

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

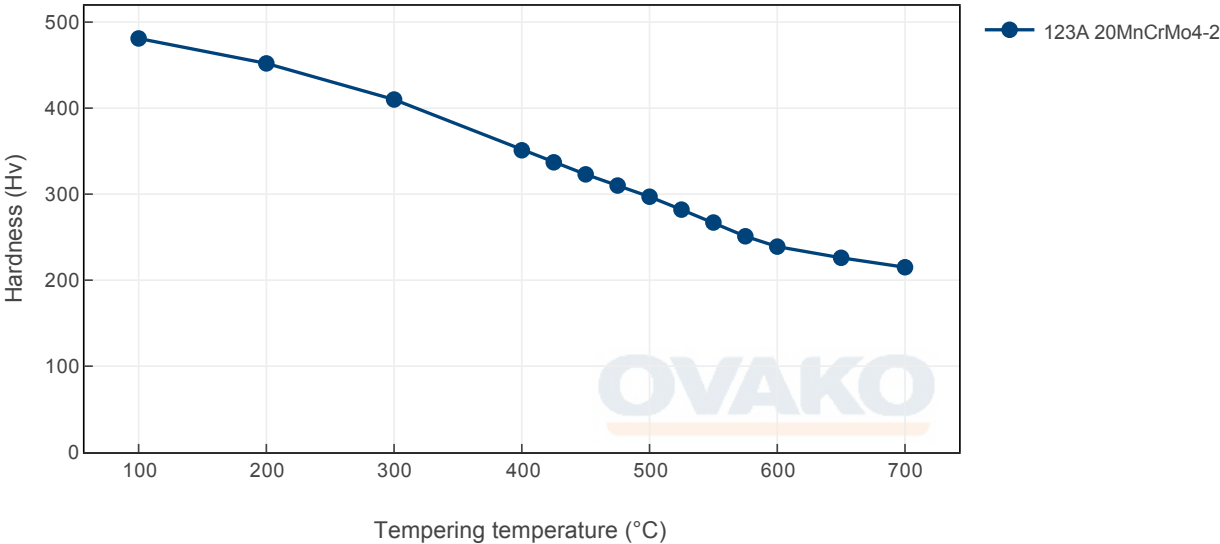
Heat treatment recommendations

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

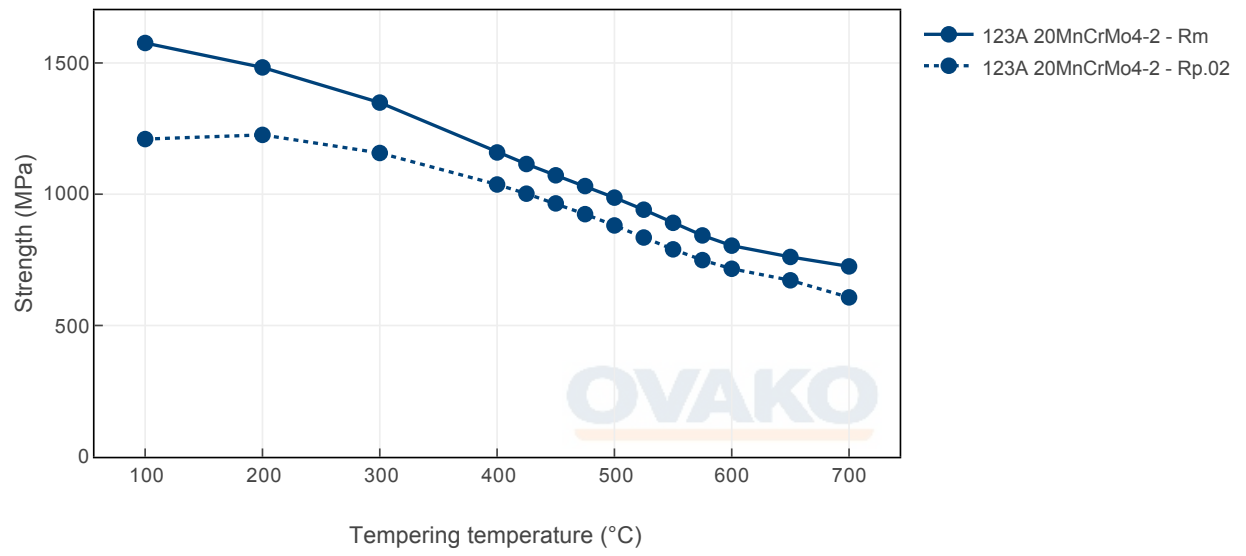
Heat Treatment Guide generated Graphs

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.

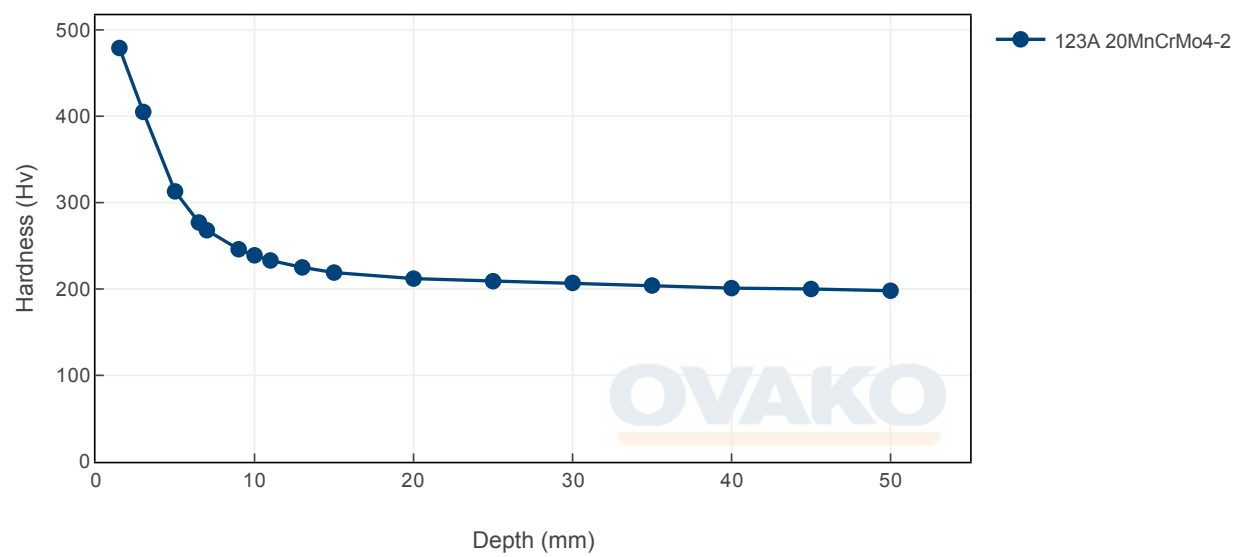
Tempering Diagram (hardness)



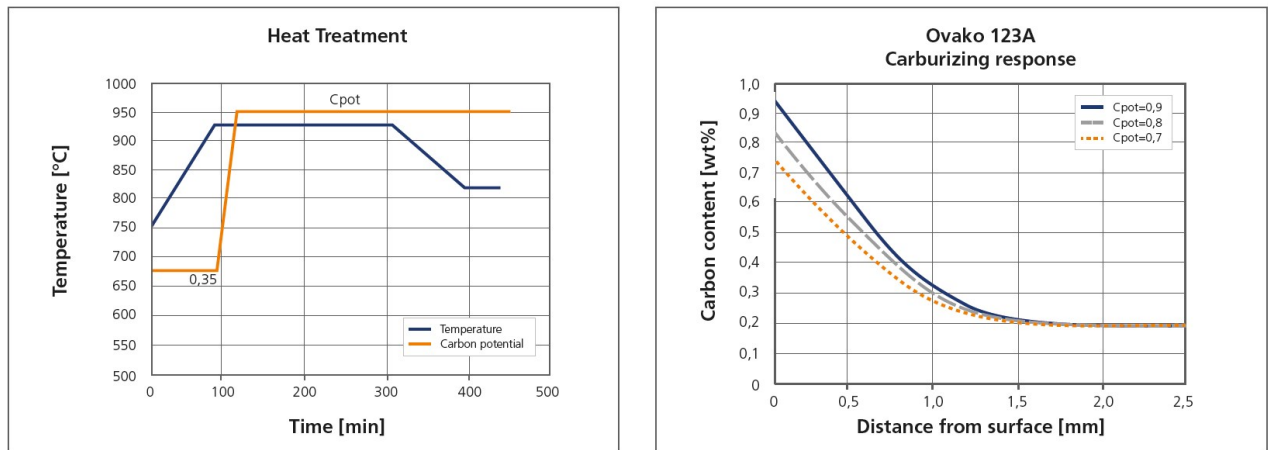
Tempering Diagram (strength)



Jominy



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		
	2.5	1.5	2.0	1.0	0.5	0.5	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](#).

In many international comparisons the crude steel Scope 1-2 emission is a key parameter, ie. the CO₂ emission from the steel works itself.

As of 1 January 2022 we carbon offset all our scope 1 and 2 volume shown below.

Steel works	Hofors	Smedjebacken	Imatra
CO ₂ e/kg	120	62	76

To get the full picture of our products environmental impact we have to look at all of our CO₂ 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 (CO ₂ e kg /1000 kg steel)	Climate compensated Net emission = Scope 3 (CO ₂ e kg /1000 kg steel) Scope 1 - 2 = 0 (compensated)
123A	Round bar	+AR	620	224
123A	Round bar	+SA	626	225
123A	Tube, wall	+AR	637	235
123A	Tube, wall	+SA	640	235

To get the full picture of our products environmental impact we have to look at all of our CO₂ 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.

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 resistivity Ambient 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:

Via e-mail: info@ovako.com

Via telephone: +46 8 622 1300

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

Disclaimer

The information in this document is for illustrative purposes only. The data and examples are only general recommendations and not a warranty or a guarantee. The suitability of a product for a specific application can be confirmed only by Ovako once given the actual conditions. The purchaser of an Ovako product has the responsibility to ascertain and control the applicability of the products before using them. Continuous development may necessitate changes in technical data without notice. This document is only valid for Ovako material. Other material, covering the same international specifications, does not necessarily comply with the properties presented in this document.