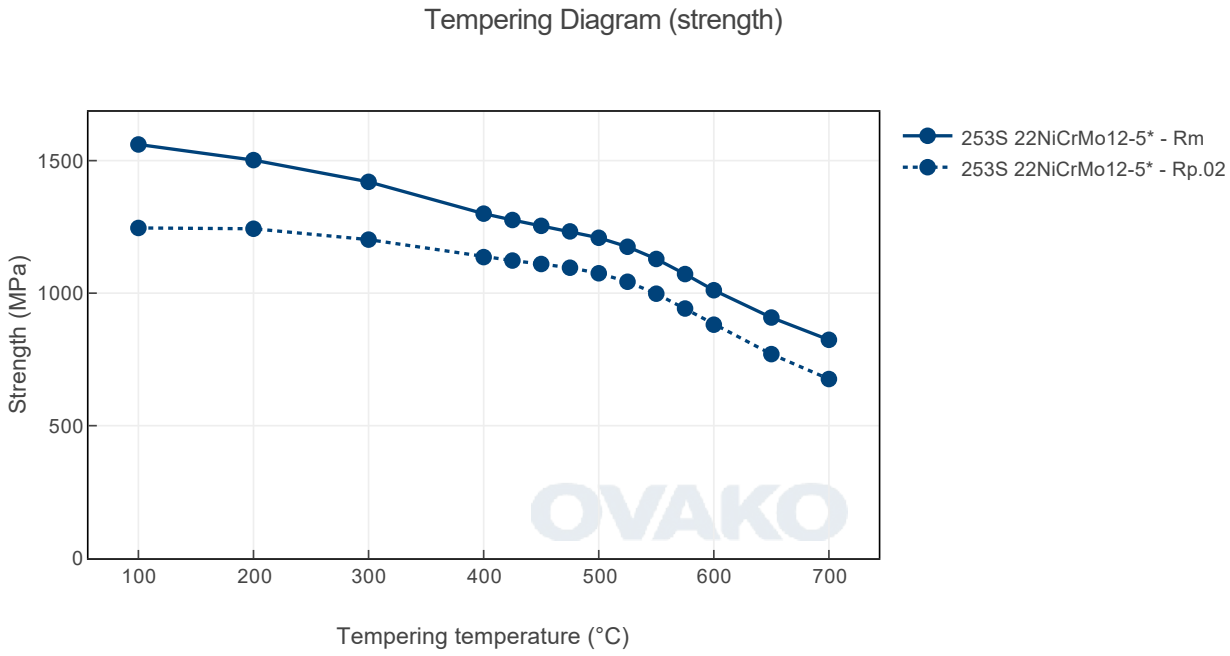
Transformation temperatures

	Temperature °C
MS	356
AC1	696
AC3	787

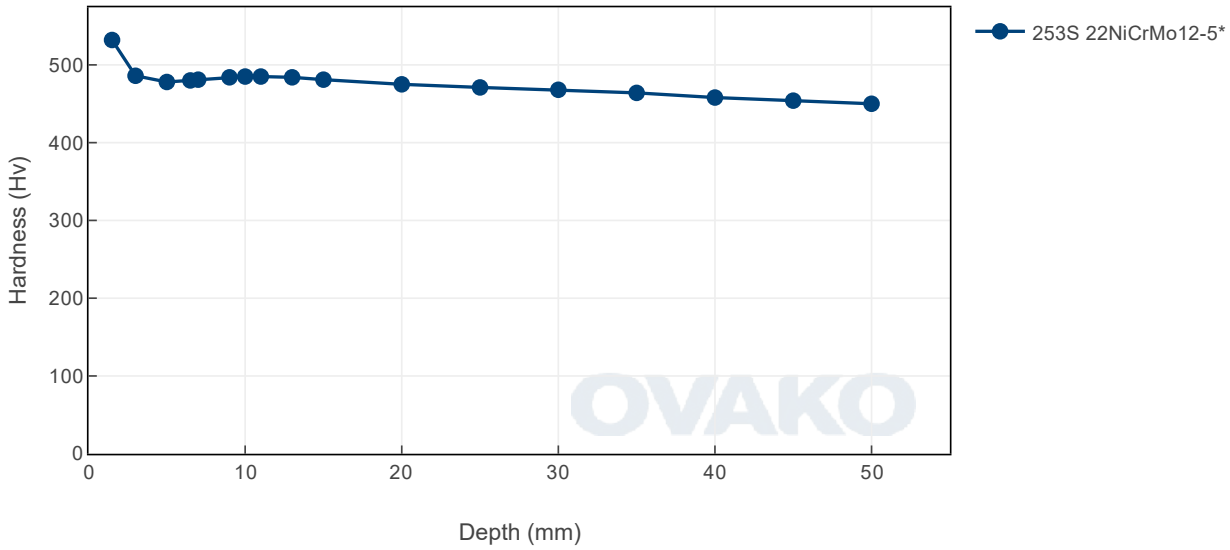
Heat Treatment Guide generated Graphs

The following graphs are generated from a theoretical model. For further info see the Heat treatment guide module. Select a specific grade version for individual display.

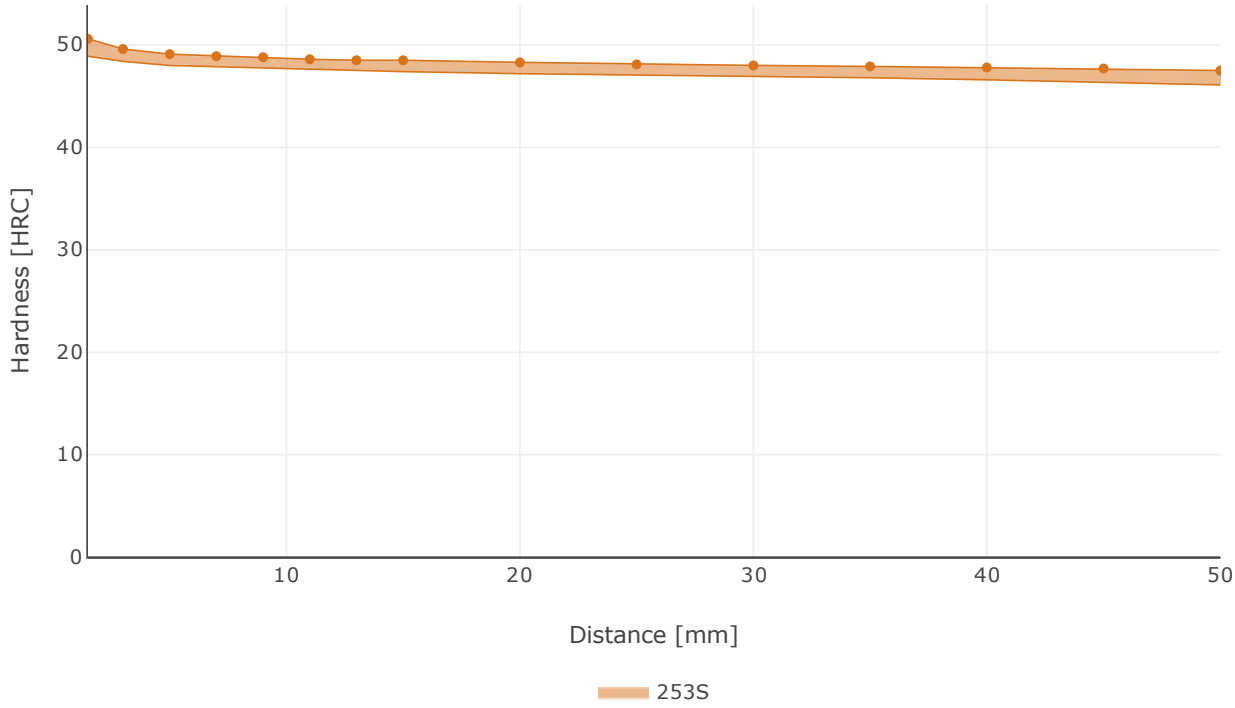




Jominy


Hardness (Hv)
500
400
300
200
100
0
0
10
20
30
40
50
Depth (mm)
253S 22NiCrMo12-5*

Hardenability



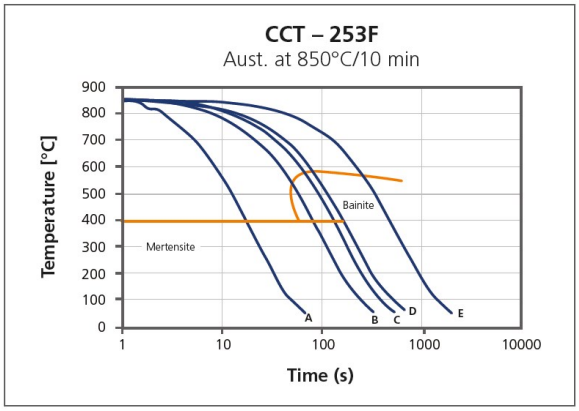
Jominy hardenability of Ovako 253. Average value with +/-standard deviation.

Steel cleanliness

Applied standard	ASTM E45							
Sampling	ASTM A295							
Maximum average limits	A		BMicro inclusions		C		D	
	Th	He	Th	He	Th	He	Th	He
	2,5	1,5	1,0	0,5	0	0	0,5	0,5

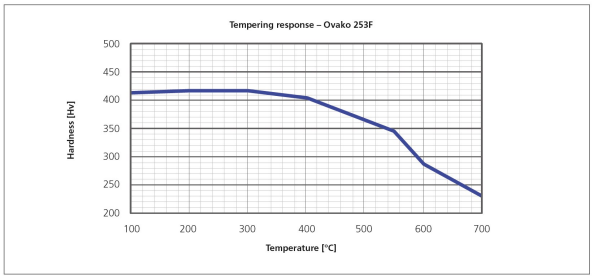
Macro inclusions	
Applied standard	ISO 3763 (Blue fracture)
Sampling	Statistical testing on billets
Limits	< 5 mm/dm^2

CCT



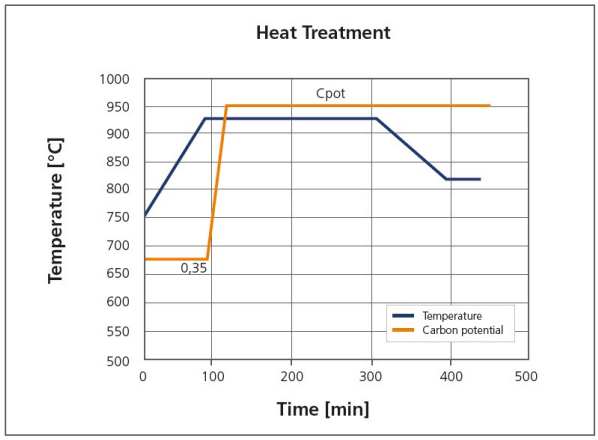
	A	B	C	D	E
t_{8-5} [s]	10	50	80	100	300
Hv_{30}	420	420	345	334	293

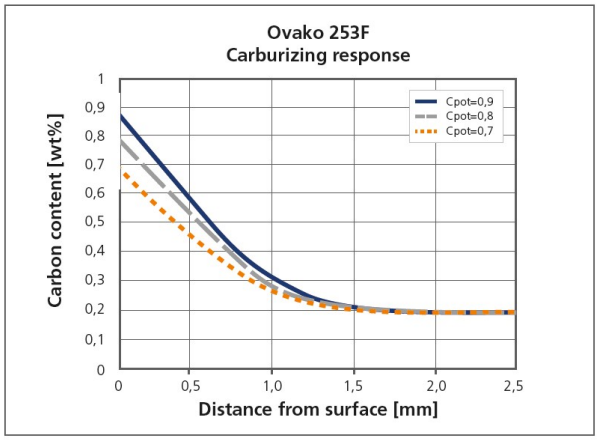
Tempering response - 253



Tempering response for Ovako 253F. Austenitised at 870°C for 30 min and oil quenched. Tempered one hour at each test temperature.

Case carburizing response - 253





Carburization response for Ovako 253F for the cycles shown.

SUSTAINABILITY-ENVIRONMENTAL IMPACT DATA

At Ovako sustainability and reduction of our environmental impact is a major focus in everything we do.
Further information is found here.

Steel works	Hofors	Smedjebacken	Imatra
CO2e/kg	120	62	76

To get the full picture of our products environmental impact we have to look at all of our CO_2 emission sources.
Not only the steel work Scope 1-2 itself, but all operations downstream in our production, heating and heat treatment furnaces etc (full scope 1-2) as well as all the emission from input material, eg. alloys, scope 3.

Steel Grade	Format	Condition	Scope 1-3 (CO2e kg /1000 kg steel)	Climate compensated Net emission = Scope 3 (CO2e kg /1000 kg steel) Scope 1 - 2 = 0 (compensated)
253	Round bar	+AR	1112	713
253	Round bar	+A	1119	718
253	Tube,wall	+AR	1178	781
253	Tube,wall	+A	1181	783
4722	Round bar	+A	962	663

All above data are to be seen as typical values for the specified format and condition. Detailed information about your specific product please contact your sales contact.

Other properties (typical values)

Youngs module (GPa)	Poisson´s ratio (-)	Shear module (GPa)	Density (kg/m3)
210	0.3	80	7800
Average CTE 20-300°C (µm/m°K)	**Specific heat capacity 50/100°C (J/kg °K)**	**Thermal conductivity Ambient temperature (W/m°K)**	**Electrical resistivityAmbient temperature (µΩm)**
12	460 - 480	40 - 45	0.20 - 0.25

Contact us

Would you like to know more about our offers? Don´t hesitate to contact us:

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Via telephone: +46 8 622 1300

For more detailed information please visit http://www.ovako.com/en/Contact-Ovako/