

# 42NiSiCrMo8-7-3\* All

## General Information

Ovako 497Q is an ingot cast high tensile quench and tempering steel with very high strength and toughness. Ovako 497Q is an excellent choice for shafts and machine components. The high silicon content will give an improved tempering resistance. The grade is produced with the quality class IQ (isotropic quality). This ensures a very low number of elongated sulphide inclusions which will give more isotropic properties. The high oxidic cleanliness will enable the steel to meet the same high demands as for re-melted qualities. The carbon range will give a high surface hardness after surface induction hardening.

*\* 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.

## Similar designations

UNS K 44220, AMS 6417, AMS 6419, ASTM/SAE 300M

## Chemical composition

Variant	Cast	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	V %
497Q	IC	CEV 1.03 <sub>max</sub>	Min	0.39	1.50	0.60	-	-	0.70	1.65	0.30	0.060
		Pcm 0.68 <sub>max</sub>	Max	0.44	1.80	0.90	0.015	0.001	0.95	2.00	0.45	0.100

## Mechanical Properties

Variant	Condition <sup>⑤</sup>	Format	Yield strength min [MPa]	Tensile strength [MPa]	Elongation A <sub>5</sub> [%]	Hardness
497Q	+SA	All formats	-	-	-	220 HB typical
	+QT	All formats	1550	2100 typical	8	53 HRC typical

*R<sub>p0.2</sub> \* R<sub>ehv</sub> \*\* R<sub>el</sub>*

## Transformation temperatures

	Temperature °C
MS	304
AC1	744
AC3	835

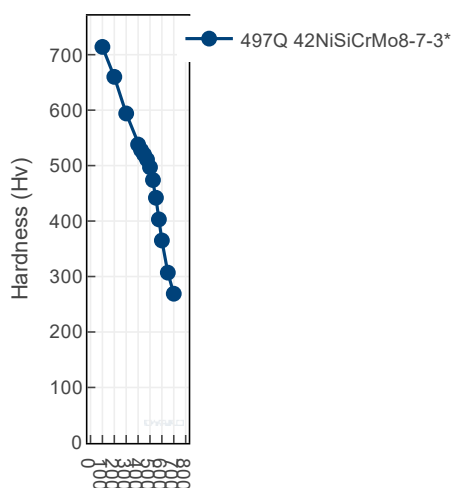
## Heat treatment recommendations

Treatment	Condition <sup>⑤</sup>	Temperature cycle	Cooling/quenching
Soft annealing	+SA	RT-820°C 1h, 820°C 2h, 820-740°C 1h, 740-690°C 14h	In air
Hot forging	+AR	900-1200°C	In air
Quenching	+QT	Austenitization 860-880°C 1h	In oil
Tempering	+QT	200-650°C Double tempering is recommended, see tempering diagram	In air

## Heat Treatment Guide generated Graphs

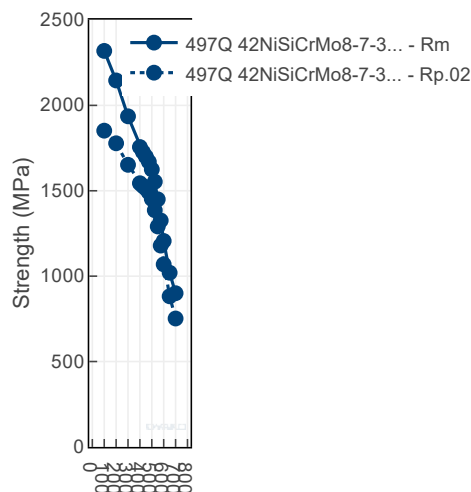
The following graphs are generated from a theoretical model. For further info see the Heat treatment guide module. Select a specific grade version for individual display.

Tempering Diagram (hardness)



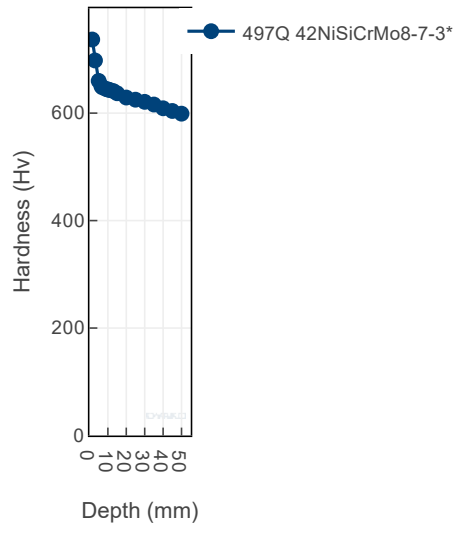
Tempering temperature (°C)

Tempering Diagram (strength)



Tempering temperature (°C)

# Jominy



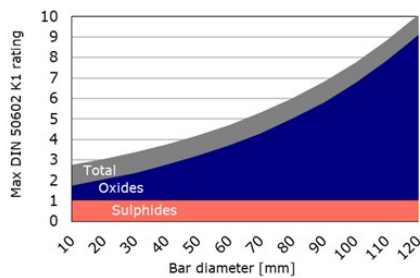


## Steel cleanliness

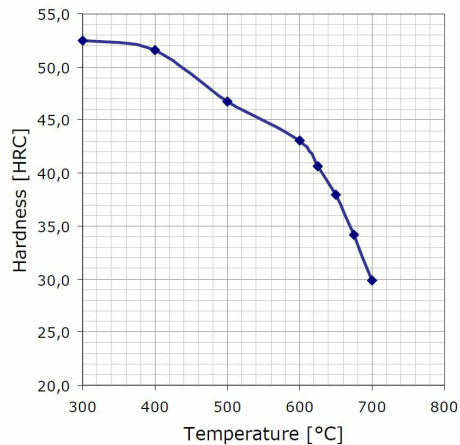
Micro inclusions - IQ		Macro inclusions - IQ	
Applied standard	DIN 50602 K1	Applied standard	10 M Hz UST (Ovako internal standard)
Sampling	Six random samples from final product dimension	Sampling	Statistical testing on billets
Limits	The limit is dimension dependent. The average rating of six samples should not exceed the limits given in the graph	Limits	< 5 defects/dm <sup>3</sup> > 0,2 mm FBH

### IQ

Inclusion limits IQ-processed steel

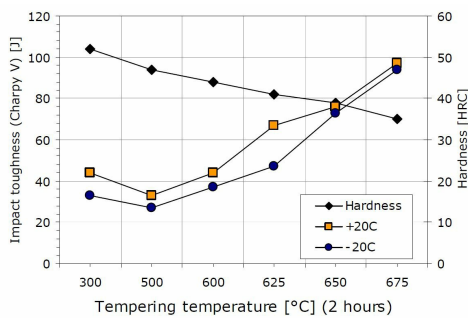


### Tempering response - Ovako 497



Tempering response 2h tempering. Hardening 870°C 45min +

### Impact toughness - Ovako 497



Charpy-V impact toughness. Hardening 870°C 45min + oil quench and 2h tempering.

## 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 CO<sub>2</sub> 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 <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 <sup>①</sup>	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)
497Q	Round bar	+AR	908	515
497Q	Round bar	+SA	914	517
497Q	Tube,wall	+AR	961	561
497Q	Tube,wall	+SA	963	561

As of 1 January 2022 we use carbon offset for all our scope 1- 2 emissions, so in practice the climate compensated data is the same as the full Scope 3 level. 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/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

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