

STEEL GRADE

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42CrMo4 All

General Information

42CrMo4 is a steel for quenching and tempering, which has a good combination of strength and toughness in the quenched and tempered condition. After the oil quenching, the steel will be through hardened up to $\varnothing 60$ mm bar diameter. The microstructure of larger dimensions is not fully martensite. The steel is applicable to induction hardening. The surface hardness will exceed min. 53 HRC. 42CrMo4 can be delivered M-treated in order to optimize the machinability.

Variant 6082 is offered under the name MoC410M

Variant 6115 conform with SAE 4140 and ISO 898 Grade 10.9 up to 60 mm bar diameter

Variant 6137 conform with L7 ASTM A320 and ISO 898 Grade 10.9 up to 50 mm bar diameter

Variant SB9288 is offered under the name SB42CrMo4

Variant SB9287 with a slightly increased hardenability, is offered under the name SB42CrMo4.

Variant 327S is a continuous cast variant with slightly increased hardenability, similar to the ingot casted variant 327A

Variant 327A is an ingot cast variant with slightly increased hardenability.

Variant 326C is a BQ-steel variant which fulfils SAE 4140 standard but has a restricted sulphur content for improved cleanliness and a lower maximum allowed phosphorus content for improved mechanical properties

M-Steel®

The basis for the concept is that non-metallic inclusions are modified and controlled with calcium treatment in a way to minimize tool wear and to maximize chip control in machining operations. Our M-Steel treatment can be applied to any steel grade.

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

AISI 4140, 42CD4(AFNOR), 708M40(B.S.), SS 2244, SS142244, SAE 4140H, ASTM A193 B7, 41Cr4, 42CrMoS4, 1.7225

Chemical composition

Variant	Cast	Di	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	V %	Cu %	Al %	B %	DI %
42CrMo4 M (6082), MoC 410 M	CC	5.6	CEV 0.82 _{max}	Min	0.38	0.15	0.60	-	0.020	0.90	-	0.15	-	-	-	-	-
			Pcm 0.55 _{max}	Max	0.45	0.40	0.90	0.025	0.035	1.20	-	0.30	-	-	-	-	-
42CrMnMo4- 4,SAE 4140 (6115)	CC	6.8	CEV 0.87 _{max}	Min	0.40	0.15	0.75	0.000	0.000	0.90	-	0.15	-	-	-	-	-
			Pcm 0.59 _{max}	Max	0.45	0.35	0.90	0.020	0.025	1.10	-	0.25	-	-	-	-	-
L7 ASTM A320 (6137)	CC	6.39	CEV 0.86 _{max}	Min	0.38	0.15	0.75	-	-	0.90	-	0.15	-	-	-	-	-
			Pcm 0.585 _{max}	Max	0.45	0.35	0.90	0.025	0.025	1.10	-	0.25	-	-	-	0.0030	-
SB 9288	CC	4.9	CEV 0.8 _{max}	Min	0.40	0.15	0.75	-	0.020	0.90	-	0.15	-	-	0.015	-	-
			Pcm 0.57 _{max}	Max	0.43	0.25	0.90	0.025	0.035	1.10	0.30	0.25	-	0.25	0.040	-	-
327S	CC		CEV _{max}	Min	0.41	0.20	0.65	-	0.020	1.00	0.15	0.22	-	-	0.020	-	-
			Pcm _{max}	Max	0.45	0.35	0.80	0.025	0.030	1.20	0.30	0.28	0.040	-	0.035	-	-
327A	IC		CEV 0.92 _{max}	Min	0.41	0.20	0.65	-	0.020	1.00	0.15	0.22	-	-	-	-	5.60
			Pcm 0.6 _{max}	Max	0.45	0.35	0.80	0.025	0.030	1.20	0.30	0.28	-	-	-	-	8.30
326C	IC		CEV 0.9 _{max}	Min	0.38	0.20	0.80	-	0.005	0.90	-	0.15	-	-	-	-	-
			Pcm 0.58 _{max}	Max	0.43	0.30	1.00	0.015	0.010	1.10	0.20	0.25	-	-	-	-	-
42CrMo4 EN ISO 683-2	Std		CEV _{max}	Min	0.38	0.10	0.60	0.000	0.000	0.90	-	0.15	-	0.00	-	-	-
			Pcm _{max}	Max	0.45	0.40	0.90	0.025	0.035	1.20	-	0.30	-	0.40	-	-	-

Mechanical Properties

Variant	Condition ^①	Format	Dimension [mm]	Yield strength min [MPa]	Tensile strength [MPa]	Elongation A ₅ [%]	Reduction of area Z _{min} [%]	Hardness	Impact (ISO-V) strength _{min}
42CrMo4 M (6082), MoC 410 M	+AR	Round bar	25 < 160	-	-	-	-	350 HB typical	-
	+A	Round bar	25 < 160	-	-	-	-	241 HB typical	-
	+QT	Round bar	25 < 40	750**	1000-1200	11	45	300-350 HB	20 °C 35 J (long)
		Round bar	40 < 100	650**	900-1100	12	50	270-320 HB	20 °C 35 J (long)
		Round bar	100 < 160	550**	800-950	13	50	240-280 HB	20 °C 35 J (long)
42CrMnMo4-4, SAE 4140 (6115)	+QT	Round bar	25 < 60	940	> 1040	9	48	316-375 HB	-20 °C 27 J (long)
L7 ASTM A320 (6137)	+AR	Round bar	22 < 160	-	-	-	-	< 340 HB	-
	+A	Round bar	22 < 160	-	-	-	-	< 241 HB	-
	+QT	Round bar	22 < 90	725	860-1070	16	50	260-321 HB	-101 °C 27 J (long)
SB 9288	+QT	Round bar	15 < 64	940**	1050-1140	9	-	-	-
327A	+AR	Round bar	24 < 190	-	-	-	-	350 HB typical	-
	+A	Round bar	24 < 190	-	-	-	-	241 HB typical	-
	+QT	Round bar	25 < 40	750**	1000-1200	11	45	300-350 HB	20 °C 35 J (long)
		Round bar	40 < 100	650**	900-1100	12	50	270-320 HB	20 °C 35 J (long)
		Round bar	100 < 160	550**	800-950	13	50	240-280 HB	20 °C 35 J (long)
Round bar		160 < 180	500**	750-900	14	55	220-270 HB	20 °C 35 J (long)	
326C	+A	Round bar	25 < 180	-	-	-	-	200 HB typical	-
	+QT	Round bar	25 < 180	600	700-1050	17	65	230-330 HB	-

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

Transformation temperatures

	Temperature °C
MS	320
AC1	740
AC3	770

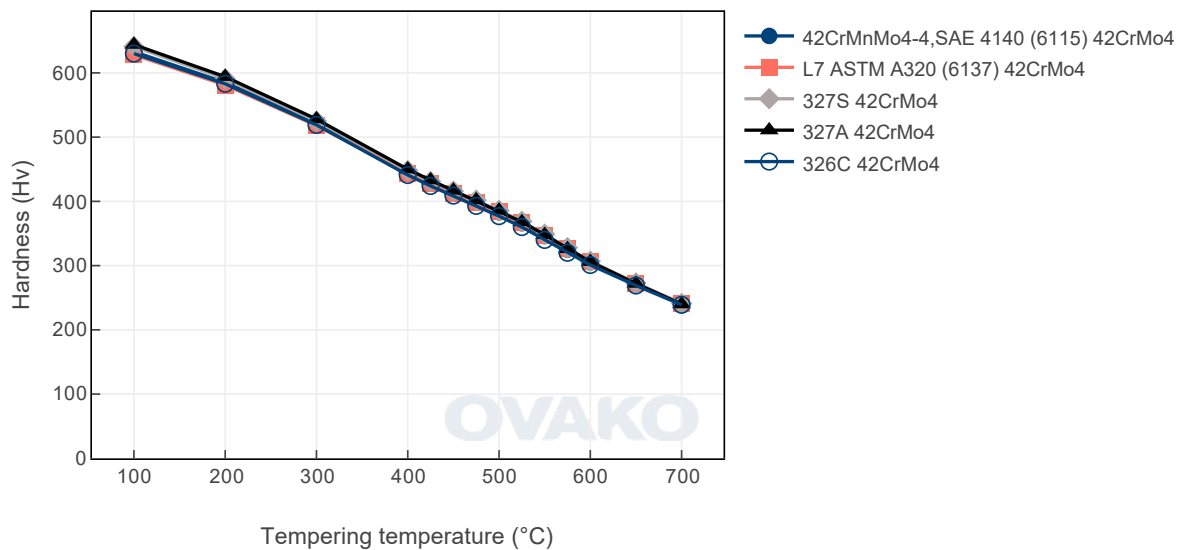
Heat treatment recommendations

Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+U	850-1050°C	In air
Soft annealing	+A	680-720°C	Slowly (15°C/h) until 600°C
Stress relieve annealing	+SRA	450-650°C	In air
Quench & Tempering	+QT	840-880°C	In oil or water. Temper in 540-680°C
Stress relieve annealing	+SRA	150-180°C (after Induction Hardening)	In air

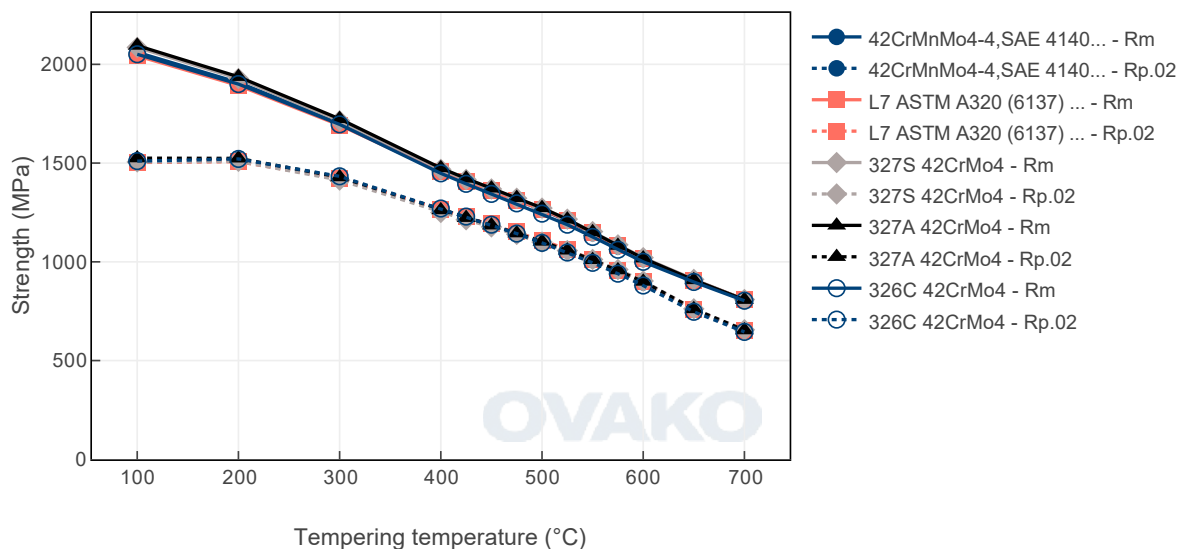
Heat Treatment Guide generated Graphs

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.

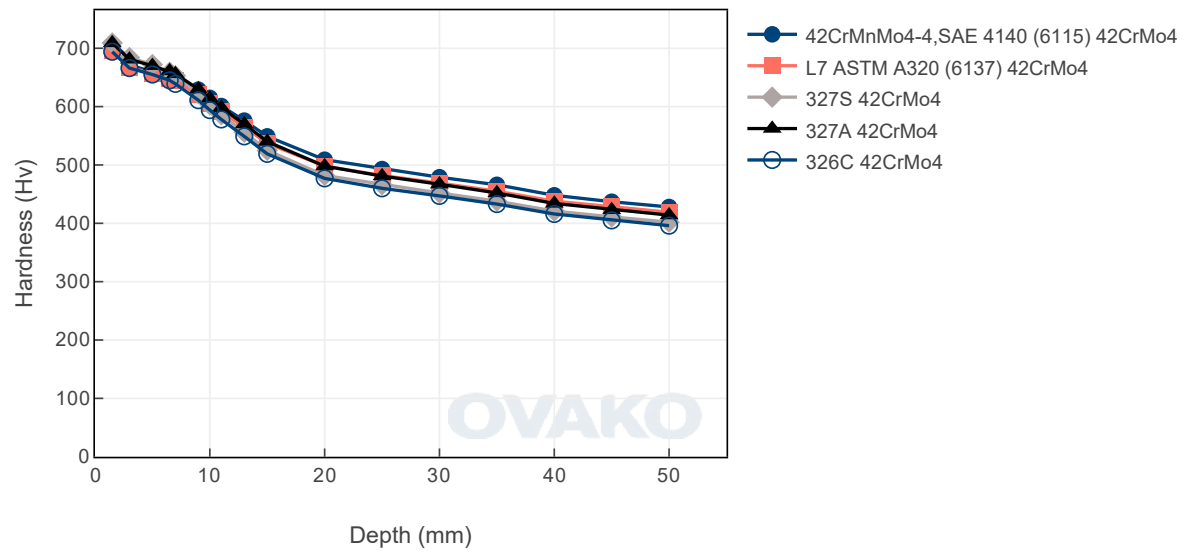
Tempering Diagram (hardness)



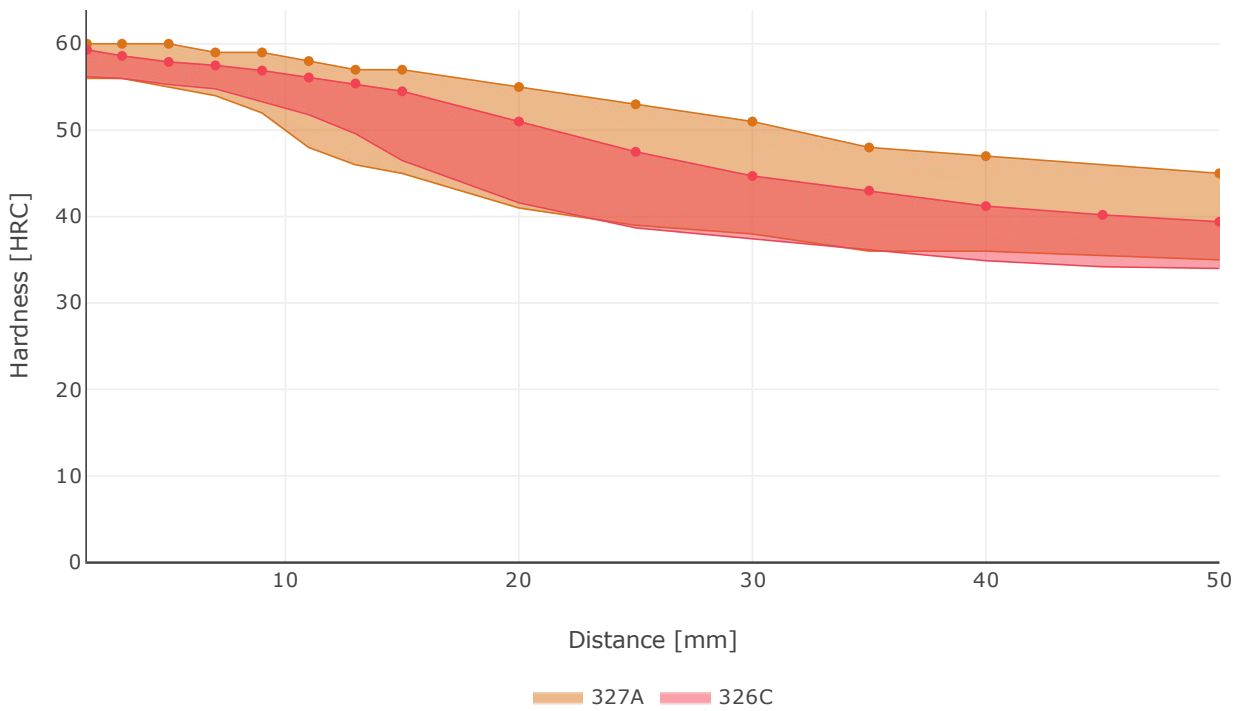
Tempering Diagram (strength)



Jominy



Hardenability



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 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 ^①	Scope 1-3 (CO2e kg /1000 kg steel)	Climate compensated Net emission = Scope 3 (CO2e kg /1000 kg steel) Scope 1 - 2 = 0 (compensated)
327	Round bar	+AR	621	222
327	Round bar	+QT	627	226
327	Tube,wall	+AR	643	245
327	Tube,wall	+QT	651	252
326C	Round bar	+AR	615	216
326C	Round bar	+QT	621	219
326C	Tube,wall	+AR	638	240
326C	Tube,wall	+QT	646	247
SB 9288	Flat bar	+A	433	196
L7 ASTM A320 (6137)	Round bar	+AR	531	250
L7 ASTM A320 (6137)	Round bar	+QT	786	299
6082	Round bar	+AR	524	243
6082	Round bar	+QT	778	291
42CrMnMo4-3, ASTM A 320 L7	Round bar	+AR	531	250
42CrMnMo4-3, ASTM A 320 L7	Round bar	+QT	786	299
42CrMnMo4-4,SAE 4140	Round bar	+AR	530	245
42CrMnMo4-4,SAE 4140	Round bar	+QT	783	295

All above data are to be seen as typical values for the specified format and condition. Detailed information about your specific product please contact your sales contact.

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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