

STEEL GRADE

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20NiCrMo7 All

General Information

Ovako 157 is a high cleanliness case hardening steel used for bearing and transmission components. There are three different modifications of the grade.

157C - Bearing quality (BQ) variant with low sulphur content

157D - Bearing quality (BQ) variant with low sulphur content

157G - Regulated sulphur content for improved and consistent machinability

BQ-Steel®

BQ-Steel® is a bearing quality clean steel optimized for fatigue strength and is also ideal for new design solutions outside the bearing industry.

Similar designations

ASTM 4320, ASTM 4320H, ASTM 4320RH

Chemical composition

Variant	Cast	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	V %
157C	IC	CEV 0.65 _{max}	Min	0.17	0.20	0.55	-	0.002	0.50	1.65	0.23	-
		Pcm 0.36 _{max}	Max	0.22	0.30	0.65	0.015	0.005	0.60	2.00	0.28	0.014
157D	IC	CEV 0.67 _{max}	Min	0.17	0.20	0.55	-	0.002	0.50	1.65	0.23	-
		Pcm 0.37 _{max}	Max	0.22	0.30	0.65	0.015	0.005	0.60	2.00	0.28	0.100
157G	IC	CEV 0.7 _{max}	Min	0.20	0.20	0.70	-	0.010	0.55	1.70	0.25	-
		Pcm 0.38 _{max}	Max	0.22	0.35	0.80	0.020	0.020	0.65	1.80	0.30	0.100

Mechanical Properties

Variant	Condition ⓘ	Format	Dimension [mm]	Yield strength min [MPa]	Tensile strength [MPa]	Hardness
157C	+QT	Round bar	25 typical	1200	1300 typical	360 HB typical
157D	+QT	Round bar	25 typical	1200	1300 typical	360 HB typical

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

Transformation temperatures

	Temperature °C
MS	400
AC1	704
AC3	806

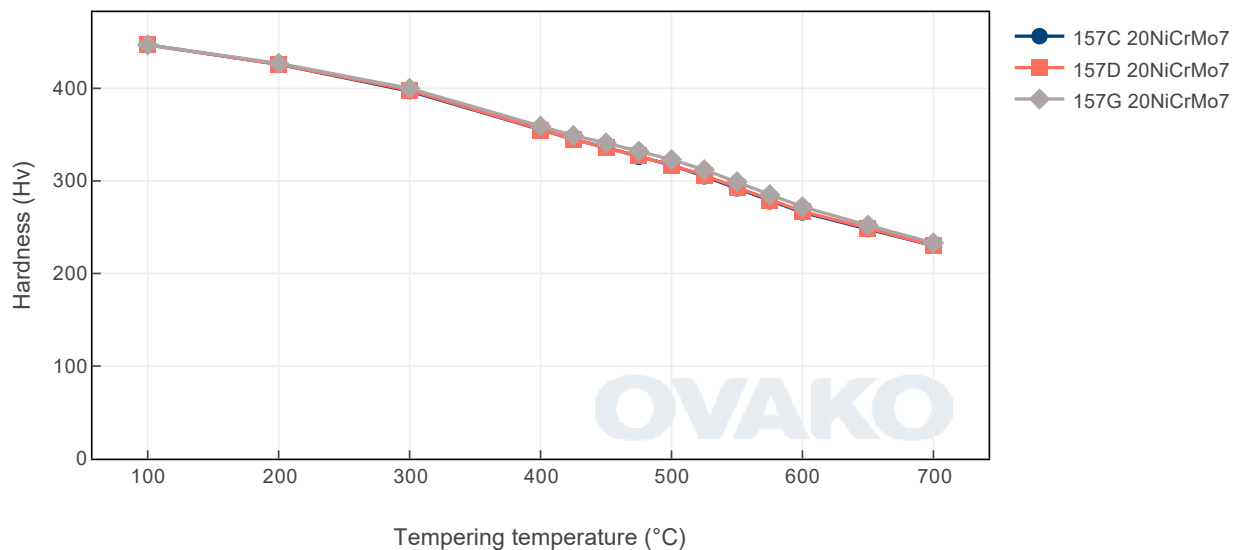
Heat treatment recommendations

Treatment	Condition ⓘ	Temperature cycle	Cooling/quenching
Hot forging	+U	800-1200C	In air
Normalizing	+N	860-890C	In air
Soft annealing	+A	600-670/2h	In air
Quench & Tempering	+QT	840-890C	In oil
Quench & Tempering	+QT	780-830C Hardening of as-carburized components	In oil
Tempering	+T	160-250C	In air

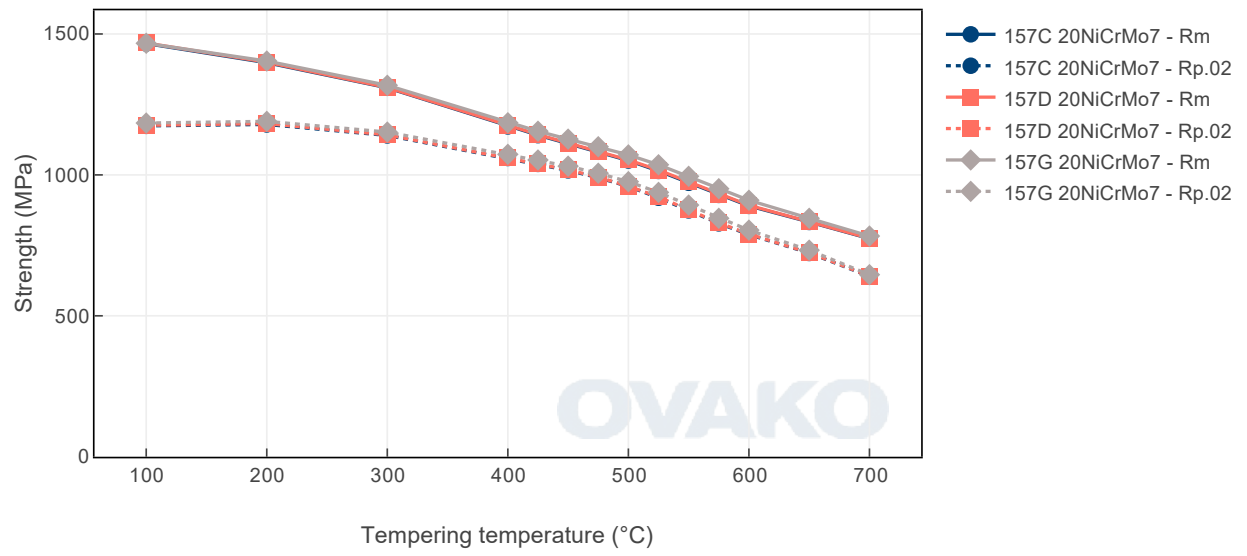
Heat Treatment Guide generated Graphs

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.

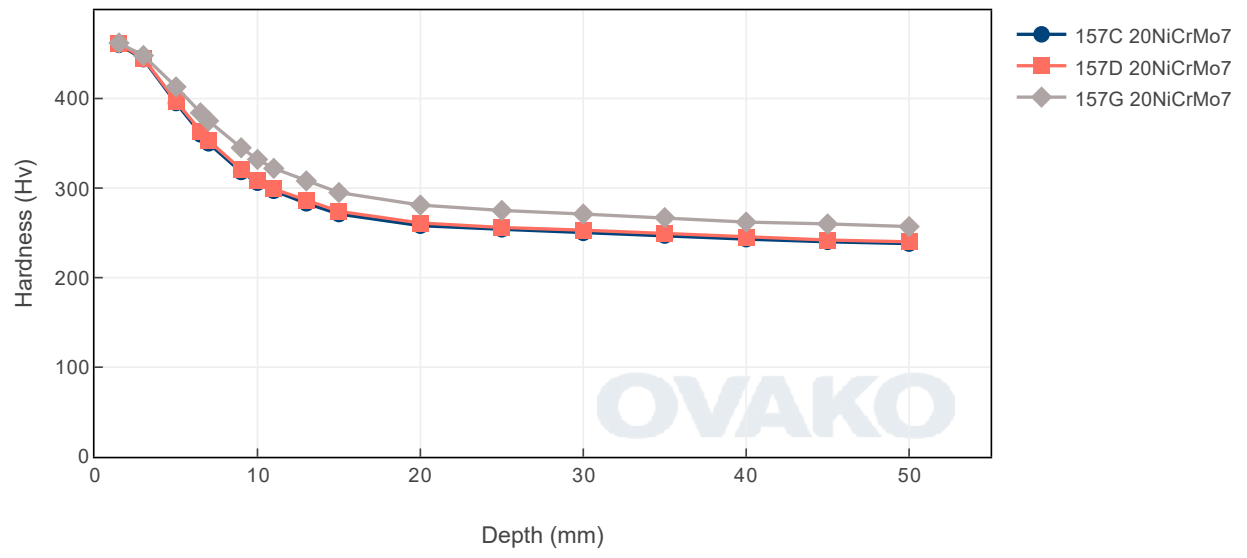
Tempering Diagram (hardness)



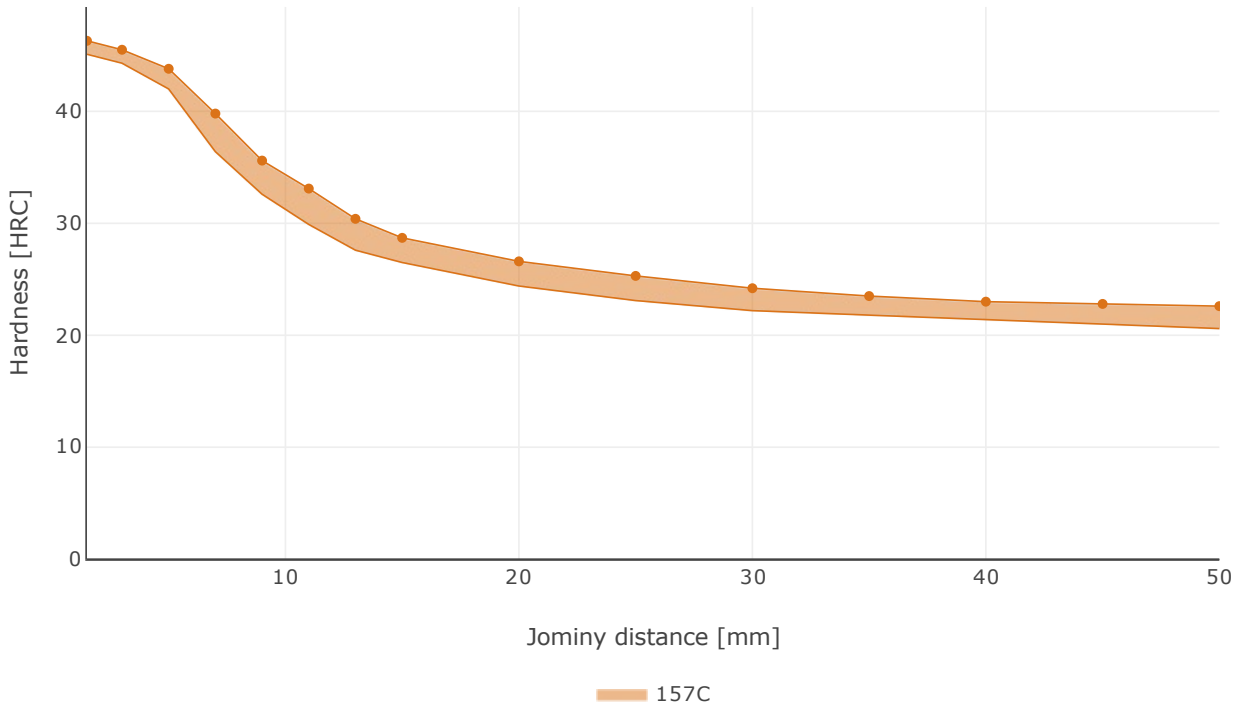
Tempering Diagram (strength)



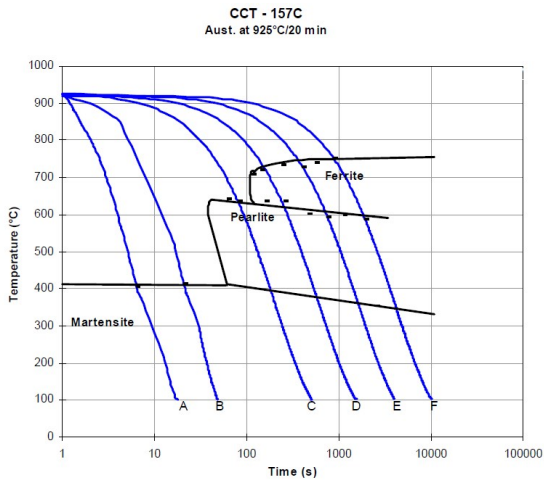
Jominy



Hardenability

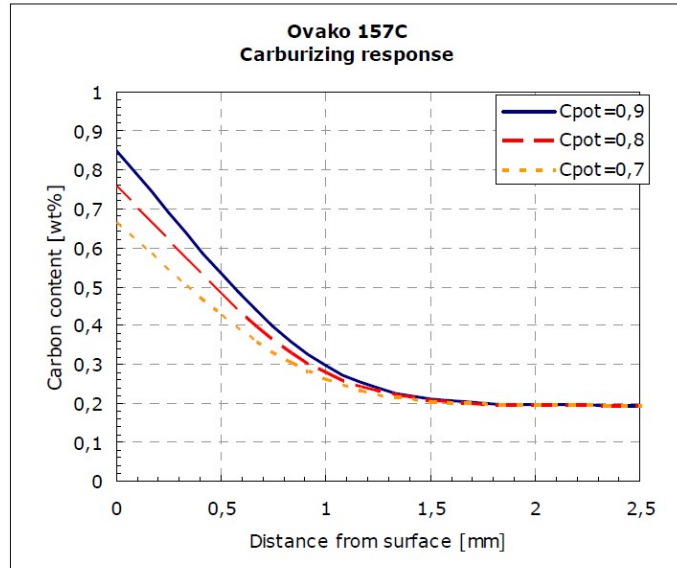
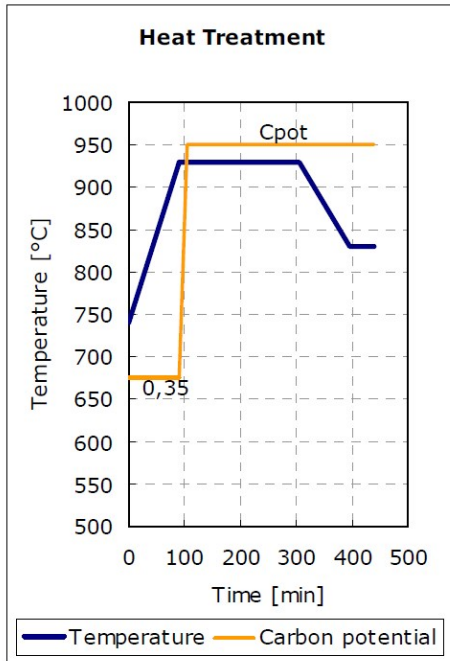


CCT - Ovako 157C



	A	B	C	D	E	F
t_{8-5} [s]	3	10	100	300	800	2000
Hv ₃₀	459	421	256	219	212	192

Carburizing response - Ovako 157C



Carburization response for Ovako 157C for the cycles shown in the left figure. Response of 157D and 157G similar.

Steel cleanliness - Ovako 157D

Micro inclusions - BQ									Macro inclusions - BQ	
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	He		
	2,0	1,5	0,8	0,1	0	0	0,5	0,4		

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 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)
157	Round bar	+AR	888
157	Round bar	+FP	894
157	Tube,wall	+AR	935
157	Tube,wall	+FP	938

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

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