

100CrMo7-3 All

General Information

Ovako 825 is a through hardening bearing steel that is mainly used for medium sized bearing rings, but it can also be used for machine components that require high tensile strength, hardness and toughness.

- Through hardenability corresponding to a ring with approximately 30mm wall thickness ($\approx \varnothing 50$ mm bar), quenched in oil
- Suitable for martensitic or bainitic hardening
- Good machinability in soft annealed condition
- Good dimensional stability

825B - Standard BQ variant

825T - BQ variant with a controlled low sulphur content to minimize the number of sulphide inclusions. Reduced carbon content and tighter chemical composition ranges

825Q - Isotropic properties (IQ) and better 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

ASTM A485 grade B6, 1.3536

Chemical composition

Variant	Cast		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %
825B	IC	Min	0.93	0.20	0.60	-	0.005	1.65	-	0.20
		Max	1.05	0.40	0.80	0.025	0.015	1.95	0.25	0.35
825T	IC	Min	0.93	0.20	0.73	-	0.003	1.74	-	0.25
		Max	0.98	0.35	0.80	0.025	0.006	1.85	0.25	0.35
825Q	IC	Min	0.93	0.20	0.60	-	-	1.65	-	0.20
		Max	1.05	0.40	0.80	0.020	0.001	1.95	0.25	0.35
EN ISO 683-17	Std	Min	0.93	0.15	0.60	-	-	1.65	-	0.20
		Max	1.05	0.45	0.80	0.025	0.150	1.95	-	0.35

Mechanical Properties

Variant	Condition ⓘ	Format	Dimension [mm]	Yield strength min [MPa]	Tensile strength [MPa]	Hardness
825B	+SA	All formats	30 < 190	460	700 typical	180-220 HB
	+Q/T(m)	All formats	< 30	1700	2300 typical	61 HRC typical
	+Q/T(b)	All formats	< 30	2000	2200 typical	59 HRC typical
825T	+SA	All formats	30 < 190	460	700 typical	180-220 HB
	+Q/T(m)	Ring, wall	< 30	1700	2300 typical	61 HRC typical
	+Q/T(b)	Ring, wall	< 30	2000	2200 typical	59 HRC typical
825Q	+SA	All formats	30 < 190	460	700 typical	180-220 HB
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	+Q/T(b)	Ring, wall	< 30	2000	2200 typical	59 HRC typical

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

Transformation temperatures

	Temperature °C
MS	183
AC1	750
AC3	750

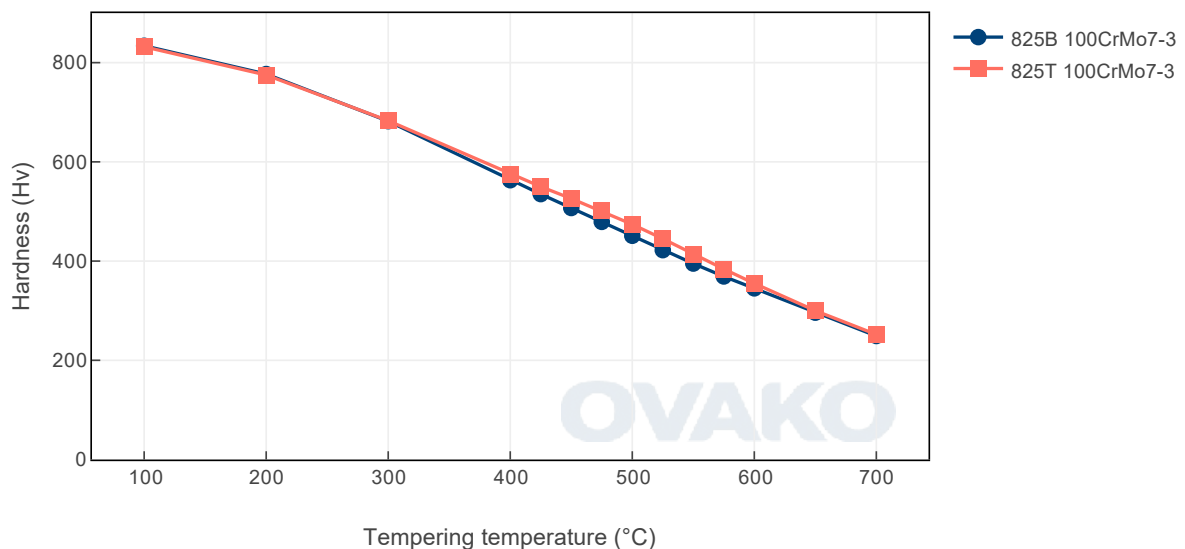
Heat treatment recommendations

Treatment	Condition ⓘ	Temperature cycle	Cooling/quenching
Hot forging	+U	800-1100C	In air
Normalizing	+N	880-910C	In air
Spheroidize annealing	+SA	RT-820C 1-2h 820C 2-5h 820-740C 1h 740-690C 12h	In air
Stress relieve annealing	+SRA	550-650C 2h	In air
Q/T (martensite)	+Q/T(m)	830-870C 20-60 min	In oil (tempering within 2h)
Q/T (bainite)	+Q/T(b)	850-875C 20-60min	Salt bath 220-250C 3-9h
Tempering	+T	160-500C, see diagram	In air

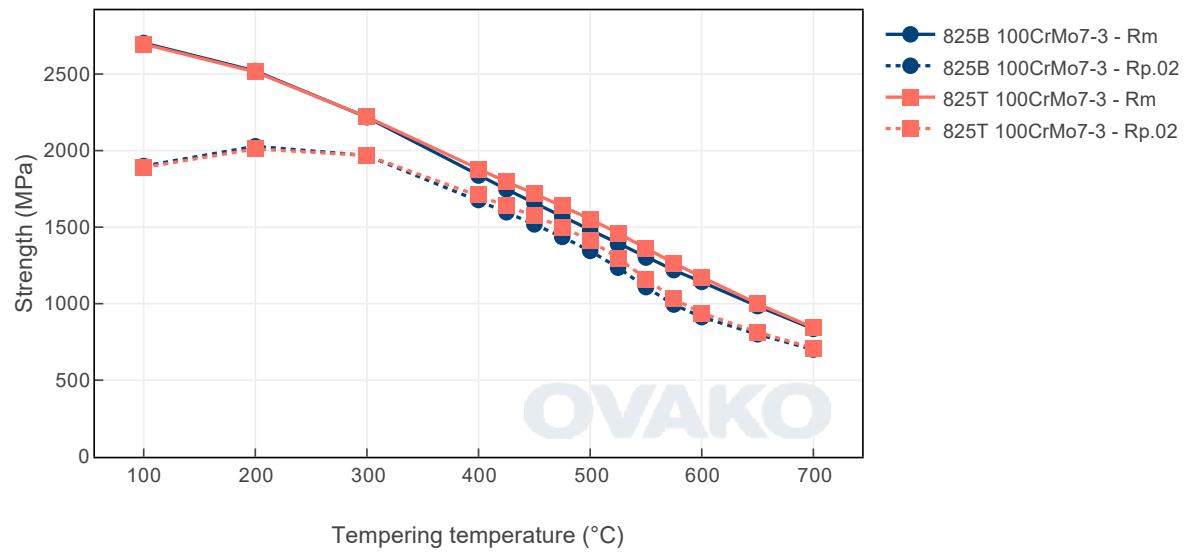
Heat Treatment Guide generated Graphs

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.

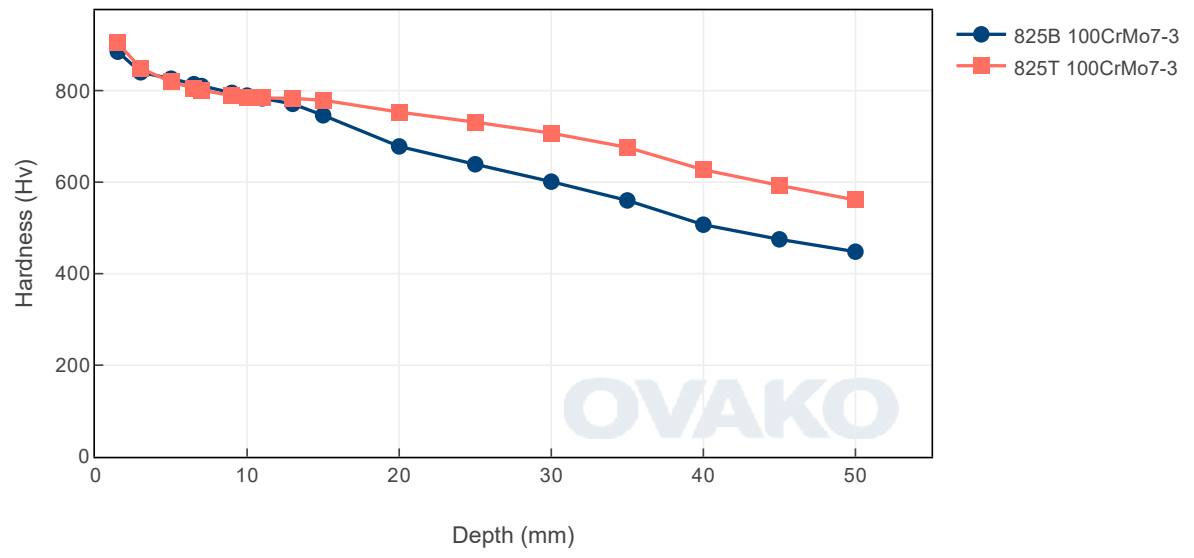
Tempering Diagram (hardness)



Tempering Diagram (strength)

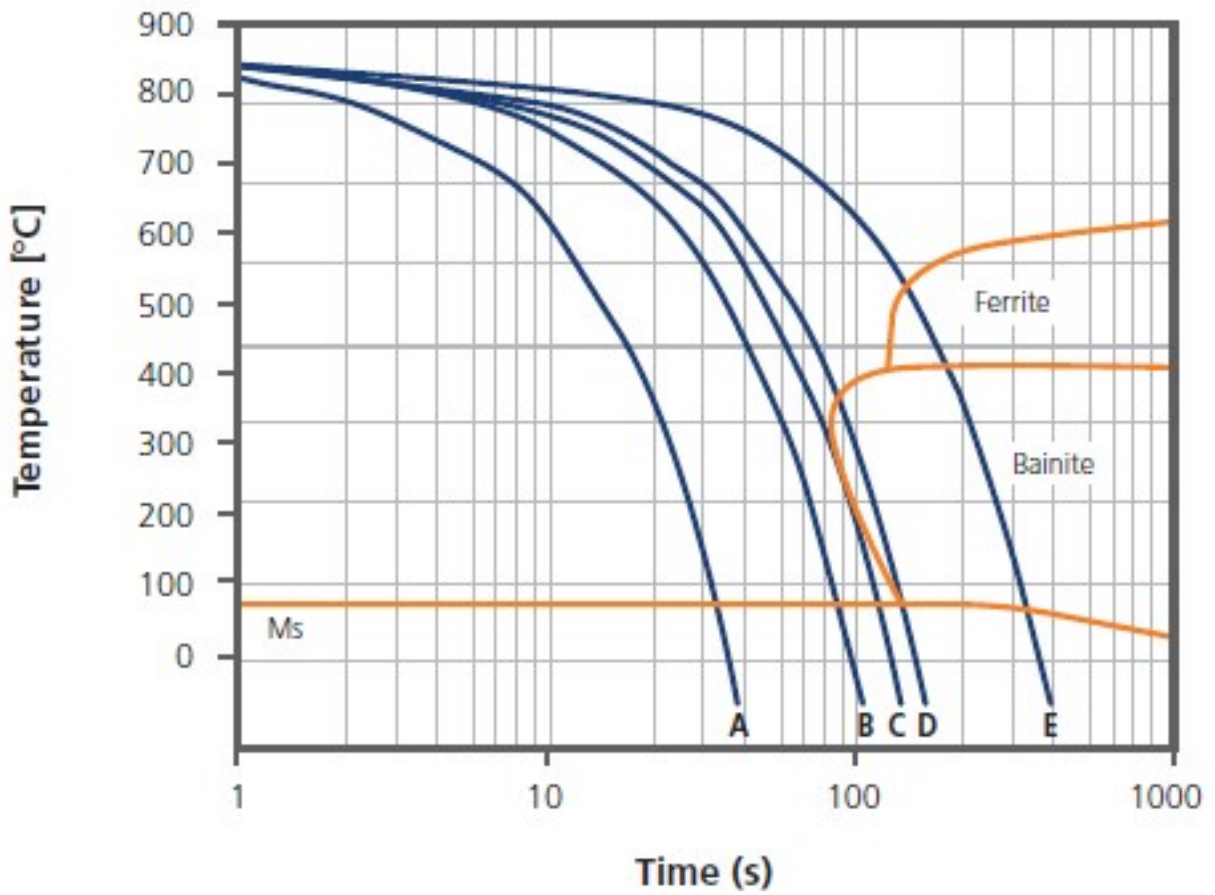


Jominy



CCT

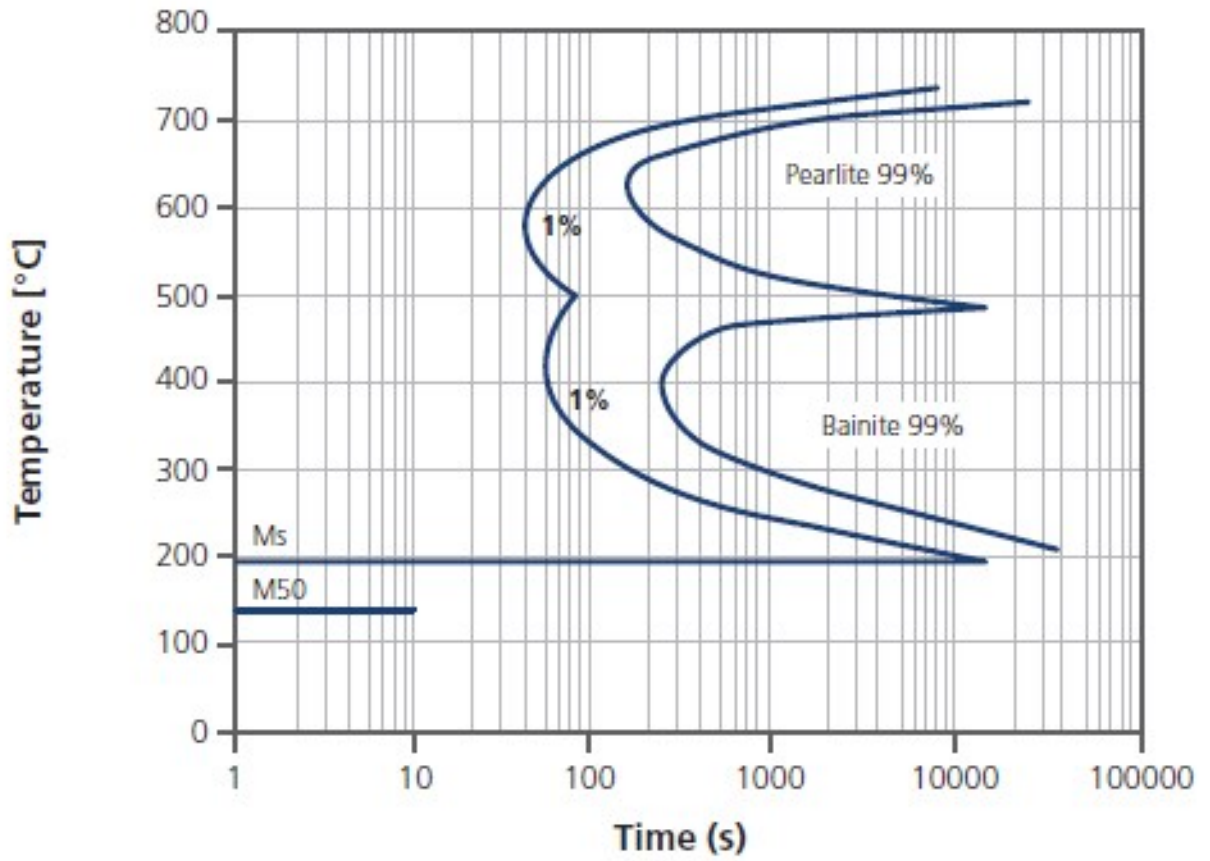
Austenitized at 860°C for 10 minutes



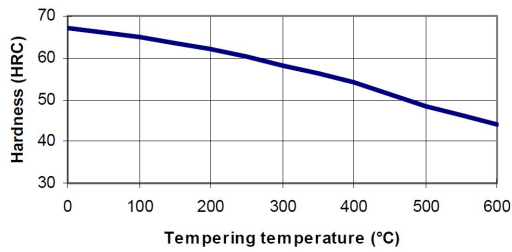
	A	B	C	D	E
t_{8-5} [s]	15	38	50	60	150
Hv ₃₀	910	905	905	840	635

TTT

Austenitized at 860°C for 10 minutes



Tempering response



Tempering response for Ovako 825B. Austenitized at 860°C for 30min and quenched in oil. Tempered one hour at each tested temperature

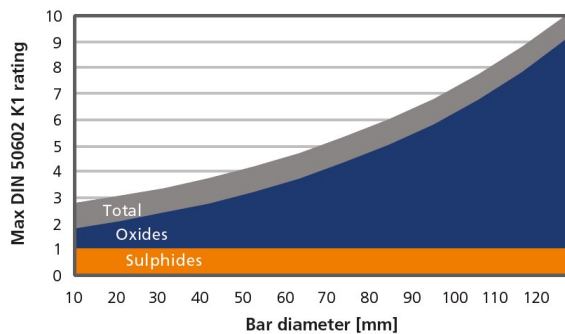
Steel cleanliness

Micro inclusions - Ovako 825B									Macro inclusions - 825B	
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	0,3		

Micro inclusions - IQ									Macro inclusions - IQ		
Applied standard	DIN 50602 K1								Applied standard	ISO 3763 (Blue fracture)	10 M Hz UST (Ovako internal procedure)
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	< 1 mm/dm ²	< 5 defects/dm ³ > 0,2 mm FBH

IQ

Inclusion limits IQ-processed steel



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 CO₂ 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 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)	Climate compensated Net emission = Scope 3 (CO ₂ e kg /1000 kg steel) Scope 1 - 2 = 0 (compensated)
825	Round bar	+SA	627	231
825	Tube,wall	+SA	653	251

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Other properties (typical values)

Youngs module (GPa)	Poisson 's ratio (-)	Shear module (GPa)	Density (kg/m ³)
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

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

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