

24CrMo13-6

All

General Information

Ovako 420G is a through hardening alloy steel with god wear resistance in the as-rolled condition. It is also a good nitriding steel for enhanced wear resistance. Mainly used for drill rods.

- Good toughness
- Good dimensional stability
- Through hardenability corresponding to approximately 130 mm
- Delivered as rolled, soft annealed or QT

Similar designations

BS 722 M 24

Chemical composition

Variant	Cast	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	V %
420G	IC	CEV 1.21 <sub>max</sub>	Min	0.23	0.20	0.50	-	0.010	3.00	-	0.45	-
		Pcm 0.53 <sub>max</sub>	Max	0.25	0.35	0.60	0.020	0.025	3.50	0.03	0.60	0.050
EN ISO 683-5	Std	CEV <sub>max</sub>	Min	0.20	-	0.40	-	-	3.00	-	0.50	-
		Pcm <sub>max</sub>	Max	0.27	0.40	0.70	0.025	0.035	3.50	-	0.70	-

Mechanical Properties

Variant	Condition	Format	Dimension [mm]	Yield strength min [MPa]	Tensile strength [MPa]	Elongation A <sub>5</sub> [%]	Reduction of area Z <sub>min</sub> [%]	Hardness	Impact (ISO-V) strength <sub>min</sub>
420G	+A	All formats	25 < 130	-	-	-	-	230 HB typical	-
	+N	All formats	25 < 130	800*	1300 typical	13	54	370 HB typical	20 °C 62 J (long)
	+QT	All formats	25 < 130	1130*	1570 typical	11	50	430 HB typical	20 °C 55 J (long)

*RP<sub>0.2</sub> \* R<sub>eh</sub>, \*\* R<sub>el</sub>*

Transformation temperatures

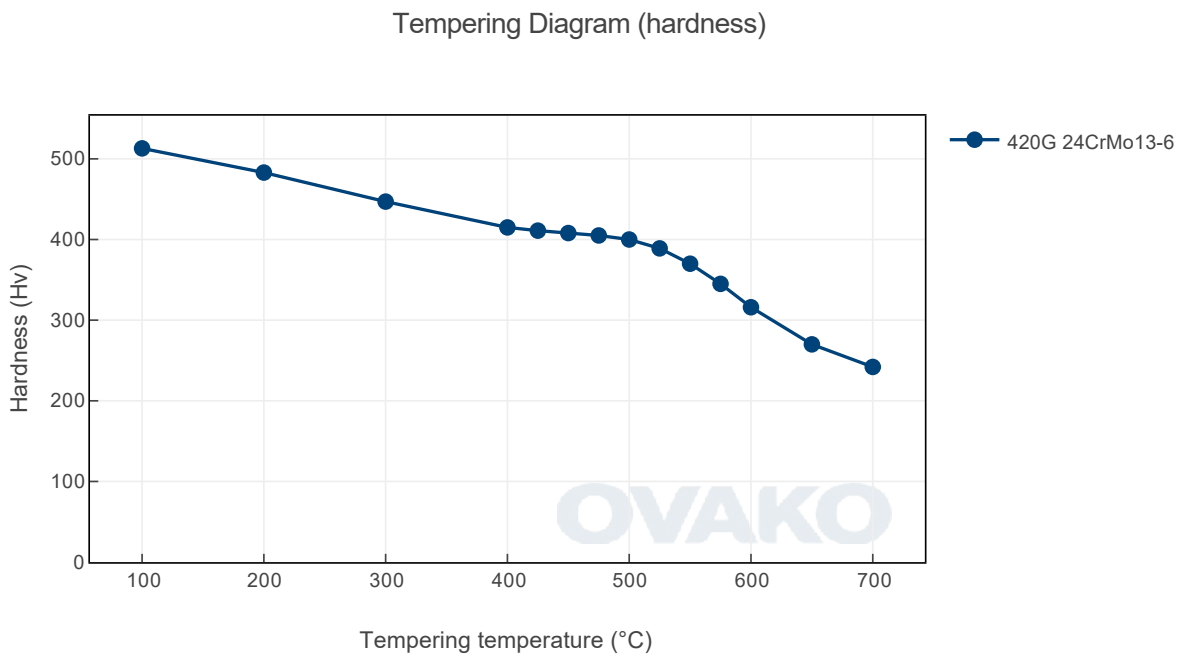
	Temperature °C
AC1	776
AC3	859

Heat treatment recommendations

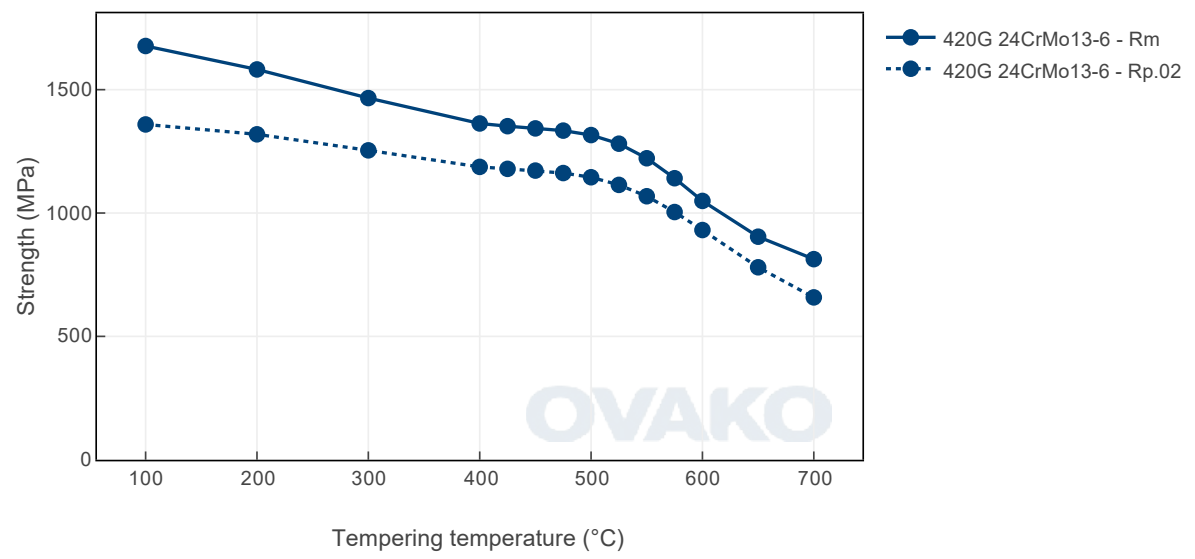
Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+AR	840-1040°C	In air
Normalizing	+N	930-960°C	In air
Quench & Tempering	+QT	840-880°C	In oil or in air
Tempering	+T	160-250°C	In air

Heat Treatment Guide generated Graphs

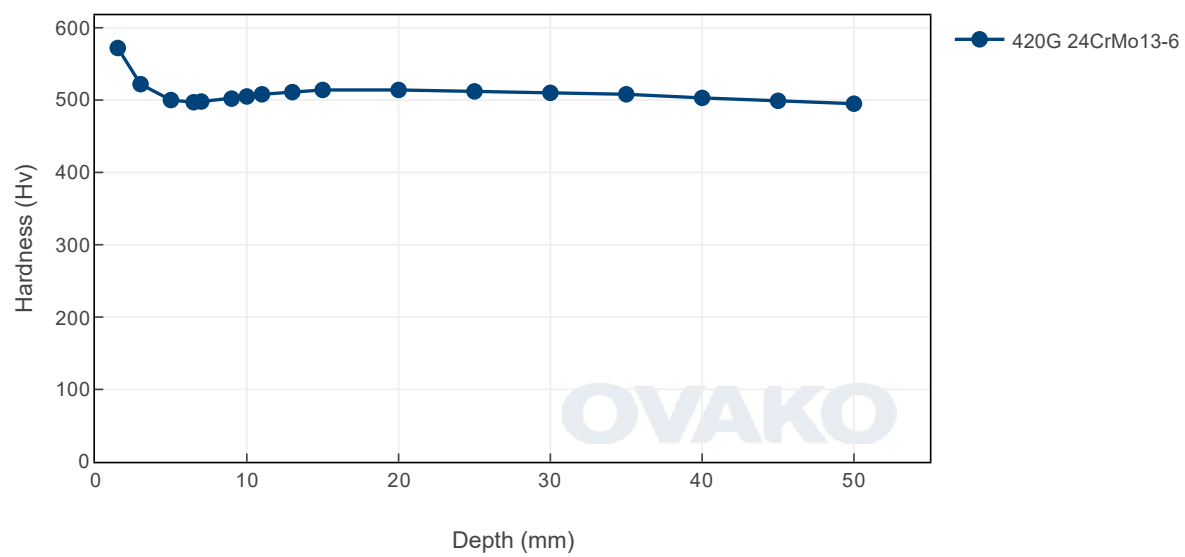
The following graphs are generated from a theoretical model. For further info see the Heat treatment guide module. Select a specific grade version for individual display.



Tempering Diagram (strength)

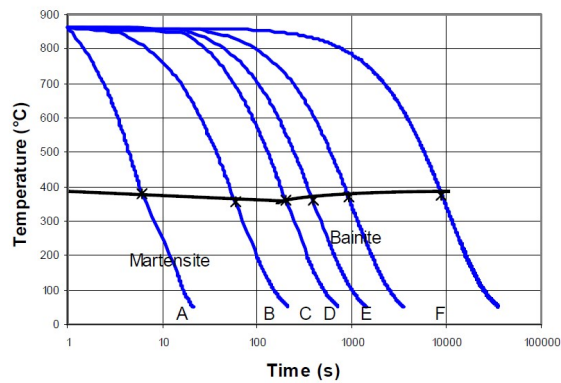


# Jominy



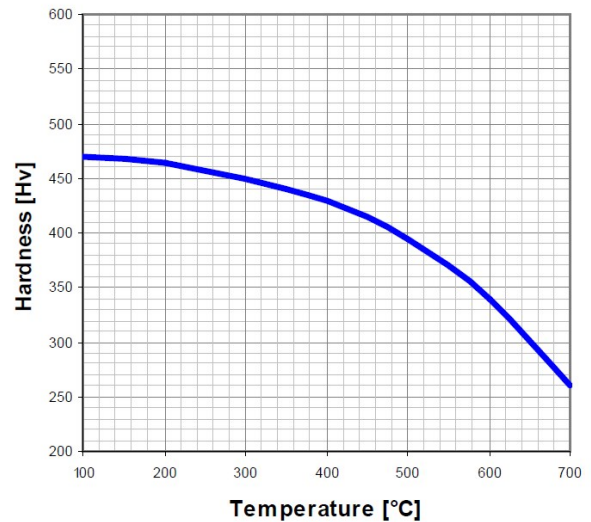


## CCT - steel grade Ovako 420G



	A	B	C	D	E	F
t <sub>8-5</sub> [s]	3	30	100	200	500	5000
Hv <sub>30</sub>	494	470	467	465	452	354

## Tempering response - Ovako 420G



Austenitized at 870°C and oil quenched. Tempered for 1h.

## Steel cleanliness

Micro inclusions - steelgrade 420G								Macro inclusions - 420G	
Applied standard	ASTM E45							Applied standard	ISO 3763 (Blue fracture)
Sampling	ASTM A295							Sampling	Statistical testing on billets
Maximum average	A		B		C		D	Limits	< 5 mm/dm <sup>2</sup>
limits	Th	He	Th	He	Th	He	Th		
	2.5	1.5	1.0	0.5	0	0	0.5		

## 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
CO <sub>2</sub> e/kg	120	62	76

To get the full picture of our products environmental impact we have to look at all of our CO<sub>2</sub> 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 <sub>2</sub> e kg /1000 kg steel)	Climate compensated Net emission = Scope 3 (CO <sub>2</sub> e kg /1000 kg steel) Scope 1 - 2 = 0 (compensated)
420G	Round bar	+AR	690	291
420G	Round bar	+A	694	293
420G	Tube,wall	+AR	719	321
420G	Tube,wall	+A	722	324

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 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:

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Via telephone: +46 8 622 1300

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

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