**OVAKO** 



## **General Information**

12NiCr14-6\* is a case hardening steel with high toughness of the type SAE 3311.

Ovako 245S - Is an ingot cast steel following Ovako internal BQ-Steel demands ensuring a high microscopic and macroscopic cleanliness.

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

#### **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

SAE 3311

#### **Chemical composition**

Variant	Cast		С%	Si %	Mn %	Р%	S %	Cr %	Ni %	Мо %
245S	IC	Min	0.10	0.15	0.40	-	0.003	1.35	3.25	-
		Max	0.15	0.35	0.60	0.015	0.008	1.60	3.75	0.15

## **Mechanical Properties**

Variant	• Condition	Format	Hardness
245S	+A	All formats	170-229 HB

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

# Transformation temperatures

Temperature °C				
MS	395			
AC1	694			
AC3	806			

#### Heat treatment recommendations

Treatment	G Condition	Temperature cycle	Cooling/quenching
Hot forging	+AR	800-1200C	In air
Normalizing	+N	860-890C	In air
Soft annealing	+A	670C, 15h	In air
Carburizing	+C	850-930C	-
Quench & Tempering	+QT	840-890C	In oil
Hardening	+QT	780-850C, hardening of as-carburized component	In oil

## 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)



Tempering temperature (°C)

Jominy



## Hardenability



Jominy hardenability of Ovako 245S. Average value with +/- standard deviation. Austenitizing temperature 845°C.

### Carburizing response



## Heat treatment



#### **Steel cleanliness**

Micro inclusions									Macro inclusions		
Applied standard	d ASTM E45								Applied standard	ISO 3763 (Blue fracture)	
Sampling	ASTN	ASTM A295							Sampling	Statistical testing on billets	
Maximum average	А	A B C D									
limite	Th	He	Th	He	Th	He	Th	He	Limits	< 5 mm/dm <sup>2</sup>	
	2,5	1,5	0,8	3 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	
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	Scope 1-3 (CO2e kg Condition /1000 kg steel)		Climate compensated Net emission = Scope 3 (CO2e kg /1000 kg steel) Scope 1 - 2 = 0 (compensated)				
245S	Round bar	+AR	1180	780				
245S	Round bar	+SA	1187	786				
245S	Tube,wall	+AR	1251	854				
245S	Tube,wall	+SA	1254	856				

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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**

Would you like to know more about our offers? Don't hesitate to contact us:

Via e-mail: info@ovako.com

Via telephone: +46 8 622 1300

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

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