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18NiCrMo14-6

General Information

18NiCrMo14-6 is a case hardening steel with high toughness used for bearing and transmission components. There are two different versions of the grade with high cleanliness requirements. The high hardenability ensures a through hardenability of large sections.

255G - Bearing quality (BQ) variant with low sulphur content and high cleanliness demands

255Q - Isotropic quality (IQ) with isotropic properties and improved fatigue strength due to higher cleanliness levels, and a finer size and distribution of non-metallic inclusions

IQ-Steel®

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

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

1.3533

Chemical composition

Variant	Cast	Weldability		С%	Si %	Mn %	Р%	S %	Cr %	Ni %	Mo %
255G	IC	CEV 0.96 _{max}	Min	0.15	0.15	0.40	-	-	1.30	3.25	0.15
		Pcm 0.41 _{max}	Max	0.18	0.40	0.70	0.025	0.005	1.60	3.75	0.25
255Q	IC	CEV 0.96 _{max}	Min	0.15	0.15	0.40	-	-	1.30	3.25	0.15
		Pcm 0.41 _{max}	Max	0.18	0.40	0.70	0.025	0.002	1.60	3.75	0.25
EN ISO 683-17	Std	CEV max	Min	0.15	-	0.40	-	-	1.30	3.25	0.15
		Pcm max	Max	0.20	0.40	0.70	0.025	0.015	1.60	3.75	0.25

Mechanical Properties

Variant	3 Condition	Format	Dimension [mm]	Hardness
255G	+SA	All formats	24 < 190	220 HB typical
255Q	+SA	All formats	24 < 120	220 HB typical

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

Transformation temperatures

Temperature °C					
AC1	695				
AC3	805				

Heat treatment recommendations

Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+AR	800-1200°C	In air
Normalizing	+N	860-890°C	In air
Soft annealing	+SA	600-670°C / 2h	In air
Carburizing	+C	850-930°C Carbon potential see diagram	
Hardening	+Q	840-890°C when Q/T is applied	In oil
Hardening	+Q	780-830°C when hardening os as-carburized component	In oil
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 (hardness)

Tempering temperature (°C)

Tempering Diagram (strength)



Tempering temperature (°C)

Jominy



Hardenability



Jominy hardenability according to ASTM A255. 255G data is average value with +/- standard deviation. En ISO 683-17 according to +H variant

Steel cleanliness

Micro inclusions - Steel grade 255G										Macro inclusions - 255G		
Applied standard	ASTM 45									Applied standard	ISO 3763 (Blue fracture)	
Sampling	ASTM A295								Sampling	Statistical testing on billets		
	А		В		С		D					
Maximum average limits	Th	Не	Th	He	Th	He	Th	He		Limits	<2.5 mm/dm ²	
	2.0	1.5	0.8	0.1	0	0	0.5	0.4				

Micro inclusion	s - Steel grade 255Q		Macro inclusions - 255Q			
Applied standard	DIN 50602 K1		Applied standard	10 M Hz UST (Ovako internal standard)		
Sampling	npling Six random samples from final product dimension			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		





ССТ

	А	В	С	D	Е	F
t ₈₋₅ [s]	6	15	23	30	60	150
Hv ₃₀	420	420	410	400	395	370

Carburizing



Carburization response for Ovako 255G for the cycles shown the figure above.

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.

CCT – Ovako 255G

Steel Grade	Format	G 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)
255	Round bar	+AR	1179	779
255	Round bar	+FP	1186	785
255	Tube,wall	+AR	1250	852
255	Tube,wall	+FP	1252	855

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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 resistivityAmbient temperature (μΩm)	
12	460 - 480	40 - 45	0.20 - 0.25	

Contact us

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

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