MATERIAL DATA SHEET

STEEL GRADE

Last revised: Wed, 15 Jan 2025 16:05:12 GMT

OVAKO

100CrMnSi6-4 All

General Information

Ovako 837 is a through hardening bearing steel that is mainly used for medium sized bearing rings, but can also be used for machine components that require high tensile strength and high hardness.

- 30 mm maximum wall thickness for through hardening
- Used for martensitic hardening
- Can be induction hardened
- Good machinability in soft annealed condition
- Machinable in hardened condition using hard-turning techniques (CBN tools)
- Very good dimension stability

837R - Bearing quality (BQ) variant

837S - Variant with a controlled high sulphur content for enhanced low speed machining

5625 / 837Z - A continous cast variant (BQ)

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 B3, 100 CM 6

Chemical composition

Variant	Cast		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %
837R	IC	Min	0.93	0.50	1.00	-	0.003	1.40	-	-
		Max	0.98	0.70	1.20	0.025	0.006	1.55	0.25	0.10
837S	IC	Min	0.92	0.50	1.00	-	0.020	1.40	-	-
		Max	0.98	0.70	1.20	0.025	0.027	1.65	0.25	0.10
5625 / 837Z	CC	Min	0.93	0.50	1.00	-	-	1.40	-	-
		Max	1.05	0.70	1.20	0.025	0.008	1.65	0.30	0.10
EN ISO 683-17	Std	Min	0.93	0.45	1.00	-	-	1.40	-	-
		Max	1.05	0.75	1.20	0.025	0.015	1.65	-	0.10

Mechanical Properties

Variant	Condition	Format	Dimension [mm]	Hardness
5625 / 837Z	+AR	Round bar	40 < 120	< 400 HB
	+A	Round bar	40 < 120	180-220 HB

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

Transformation temperatures

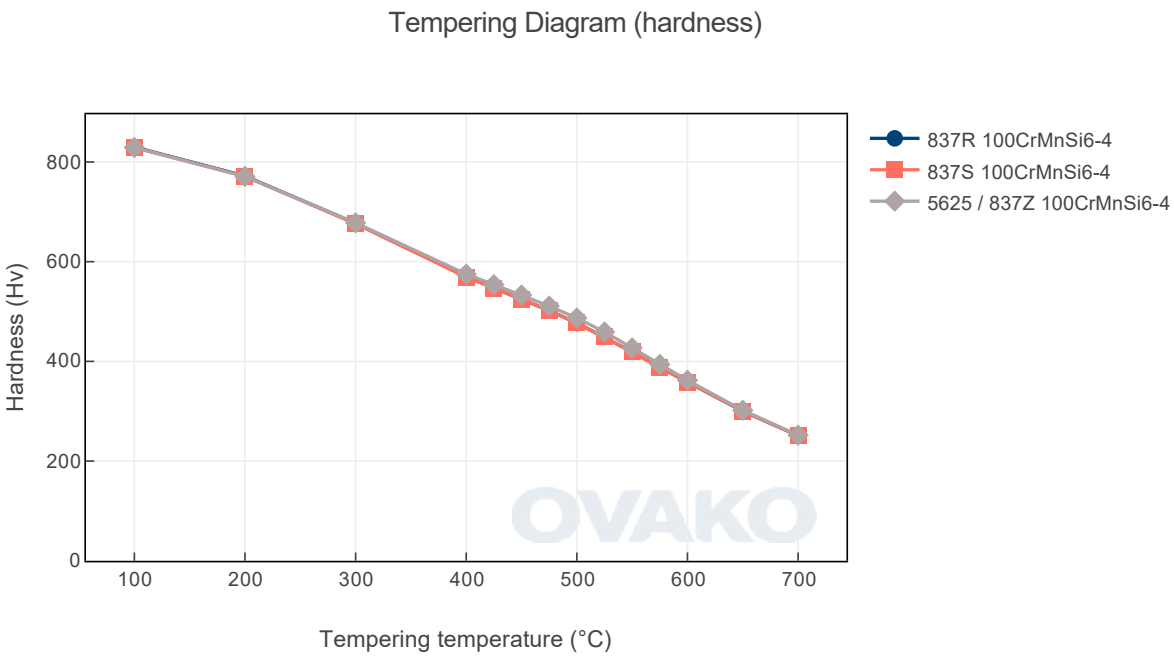
	Temperature °C
MS	229
AC1	750
AC3	750

Heat treatment recommendations

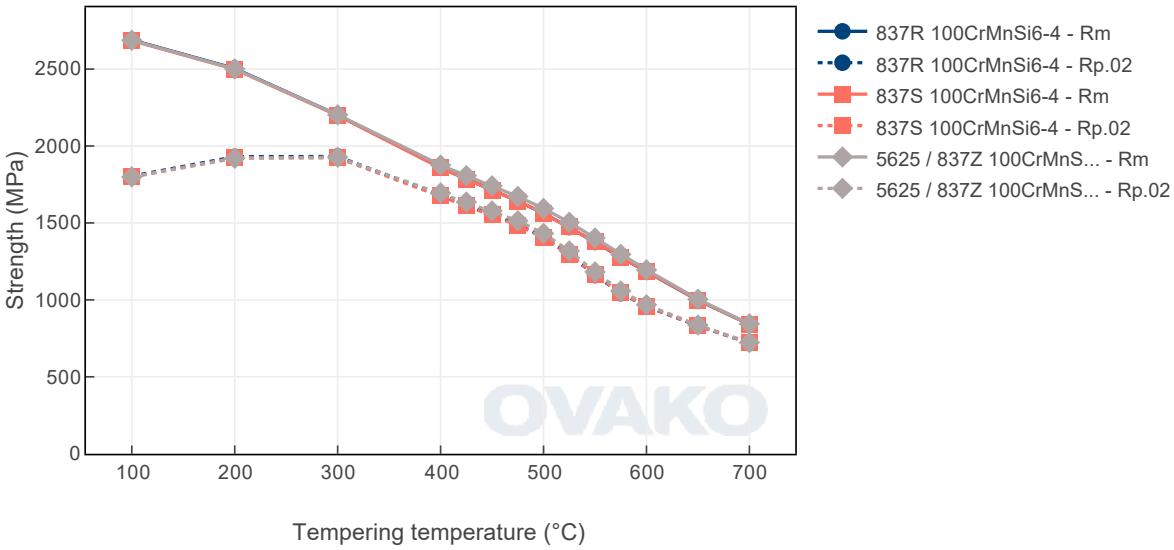
Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+U	800-1100C	In air
Normalizing	+N	880-910C	In air
Spheroidize annealing	+SA	RT-810°C 1h, 810°C 2h, 810-740°C 1h, 740-650°C 10h	In air
Stress relieve annealing	+SRA	550-650C 2h	In air
Q/T (martensite)	+Q/T(m)	830-870C 20-60min,	In oil (temper within 2h)
Tempering	+T	160-500C (see diagram)	In air

Heat Treatment Guide generated Graphs

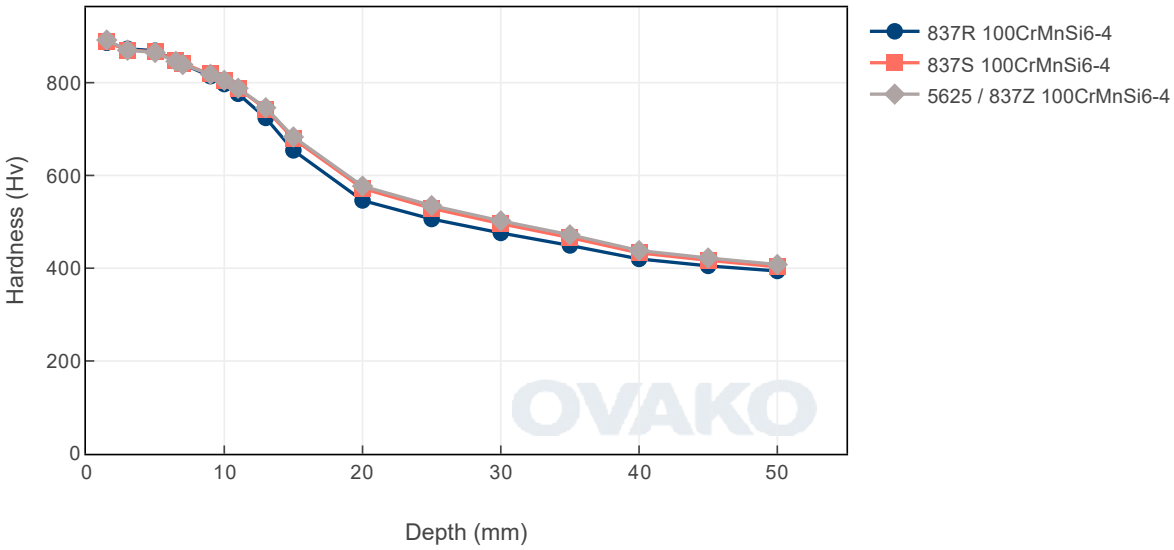
The following graphs are generated from a theoretical model. For further info see the Heat treatment guide module. Select a specific grade version for individual display.



Tempering Diagram (strength)



Jominy


Hardness (Hv)
800
600
400
200
0
0
10
20
30
40
50
Depth (mm)
837R 100CrMnSi6-4
837S 100CrMnSi6-4
5625 / 837Z 100CrMnSi6-4
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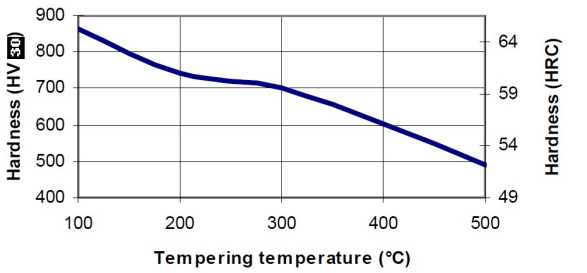
Tempering response



Tempering response for Ovako 837R. Austenitized at 850°C for 30min and quenched in oil. Tempered one hour at each tested temperature level

Steel cleanliness

Micro inclusions - Ovako 837R										Macro inclusions - Ovako 837R	
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			

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	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)
837	Round bar	+SA	628	227
837	Tube,wall	+SA	650	253
5625 / 837Z	Round bar	+SA	572	269

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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:

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