

## 20NiCrMoS2-2 All

### General Information

Alloyed case hardening steel for very high strained parts and good toughness at core tensile strength of 700 - 900 MPa. Driving bevel gears, crown wheels, gears, shafts, bolts for automotive and gear components. Suitable for direct hardening.

### M-Steel®

The basis for the concept is that non-metallic inclusions are modified and controlled with calcium treatment in a way to minimize tool wear and to maximize chip control in machining operations. Our M-Steel treatment can be applied to any steel grade.

### Similar designations

20NiCrMo2-2, MoCN206 M, SAE 8620, BS 805H22, 20NCD2, SS2506

### Chemical composition

Variant	Cast	DI	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %
4532	CC	2.3	CEV 0.55 <sub>max</sub>	Min	0.17	0.10	0.60	0.000	0.000	0.35	0.35	0.15
			Pcm 0.32 <sub>max</sub>	Max	0.23	0.25	0.95	0.025	0.025	0.70	0.75	0.25
4542	CC	2.4	CEV 0.581 <sub>max</sub>	Min	0.17	0.15	0.60	0.000	0.025	0.35	0.35	0.15
			Pcm 0.36 <sub>max</sub>	Max	0.23	0.35	0.95	0.035	0.035	0.70	0.75	0.25
4548, MoCN 206 M	CC		CEV 0.581 <sub>max</sub>	Min	0.17	-	0.65	0.000	0.025	0.35	0.40	0.15
			Pcm 0.36 <sub>max</sub>	Max	0.23	0.40	0.95	0.025	0.035	0.70	0.70	0.25

## Mechanical Properties

Variant	Condition <sup>i</sup>	Format	Dimension [mm]	Hardness
4532	+AR	Round bar	25 < 160	< 215 HB
	+U	Round bar	< 160	< 230 HB
	+A	Round bar	< 160	< 212 HB
	+QT	Round bar	16 < 40	> 245 HB
4542	+A	Round bar	< 160	< 212 HB
	+U	Round bar	< 160	< 230 HB
	+QT	Round bar	16 < 40	> 245 HB
4548, MoCN 206 M	+A	Round bar	< 160	< 212 HB
	+U	Round bar	< 160	< 230 HB

$RP_{0.2}$  \*  $R_{eh}$ , \*\*  $R_{el}$

## Transformation temperatures

	Temperature °C
MS	400
AC1	723
AC3	827

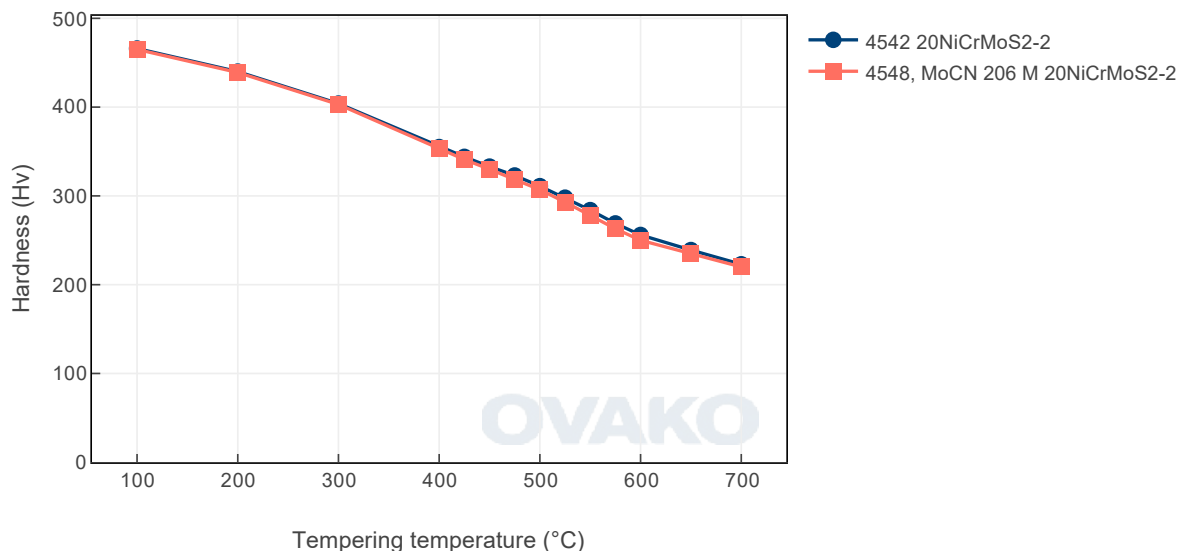
## Heat treatment recommendations

Treatment	Condition <sup>i</sup>	Temperature cycle	Cooling/quenching
Hot forging	+U	800-1200°C	In air
Normalizing	+N	860-890	In Air
Soft annealing	+SA	600-670 °C 2h	In Air
Carburizing	+C	850-900°C	

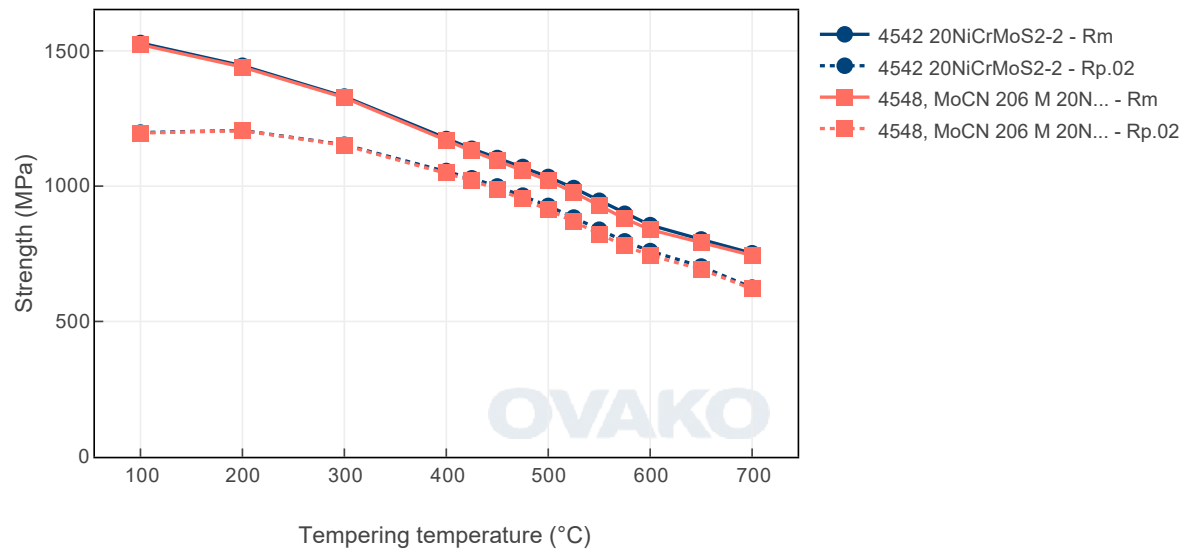
## Heat Treatment Guide generated Graphs

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.

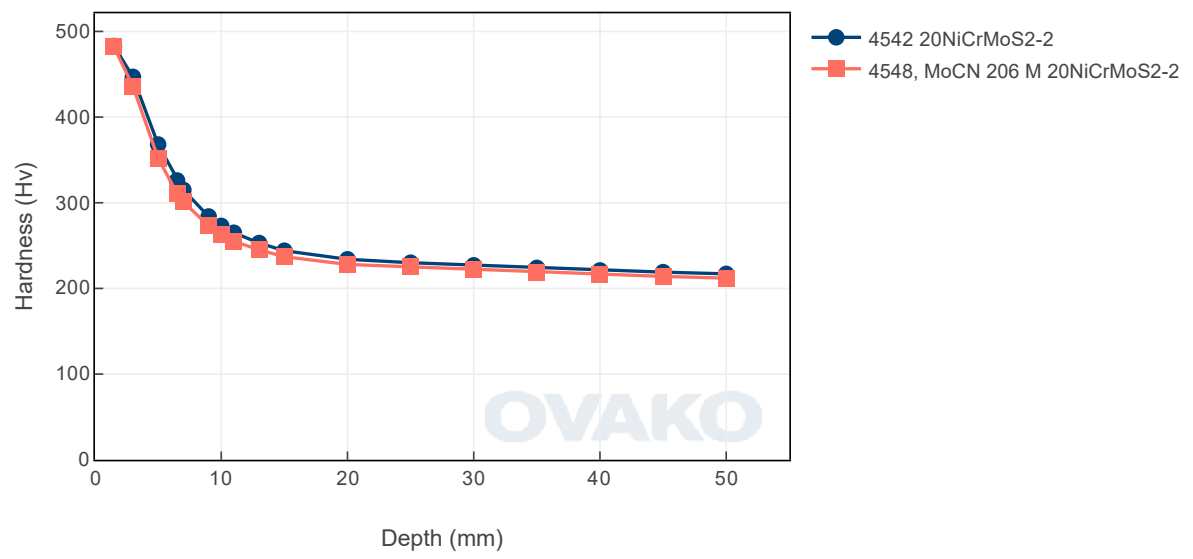
Tempering Diagram (hardness)



Tempering Diagram (strength)



# Jominy





## Other properties (typical values)

Youngs module (GPa)	Poisson´s ratio (-)	Shear module (GPa)	Density (kg/m <sup>3</sup> )
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](mailto: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.*