100CrMo7 All

General Information

Ovako 824 is a through hardening bearing steels intended for rolling contact and other high fatigued applications. In the hardened condition the high hardness, high strength and high cleanliness provides the steel with the right properties to withstand high cycle, high stress fatigue. Ovako 824 is mainly used for small and medium sized bearing components. It is also regularly used for other machine components that require high tensile strength and high hardness. The hardenability approximately corresponds to a ring with maximum 20 mm wall thickness. It is suitable for both martensitic and bainitic hardening. Ovako 824 comes in two variants. One Bearing Quality (BQ) variant that fulfills tough Ovako internal quality demands and consequently also the ISO 683-17 demands. One Isotropic Quality (IQ) with higher demands regarding micro inclusion cleanliness and improved isotropic properties. Additionally this variant has a slightly reduced carbon content to reduce the carbide segregation tendency. The IQ variant is especially suited for applications subjected to a complex loading mode.

824B - Bearing quality (BQ) variant

824P - Bearing quality (BQ) variant with low sulphur content

824Q - Isotropic quality (IQ) variant

For additional Heat Treatment Data, please visit the Heat Treatment Guide.

BQ-Steel®

(Bearing Quality) is a bearing quality clean steel optimized for fatigue strength by a strict control of steel cleanliness. BQ-steel is also ideal for new design solutions in a wide array of demanding applications outside the bearing industry that require longer performance and higher loads. The BQ-steel offer is the result of the Ovako clean steel program. Purity of production means that the material has significantly smaller inclusions compared to conventional steel and, as a result, the fatigue strength of the steel is increased dramatically. Use of the material allows components to be manufactured in smaller sizes. The BQ-steel has for decades been the problem-solver

IQ-Steel®

(Isotropic Quality) is an isotropic quality ultra clean steel. IQ-Steel is optimized for fatigue strength by a strict control of steel cleanliness. IQ-Steel, a further development of BQ-Steel, is an isotropic and ultra clean steel with properties that match re-melted steels. Based on thousands of examinations by Ovako into the effects of defects on fatigue performance, the metallurgy of IQ-Steel is purer and far more consistent than conventional grades, and designed specifically to perform well in multi axial loading. This enables the manufacturing of lighter, slimmed down components like gears, bearings and other critical parts. The steels are helping our customers to achieve new design solutions and implement higher standards of finished product performance. Key to these practical advantages are Ovako's own unique, clean and consistent modern steelmaking processes that remove harmful inclusions and impurities from within the steel. IQ-Steels contain smaller and more fragmented inclusions and can handle much higher mechanical forces in all directions than conventional steels. IQ-Steels are newer, but already now well established in high pressure automotive applications. Modern diesel engines, with high and cyclic injection pressures, have proven to be an ideal application. Transmission components are another emerging area of strong interest.

Similar designations

100CD7, A485-3

Chemical composition

Variant	Cast		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %
824B	IC	Min	0.93	0.25	0.25	-	0.005	1.65	-	0.15
		Max	1.02	0.35	0.40	0.025	0.015	1.95	0.25	0.25
824P	IC	Min	0.93	0.25	0.30	-	0.003	1.80	-	0.15
		Max	0.98	0.35	0.40	0.025	0.008	1.95	0.25	0.25
824Q	IC	Min	0.92	0.25	0.25	-	-	1.80	-	0.15
		Max	1.00	0.35	0.40	0.020	0.001	1.95	0.25	0.25

Mechanical Properties

Variant	Condition	Format	Dimension [mm]	Yield strength min [MPa]	Tensile strength [MPa]	Elongation A_5 [%]	Hardness
824B	+SA	All formats	24 < 190	420	< 700	27	< 200 HB
	+Q/T(m)	Ring, wall	< 20	1700	< 2300	2	< 61 HRC
	+Q/T(b)	Ring, wall	< 20	2000	< 2200	7	< 59 HRC

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

Mechanical properties are valid for all steel grade variants

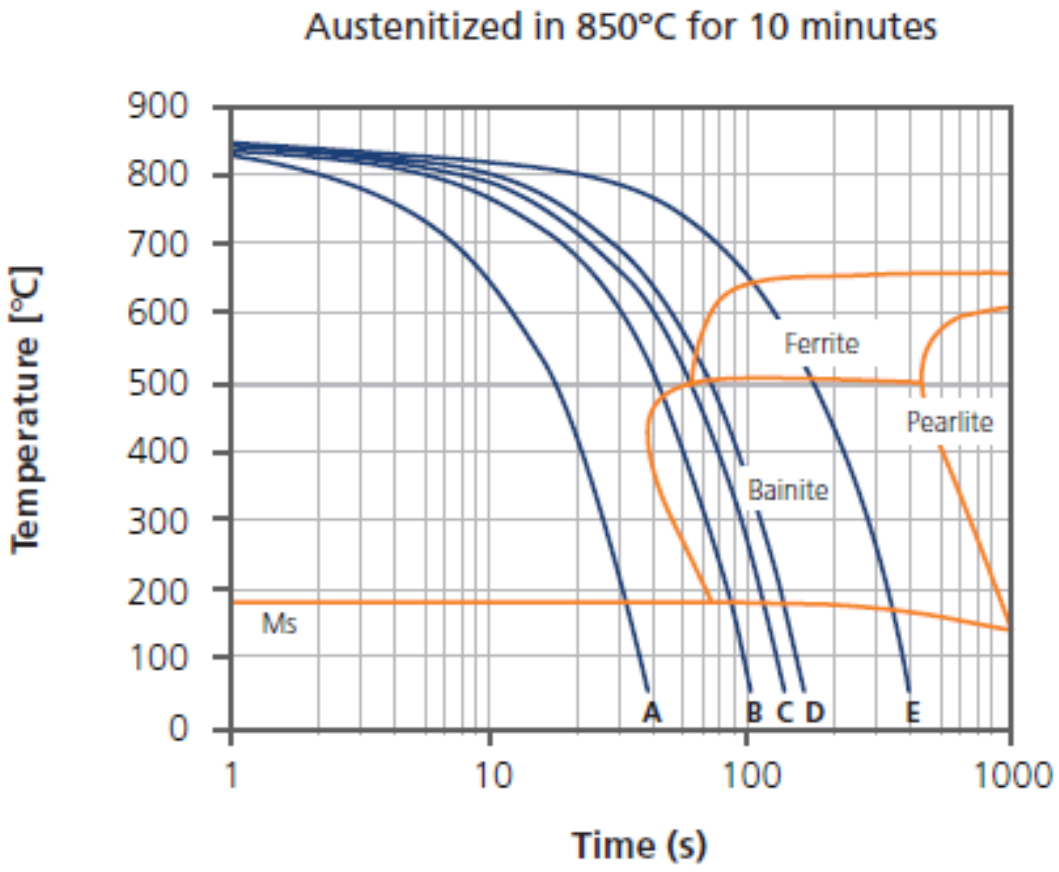
Transformation temperatures

	Temperature °C
MS	186
AC1	750
AC3	750

Heat treatment recommendations

Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+U	800-1100C	In air
Soft annealing	+SA	RT-820C 1h 820C 2h 820-740C 1h 740-690C 12h	In air
Stress relieve annealing	+SRA	550-650C 1h	In air
Q/T (martensite)	+Q/T(m)	830-870C 10-60 min	In oil. Temper within 2h
Q/T (bainite)	+Q/T(b)	850-875C 10-60 min	Salt bath 220-250C 3-8h
Tempering	+T	160-500C	In air

CCT



	A	B	C	D	E
t_{8-5} [s]	15	38	50	60	150
Hv_{30}	880	730	680	560	420

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/

Steel cleanliness

Micro inclusions - Ovako 824B + 824P								
Applied standard	ASTM E45							
Sampling	ASTM A295							
Maximum average limits	A		B		C		D	
	Th	He	Th	He	Th	He	Th	He
	2,0	1,5	0,5	0,1	0	0	0,2	0,1

Macro inclusions - 824B + 824P	
Applied standard	ISO 3763 (Blue fracture)
Sampling	Statistical testing on billets.
Limits	< 2,5 mm/dm^2

Micro inclusions - IQ	
Applied standard	DIN 50602 K1
Sampling	Six random samples from final product dimension
Limits	The limit is dimension dependent. The average rating of six samples should not exceed the limits given in the graph

Macro inclusions - IQ		
Applied standard	ISO 3763 (Blue fracture)	10 MHz UST (Ovako internal procedure)
Sampling	Statistical testing on billets	
Limits	< 1 mm/dm^2	< 5 defects/dm^3 > 0,2 mm FBH

IQ

Inclusion limits IQ-processed steel