MATERIAL DATA SHEET

STEEL GRADE

Last revised: Tue, 28 Jan 2025 16:26:36 GMT

OVAKO

30MoCrV20-7* All

General Information

Ovako 499Q is a tool steel suitable for carburizing or used in quenched and tempered condition. The alloying strategy gives a high tempering resistance which make the steel suitable for using in elevated temperature applications. Ovako 499Q is produced through the Ovako IQ-process (isotropic quality) to a cleanliness comparable to VAR-remelted quality. Carburizing requires certain precautions due to the high alloying content. A low carbon po-tential should be used and pre-oxidation is recommended to enhance carbon diffusion. The strong carbide formers will give an excellent microstructural stability and excellent wear properties.

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

IQ-Steel®

IQ-Steel® is an isotropic quality ultra clean steel optimized for high fatigue strength under multi axial loading.

Chemical composition

Variant	Cast	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	V %
499Q	IC	CEV 1.39_{max}	Min	0.28	0.15	0.30	-	-	1.60	-	1.80	0.400
		Pcm 0.68_{max}	Max	0.32	0.25	0.50	0.025	0.001	1.80	0.20	2.20	0.600

Mechanical Properties

Variant	Condition	Format	Dimension [mm]	Hardness
499Q	+QT	Round bar	25 < 80	400 HB typical

*$Rp_{0.2}$ * R_{eh}, ** R_{el}*

Transformation temperatures

	Temperature °C
AC1	752
AC3	923

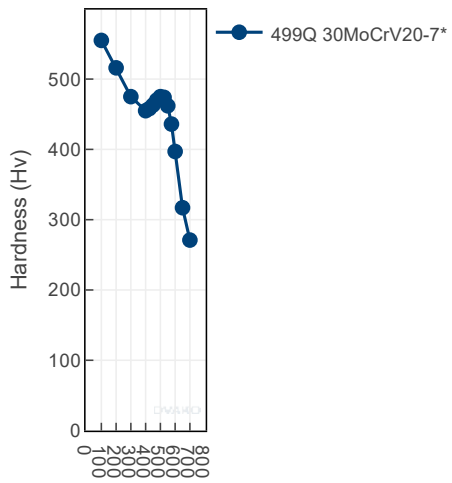
Heat treatment recommendations

Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+AR	1000-1250°C	In air
Normalizing	+N	950-1100°C	In air
Soft annealing	+A	850-600°C / 25h	In air
Isothermal annealing	+IA	770-810°C See graph	In air
Carburizing	+C	850-950°C Carbon potential see graph	
Hardening	+QT	950-1050°C	Forced air / Hot oil
Hardening	+QT	950-1050°C Hardening of as-carburized component	Forced air / Hot oil
Tempering	+QT	160-600°C Tempering response see graph	In air

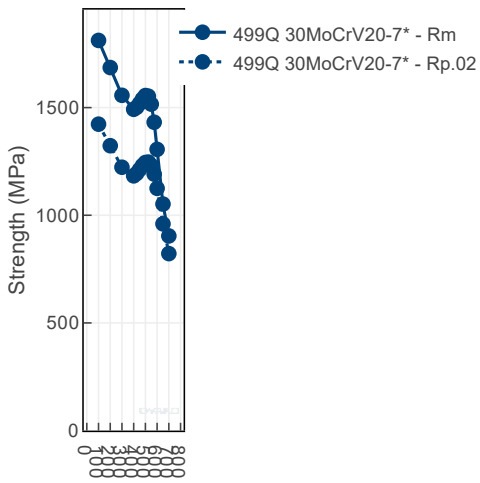
Heat Treatment Guide generated Graphs

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.

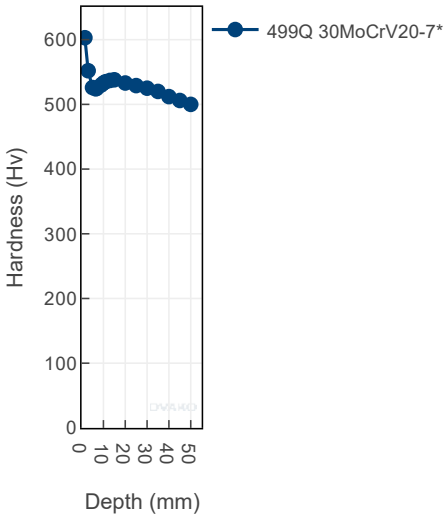
Tempering Diagram (hardness)



Tempering Diagram (strength)



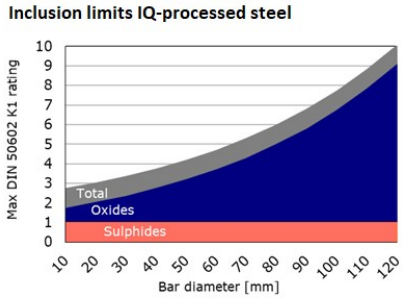
Jominy


499Q 30MoCrV20-7*
Hardness (Hv)
600
500
400
300
200
100
0
0
10
20
30
40
50
Depth (mm)

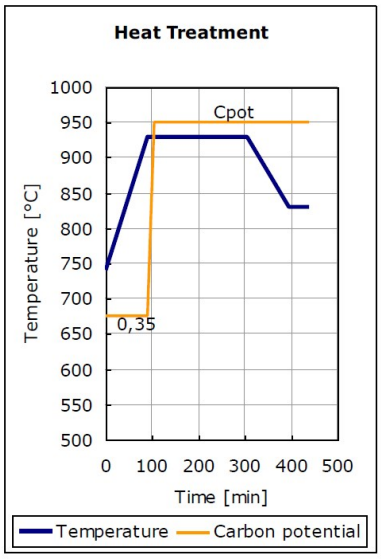
Steel cleanliness

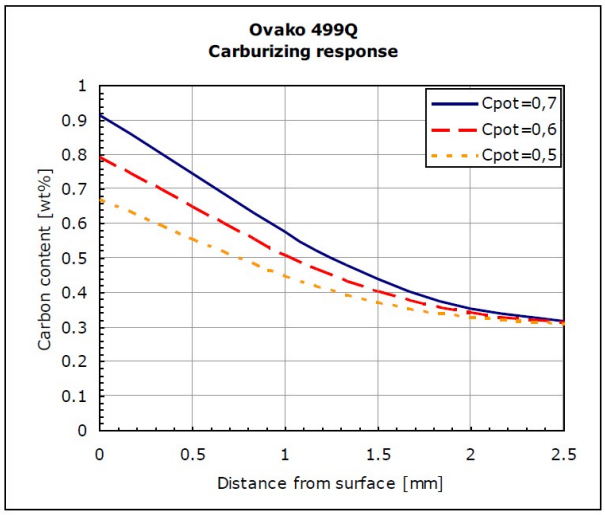
Micro inclusions - IQ			Macro inclusions - IQ	
Applied standard	DIN 50602 K1		Applied standard	10 M Hz UST (Ovako internal standard)
Sampling	Six random samples from final product dimension		Sampling	Statistical testing on billets
Limits	The limit is dimension dependent. The average rating of six samples should not exceed the limits given in the graph		Limits	< 10 defects/dm3 > 0,2 mm FBH

IQ



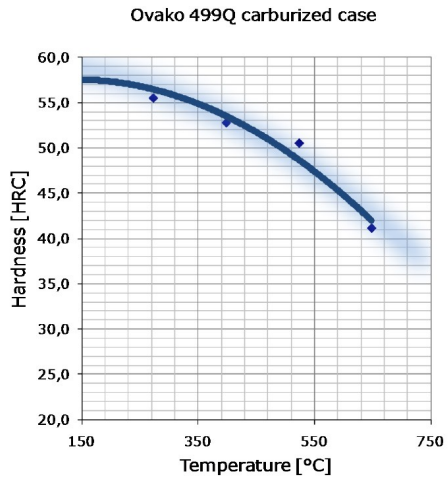
Carburizing response





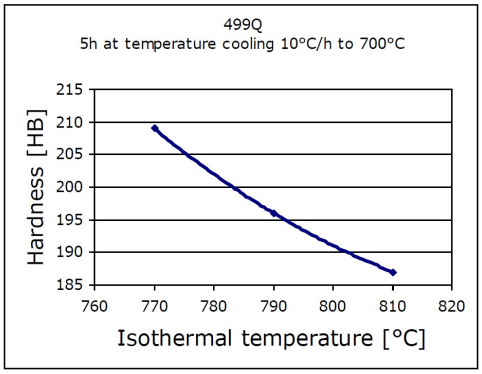
Carburization response for Ovako 499Q for the cycles shown

Case tempering response



Tempering response of carburized Ovako 499Q. i.e. Surface hardness. Note that the aimed surface hardness was 58 HRC.

Isothermal annealing



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)
499Q	Round bar	+AR	768	369
499Q	Round bar	+SA	775	374

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/