MATERIAL DATA SHEET

STEEL GRADE

Last revised: Wed, 04 Dec 2024 16:05:58 GMT

OVAKO

20MnCrMo4-2 All

General Information

General information

Ovako 123A is a Mn, Cr and Mo alloyed carburizing steel. The grade is comparable with 20MnCrMo4-2 but with slightly increased sulphur range for improved machinability. It is produced with tighter compositional ranges compare to the ISO standard in order to ensure a reproducible heat treatment behaviour.

Chemical composition

Variant	Cast	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %
123A	IC	CEV 0.66_{max}	Min	0.19	0.05	0.80	-	0.015	0.45	-	0.08
		Pcm 0.37_{max}	Max	0.23	0.18	1.10	0.020	0.025	0.70	0.30	0.25

Transformation temperatures

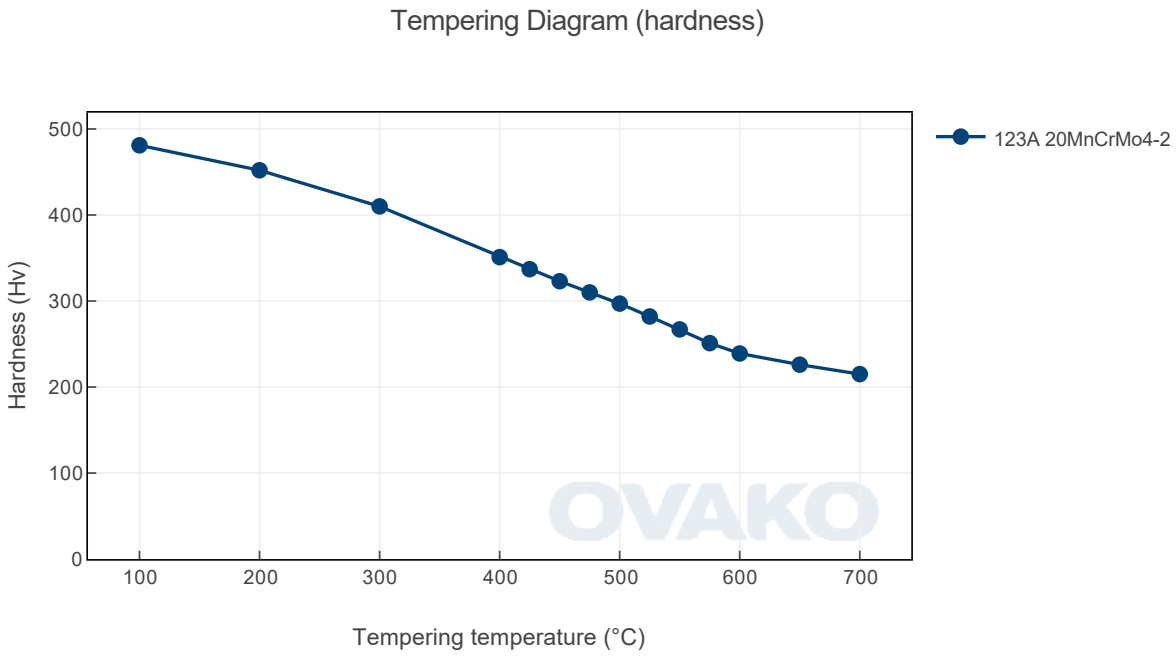
	Temperature °C
AC1	726
AC3	810

Heat treatment recommendations

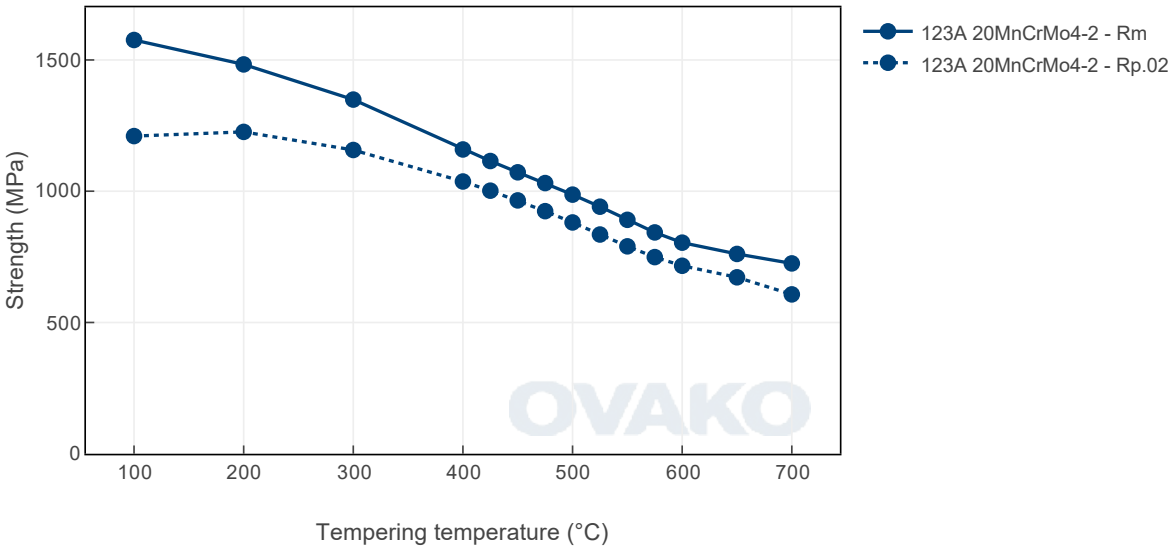
Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+AR	800-1200°C	In air
Normalizing	+N	860-890°C	In air
Annealing	+SA	600-670°C / 2h	In air
Carburizing	+C	850-930°C Carbon potential see diagram	
Hardening	+Q	840-890°C	In oil
Hardening	+Q	780-830°C Hardening of as-carburized component	In oil

Heat Treatment Guide generated Graphs

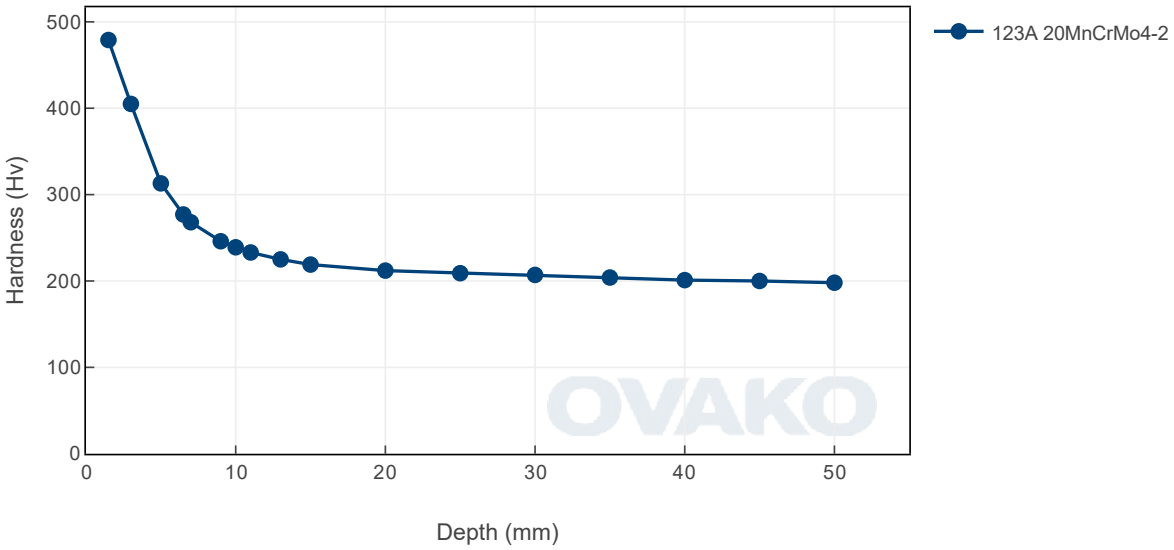
The following graphs are generated from a theoretical model. For further info see the Heat treatment guide module. Select a specific grade version for individual display.



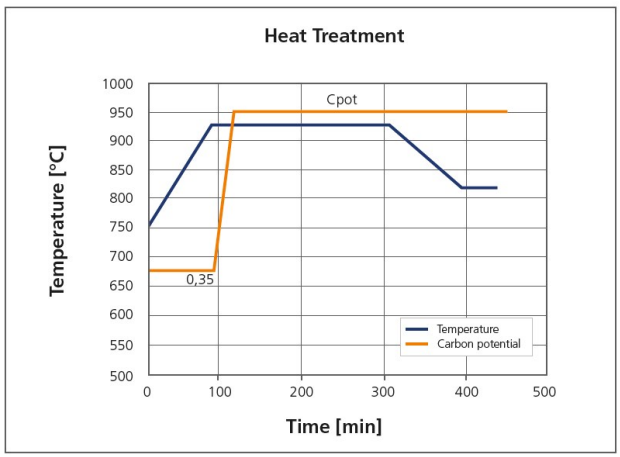
Tempering Diagram (strength)

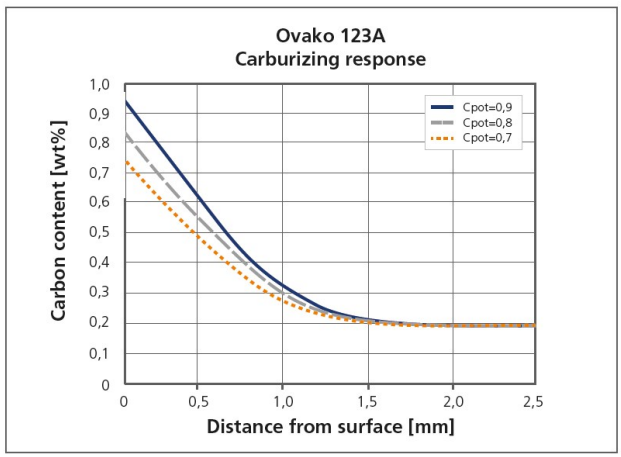


Jominy


Hardness (Hv)
500
400
300
200
100
0
0
10
20
30
40
50
Depth (mm)
123A 20MnCrMo4-2

Carburizing response - Ovako 123A





Carburization response for Ovako 123A for the cycles shown in the left figure.

Steel cleanliness

Micro inclusions - steel grade 123A										Macro inclusions - 123A	
Applied standard	ASTM E45									Applied standard	ISO 3763 (Blue fracture)
Sampling	ASTM A295									Sampling	Statistical testing on billets.
Maximum average limits	A		B		C		D			Limits	< 2,5 mm/dm^2
	Th	He	Th	He	Th	He	Th	He			
	2.5	1.5	2.0	1.0	0.5	0.5	1.0	1.0			

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)
123A	Round bar	+AR	602	203
123A	Round bar	+FP	606	205
123A	Tube,wall	+AR	623	226
123A	Tube,wall	+FP	626	228

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