

Products



- › Spring bush bearing
- › Split bearings
- › SACRB
- › Cylindrical roller bearings
- › Hardening process

Products

Spring bush bearings

Spring bush bearings, spring roller bearings

These special rolling bearing designs build the brand essence of Eich. They are manufactured since the founding days of Eich. Initially, some of these bearing types had been used in various mining applications. An example is the yoke type roller „Alaf“, a type of wheel bearing for transport containers for discharging coal. The good experience in mining applications provided important insights into the performance of these bearing also for other applications. One example is the steel industry with different applications, roller table rollers in rolling mills, support and guide rollers in continuous casting, roller table rollers in furnaces or in finishing equipment.



Products

Spring bush bearings

Floating bearing

Bearing type	Spring- inner- bushing	Spring- outer- sleeve	Spring- roller- cage	Solid- roller- cage	Solid- inner- bushing	Solid- outer- sleeve
EL		●	●			
ELMA			●			●
ELR		●		●		
ELMAR				●		●
B	●	●	●			
BMA	●		●			●
BMI		●	●		●	
BMF			●		●	●
BR	●	●		●		
BMAR	●			●		●
BMIR		●		●	●	
BMR				●	●	●
ABC	●	●		●		

Products

Spring sleeve bearings

Locating bearing

Bearing type	Spring- inner- bush	Spring- outer- bush	Spring- roller- cage	Solid- roller- cage	Solid- inner- bush	Solid- outer- bush	Rings
UL	●	●	●				●
ULMA			●			●	●
ULMI		●	●		●		●
ULMF			●		●	●	●
ULR	●	●	●	●			●
ULMAR	●			●		●	●
ULMIR		●		●	●		●
ULMR				●	●	●	●

Products

Spring bush bearings

ABC roller bearings

Type of product	Product No.	Product dimension	Weight [kg]	C0 [kN]	C [kN]
abc	10456e	45/80 mm x 80/70 mm	2,1	327	205
abc	11588e	50/80 mm x 75/70 mm	1,6	332	189
abc	10455e	50/85 mm x 80/70 mm	2,2	375	220
abc	8227e	50/95 mm x 85/50 mm	2	320	205
abc	7565e	50/95 mm x 85/50 mm	3	320	205
abc	11166e	55/85 mm x 75/70 mm	1,8	380	215
abc	11167e	60/95 mm x 75/70 mm	2,4	432	230
abc	10203e	60/89 mm x 73/63 mm	1,6	400	195
abc	8545e	65/105 mm x 90/64 mm	2,2	390	245
abc	11590e	65/95 mm x 75/70 mm	2	410	208
abc	11259e	75/105 mm 75/70 mm	2,7	520	255
abc	10227e	75/104 mm x 73/63 mm	1,9	440	203
abc	10236e	80/120 mm x 73/63 mm	3	530	265
abc	8546e	85/125 mm x 90/64 mm	2,7	530	295
abc	10389e	90/121 mm x 73/63 mm	2,4	528	247

Products

Spring bush bearings

BR roller bearing

Type of product	Product No.	Product dimension	Weight [kg]	C0 [kN]	C [kN]
br	8132e	35/60 mm x 64/38 mm	0,6	115	82
br	2671e	35/62 mm x 50/36 mm	0,6	90	65
br	2436e	35/65 mm x 56,5/38 mm	0,65	95	50
br	2955e	35/65 mm x 64/38 mm	0,7	100	85
br	11386e	40/68 mm x 58/45 mm	0,9	160	101
br	10144e	40/71 mm x 60/45 mm	0,9	145	110
br	10772e	45/67 mm x 50/40 mm	0,6	130	80
br	10063e	45/67 mm x 73/63 mm	0,8	240	130
br	10145e	45/75 mm x 86/70 mm	1,3	260	175
br	10541e	50/80 mm x 75/70 mm	1,5	350	215
br	11941e	50/85 mm x 57/45 mm	1,4	153	108
br	8679e	50/85 mm x 73/45 mm	1,5	183	140
br	3110e	50/95 mm x 95/70 mm	2,1	285	215
br	11181e	55/80 mm x 73/63 mm	1,2	275	140
br	6204e	55/90 mm x 73/63 mm	2	320	185
br	8466e	60/89 mm x 73/63 mm	1,6	365	175
br	8065e	60/89 mm x 73/63 mm	1,6	345	160
br	6205e	60/95 mm x 73/63 mm	2	365	200

Products

Spring bush bearings

BR roller bearing

Type of product	Product No.	Product dimension	Weight [kg]	C0 [kN]	C [kN]
br	5522e	60/110 mm x 105/94 mm	3,4	515	340
br	9138e	62/89 mm x 73/63 mm	1,5	350	190
br	8511e	70/99 mm x 73/63 mm	1,7	390	180
br	2675e	70/120 mm x 71,5/50 mm	3	315	205
br	11189e	75/104 mm x 73/63 mm	1,8	393	188
br	11397e	75/105 mm x 73/63 mm	3	431	200
br	11190e	90/121 mm x 73/63 mm	2,4	538	250

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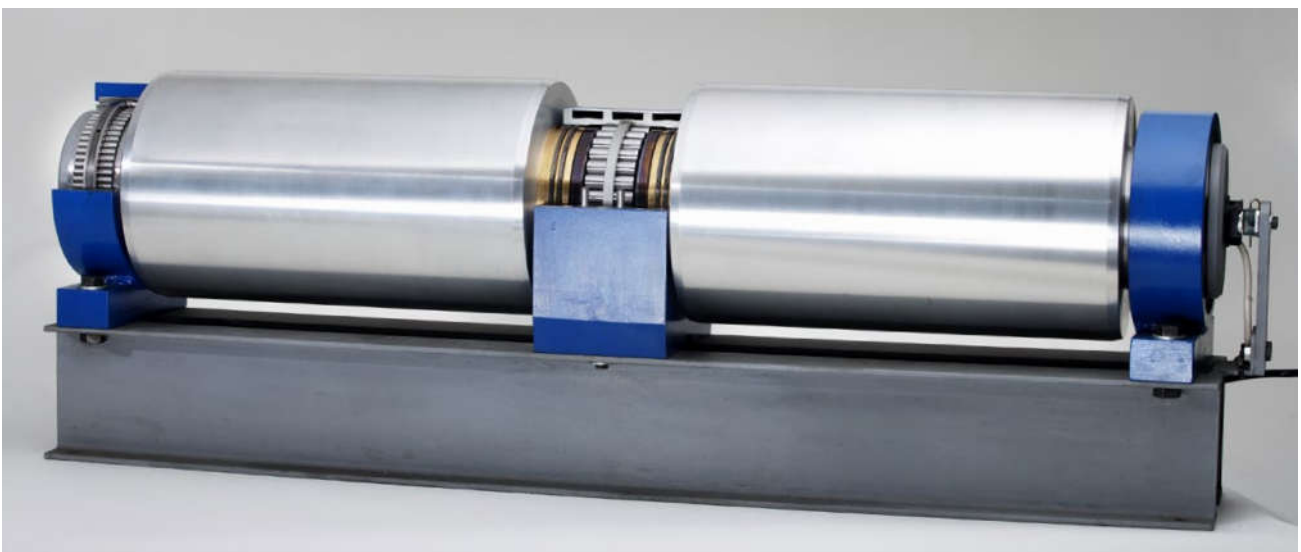
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Products

Split bearings

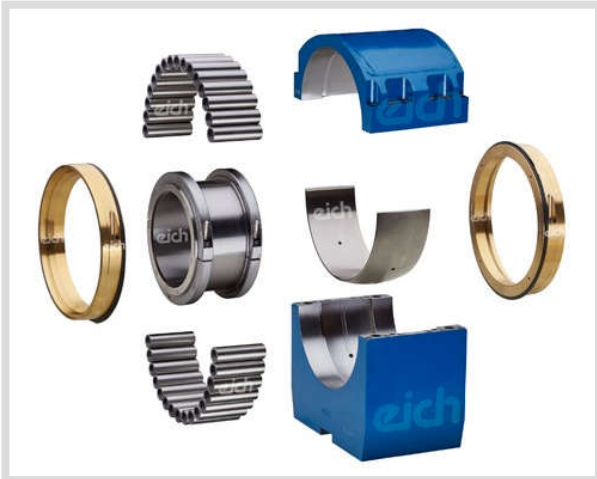
Split bearings are adapted designs to specific applications, such as cranked drive shafts (driven strand guide rollers, support bearings for long / heavy drive spindles), very long drive shafts (shafts, drive shafts in cooling beds) or bearings locations where mounting and dismounting of non-split bearings is not possible (drive shaft of a heavy fan). Split rolling bearings are available as floating bearings, locating bearings and guiding bearings. Locating bearings and guiding bearings carrying radial as well as axial forces. Thrust bearings are also available as split designs, for example as a support bearing for heavy vertical shafts. The split bearings correspond in principle to the structure of non-split bearings, Inner ring, set of rolling elements (full complement or with cage) and the outer ring. All parts except the rolling elements are split. To fit the inner ring of a split bearing so-called clamping rings are added. The inner rings include a pap between their halves, usually between 0.3 to 0.5 mm. With this feature a strong and safe fit for the inner ring is ensured. The gap has a certain angle against the rolling direction to avoid negative effects under load.

The outer ring has no gap and is held by the housing bore. Another design is the so-called split housing bearing unit, this unit includes, in addition to the split bearing, a split housing. These housings available with different features, e.g. integrated water cooling. It should be mentioned that the housing usually shows a minor wearing and thus can be used multiple times.



Products

Split bearings



Split continuous casting bearing units



Spindle bearings for use in the hot rolling mill



Split Ball bearing for use in a Waste incinerator



Application Cooling Bed

Products

Split bearings

SLEGET bearing

Product type	Product No.	Product dimension	Weight [kg]	Shaft-Ø [mm]	Roller-Ø [mm]	Window-width [mm]	C0 [kN]	C [kN]
sleget	11636e	145/120 mm x 120/185 mm	18	75	150	140	710	320
sleget	10540e	175/120 mm x 150/227,5 mm	25	95	175	130	820	360
sleget	6354e	212/134 mm x 145/235 mm	38	100	200	146	810	435
sleget	6772e	212/148 mm x 145/237,5 mm	39	105	205	165	1040	520
sleget	8189e	220/145 mm x 160/260 mm	41	120	220	165	745	375
sleget	8865e	250/162 mm x 165/280 mm	60	130	250	180	1580	800
sleget	8832e	250/160 mm x 160/275 mm	55	135	250	184	1255	645
sleget	8191e	260/165 mm x 185/305 mm	55	140	260	185	1352	677
sleget	7406e	310/174 mm x 200/340 mm	94	160	310	190	1872	1037

Products

SACRB

The SACRB bearing is a rolling bearing that combines highest static load capacities and significant capability of aligning. The name of this bearing type describes the function, it is an adjustable roller bearing. This type of bearing consists of an inner ring, the set of rolling elements, usually full complement or in a few cases with a cage, a spherical outer ring and the adjusting ring, the calotte. The spherical outer ring fits in the calotte and compensate misalignment of the bearing. The aligning movement thereby does not occur in the rolling contact. The load bearing capacity of the roller bearing remains in every position. The floating bearing has a cylindrical and straight inner ring, the rolling elements can easily float axially. By the principle of angle adjustment described above, even in the tilted state, an unconstrained axial displacement, e.g. by thermal expansion, is possible. The locating bearing has either a fixed rib on the inner ring and a lateral thrust ring, or a straight cylindrical inner ring and two lateral thrust rings which take the axial loads.

The SACRB bearings are an alternative to spherical roller bearings or toroidal bearings, they can be exchanged usually 1: 1.

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SACRB BEARING
GERMAN

SACRB BEARING
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Products

SACRB

SACRB bearing

Product type	Product No.	Product dimension	C0 [kN]	C [kN]
sacrb	7896e	50/110 mm x 40 mm	288	178
sacrb	8931e	55/120 mm x 43 mm	360	230
sacrb	10579e	65/100 mm x 35 mm	250	117
sacrb	7897e	65/140 mm x 48 mm	473	240
sacrb	8504e	75/125 mm x 40 mm	365	195
sacrb	8082e	80/140 mm x 33 mm	335	180
sacrb	11595e	80/140 mm x 43/33 mm	345	175
sacrb	10248e	90/125 mm x 46 mm	455	175
sacrb	11219e	90/135 mm x 60/55 mm	605	245
sacrb	8195e	100/150 mm x 50 mm	630	241
sacrb	8362e	100/150 mm x 76 mm	615	270
sacrb	10319e	100/165 mm x 62/52 mm	660	295
sacrb	11570e	100/165 mm x 65 mm	790	335
sacrb	10672e	100/215 mm x 73 mm	1000	570
sacrb	8072e	110/170 mm x 60 mm	859	350
sacrb	8326e	110/170 mm x 76 mm	750	315
sacrb	10036e	110/180 mm x 69 mm	1000	400
sacrb	11569e	120/180 mm x 60 mm	920	365

Products

SACRB

SACRB bearing

Product type	Product No.	Product dimension	C0 [kN]	C [kN]
sacrb	8412e	120/180 mm x 60/87 mm	825	325
sacrb	8004e	130/200 mm x 69 mm	1150	410
sacrb	8921e	130/210 mm x 80 mm	1285	585
sacrb	11416e	140/195 mm x 50/40 mm	595	255
sacrb	8442e	140/225 mm x 68 mm	1055	530
sacrb	7777e	150/225 mm x 75 mm	1400	460
sacrb	8133e	160/240 mm x 80 mm	1600	575
sacrb	8268e	170/260 mm x 90 mm	1995	745
sacrb	10519e	180/280 mm x 100 mm	2020	1020
sacrb	10212e	196/320 mm x 140 mm	3340	1400
sacrb	9033e	200/310 mm x 82 mm	1890	800
sacrb	8419e	220/340 mm x 90 mm	2445	984
sacrb	8574e	240/400 mm x 128 mm	3650	1750

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Products

Cylindrical roller bearings

Cylindrical roller bearings with high load capacity

What are the advantages of such roller bearings?. Due to their design, they have a high load-bearing capacity. The large radial load rating of such a bearing makes it particularly powerful, especially at high loads. Spherical roller bearings have a lower load capacity due to their smaller line contact while the outer dimensions are the same. Cylindrical roller bearings have a longer line contact on their larger surface despite their small size. If required, the cylindrical roller bearings manufactured Eich Roller Bearings can be made of heat-resistant material.

Cylindrical roller bearings can be used as floating or locating bearing. The fields of application for cylindrical roller bearings made by Eich Roller Bearings are manifold. Various bearings used in almost all areas of mechanical and plant engineering and support users especially in dealing with large and complex machines and plants.



Products

Cylindrical roller bearings

Roller bearings with longer rolling elements

Are there any methods to optimize bearing capacities while keeping the cross section? Cylindrical roller bearings have the advantage that they are designed for this. Every bearing is designed for an optimum load carrying capacity. Through our independent production we have always the option to use special rolling elements, beyond the standard sizes from DIN ISO. Despite a compact cross section of the bearing, the needle-like rolling elements can generate an optimum static load capacity by their length and number. The rolling elements are long cylindrical rollers. Due to the design, Cylindrical Roller Bearings can be installed especially if there is little space, but a high load rating has to be achieved. Therefore, such bearings are often installed in facilities of the heavy industry, but there is a variety of other applications.

Different bearing solutions can be realized such as single-row or multi-row bearings, depending on the needs from the application.



Products

Cylindrical roller bearings

Roller bearings with long life

How long can a roller bearing be used? Depending on the application, the materials for these roller bearings are precisely compiled to adapt the cylindrical roller bearing to your requirements. Therefore it is of major importance to get all available application details, e.g. the expected temperatures, loads and speed. Based on this, a problem solution must also be found for seals. The Eich Roller Bearings are also characterized by their high dirt and temperature insensitivity. In conjunction with the high quality materials and modular design for most bearings, a long service life can be expected. We at Eich Rollenlager see ourselves as problem solvers. Even under the harshest conditions, the bearing units must work properly and perform reliable. Where other bearings reach their limits, our cylindrical roller bearings are used! Especially for special cases we find a solution in close consultation with you and adapt our bearings to your requirements. Our roller bearings are not standardized or common because we do not manufacture bearings in series. Our goal is to find special solutions where standard bearings fail.

PERSONAL ADVICE

Do you want to get advice for your project or do you have a problem with various bearings?

Do not hesitate to contact us and we will find an alternative solution for your problem, no matter whether it is a cylindrical roller bearing or a needle roller bearing. Our bearings are very dirt and heat resistant and can meet your demands.

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**ASSEMBLING DIVIDED
ROLLER BEARING**
GERMAN

**ASSEMBLY CYLINDER
ROLL BEARINGS**
ENGLISH

**ASSEMBLING DIVIDED
ROLLER BEARING**
ENGLISH

Products

Hardening process

Materials and heat treatment at Eich roller bearings

Materials and heat treatment are important components and processes that influence the properties and performance of rolling bearings. In recent years, we have significantly expanded our expenses in this area. In the past materials purchase and heat treatment was based on standards. Today our process starts with skilled and qualified material selection, the heat treatment process is an integral part of the design process right from the beginning of the design process of our products.

In close cooperation with our material suppliers and hardening shops, we plan and simulate today the best material selection and the most suitable heat treatment process for the respective applications.

In addition, we work with scientific research institutes such as the Science institute of VDEh, and universities.

Products

Hardening process

Materials for rolling bearings and rolling bearing parts

There are a number of materials available for the different types and applications of rolling bearings, each of which is selected by the choice of weighing several criteria. First and foremost is the performance of the rolling bearing, but also issues of economy, environment protection, availability and processability influence the choice of materials.

The best-known and probably the most widely studied steel in the world is the 100Cr6. Since the turn of the century from the 19th to the 20th century and the work of Stribeck, this steel grade, with about 1% carbon and 1.5% chromium, is almost unchanged in its chemical composition.

The steel qualities commonly used today for rolling bearings are listed in the international standard DIN EN ISO 683-17 and described in detail.

Tabelle 6 — Härte in den üblichen Lieferzuständen

Stahlbezeichnung	Kurzname	Nr.	Härte im Lieferzustand							
			+S HBW max.	+A HBW max.	+U HBW max.	+AC ^b HBW max.	+AC ^b +C HBW max.	+FP HBW	+A+C HBW max.	
Durchhärtende Walzlagerstähle										
100Cr6	B1	b	—	—	—	207	241 ^{c,d}	—	—	—
100CrMnSi4-4	B2	b	—	—	—	217	—	—	—	—
100CrMnSi6-4	B3	b	—	—	—	217	251 ^d	—	—	—
100CrMnSi8-6	B4	b	—	—	—	217	251 ^d	—	—	—
100CrMo7	B5	b	—	—	—	217	251 ^d	—	—	—
100CrMo7-3	B6	b	—	—	—	230	—	—	—	—
100CrMo7-4	B7	b	—	—	—	230	280	—	—	—
100CrMoSi8-4-6	B8	b	—	—	—	230	—	—	—	—
Einsatzhärtende Walzlagerstähle										
20Cr3	B20	e	207	156 bis 207	170	f	—	—	—	—
20Cr4	B21	e	207	156 bis 207	170	f	140 bis 187	—	—	—
20MnCr4-2	B22	e	207	153 bis 207	170	f	—	—	—	—
17MnCr5	B23	e	207	156 bis 207	170	f	140 bis 187	—	—	—
18MnCr5	B24	e	207	156 bis 207	170	f	152 bis 201	—	—	—
18MnCr5	B24	e	217	170 bis 217	179	f	152 bis 201	—	—	—
15CrMo4	B25	e	207	156 bis 207	170	f	137 bis 184	—	—	—
20CrMo4	B26	e	207	163 bis 207	170	f	146 bis 193	—	—	—
20MnCrMo4-2	B27	e	207	156 bis 207	170	f	146 bis 193	—	—	—
20MnCrMo5-2	B28	e	212	153 bis 212	170	f	149 bis 194	—	—	—
20NiCrMo7	B29	e	255	229	174 bis 229	170	f	154 bis 202	—	—
18CrNiMo7-6	B30	e	255	229	179 bis 229	179	f	159 bis 202	—	—
18NiCrMo14-6	B31	e	255	—	—	241	f	—	—	—
18NiCrMo16-5	B32	e	255	—	—	241	f	—	—	—
Induktionshärtende Walzlagerstähle										
C55E2	B40	e	255 ^g	229	—	—	—	—	—	—
58Mn4	B41	e	255 ^g	229	—	—	—	—	—	—
70Mn4	B42	e	255 ^g	241	—	—	—	—	—	—
43CrMo4	B43	e	255 ^g	241	—	—	—	—	—	—
Nichtrostende Walzlagerstähle										
X4Cr14	B50	h	—	—	248	f	—	—	—	—
X9Cr14	B51	h	—	—	255	f	—	—	—	—
X10CrMo17	B52	h	—	—	255	f	—	—	—	—
X9CrMoV18-1	B53	h	—	—	255	f	—	—	—	—
Warmhärtende Walzlagerstähle										
80MoCrV42-16	B60	h	—	—	248	f	—	—	—	—
13MoCrNi42-16-14	B61	h	—	—	248	f	—	—	—	—
X3CrNiMoCrV6-5-4	B62	h	—	—	248	f	—	—	—	—
X2CrNiC18-4-1	B63	h	—	—	269	f	—	—	—	—

^a Für Einsatzstähle wird dieser Zustand verwendet, wenn Kaltumformen vorgesehen ist. Bei durchgehenden nichtrostenden und warmharten Walzlagerstählen wird dieser Zustand auch verwendet, wenn der Stahl durch spanendes Bearbeiten weiterverarbeitet wird.

^b Wenn dieser Zustand benötigt wird, sind der Höchstwert der Härte und die Anforderungen an das Gefüge bei der Anfrage und Bestellung zu vereinbaren.

^c Die Härte von Draht für Nadellager darf bis zu 331 HBW betragen. Der Höchstwert der Vickers-Härte (HV) ist bei der Anfrage und Bestellung zu vereinbaren.

^d Die Härte von kaltgeformten Hohlstäben darf bis zu 321 HBW betragen.

^e Unter geeigneten Bedingungen ist diese Sorte im unbenutzten Zustand scherbearbeitbar.

^f Je nach Kaltumformgrad dürfen die Werte bis zu etwa 50 HBW über denen für den Zustand +AC liegen. Wenn erforderlich, dürfen genaue Anforderungen bei der Anfrage und Bestellung vereinbart werden.

^g Je nach chemischer Zusammensetzung der Schmelze und den Maßen kann Zustand +A erforderlich sein.

^h Scherbearbeitet ist im Allgemeinen nur im Zustand +AC oder im Zustand +A (nur für Sorte 13MoCrNi42-16-14) möglich.

February 2015

DIN EN ISO 683-17	DIN
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ICS 77.140.10; 77.140.20 Supersedes
DIN EN ISO 683-17:2000-04

**Heat-treated steels, alloy steels and free-cutting steels –
Part 17: Ball and roller bearing steels (ISO 683-17:2014);
English version EN ISO 683-17:2014,
English translation of DIN EN ISO 683-17:2015-02**

Für eine Wärmebehandlung bestimmte Stähle, legierte Stähle und Automatenstähle –
Teil 17: Walzlagerstähle (ISO 683-17:2014);
Englische Fassung EN ISO 683-17:2014,
Englische Übersetzung von DIN EN ISO 683-17:2015-02

Aciers pour traitement thermique, aciers alliés et aciers pour décolletage –
Partie 17: Aciers pour roulements (ISO 683-17:2014);
Version anglaise EN ISO 683-17:2014,
Traduction anglaise de DIN EN ISO 683-17:2015-02

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Products

Hardening process

Materials for rolling bearings and rolling bearing parts

Among other things, the standard gives precise information about the designations, order details, chemical analyzes, mechanical properties and purity.

The steels are supplied up to a diameter of 250 mm either as a rod or as a tube. Ring dimensions above 250 mm are usually forged.

The most commonly used steels for the products at Eich Rolle Bearings are the above-cited DIN EN ISO from the group of through-hardening steels, the 100Cr6 or according to the wall thickness respectively adapted alloys for better through hardenability. From the group of case-hardened steels it is the 18CrNiMo7-6 or the 19MnCr5. For stainless parts we use the X46Cr13 or X65Cr14.

For applications in the high temperature range we have proven the qualities X40CrMoV51 or X153CrMoV12. Both steels have very good properties in the high temperature ranges.

For the rolling bearing types of the spring technology, a common spring steel strip, namely 50CrV4 or 51CrV4, which is very well researched, like the 100Cr6, is used. We collaborate on the further development of this steel in close cooperation with our suppliers as well as with renowned material institutes. The shapes and qualities used today are the result of many years of continuous cooperation. For use in the high temperature range, we also use specially rolled hot-work steel (X40CrMoV51). As a rule, we use unalloyed carbon steels for pressure rings, discs, but also cages. Cages that are not made of steel are made of brass or high-strength aluminum.

For all materials used, compliance with the chemical analysis in accordance with standards and, in the case of parts subjected to rolling, also the purity of the primary material is a decisive criterion. All material deliveries are documented by appropriate certificates. Additional tests, such as crack tests, ultrasonic tests or similar can be agreed.

Products

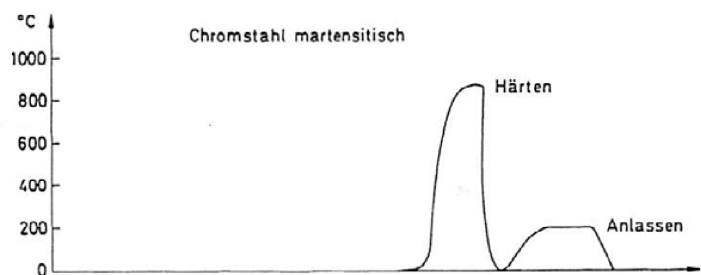
Hardening process

Heat treatment

The excellent material quality is the prerequisite for all subsequent production steps. After the soft machining of the parts, the heat treatment follows. This operation is the one in which properties for the components matched to the particular application can be set.

The classical heat treatment process for bearing rings made of through-hardened steels is the martensitic hardening with subsequent tempering.

The parts are heated to a well-defined temperature, held there for a period of time and then quenched. After quenching, the parts then have the so-called quenching hardness. Quenching takes place in an oil bath or today in special polymer blends. After cooling, the parts are then tempered again



in a corresponding furnace, they are heated again. The tempering temperatures depend on the desired properties, e.g. the temperature resistance. The temperature selected during tempering determines the maximum operating temperature for the part up to which the material has a stable structure. Through the annealing process many variants or properties of chrome steels can be affected, e.g. in a certain temperature window, a disproportionate increase in toughness is achieved with low loss of hardness.

Another well-established method is bainitization (isotemp hardening), which produces a very favorable residual stress distribution in the material. They are achieved by keeping the quenched parts at the material-dependent quenching temperature. Holding for several hours results in a gradual transformation of the microstructure, with residual compressive stresses occurring in the surface layer. These compressive stresses reduce the material fatigue when overstressed and have a reducing effect on cracks, if such form after a high number of load cycles.

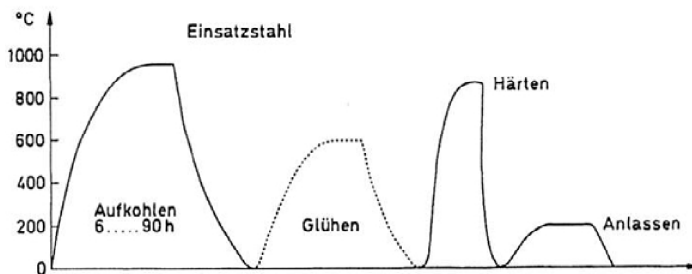
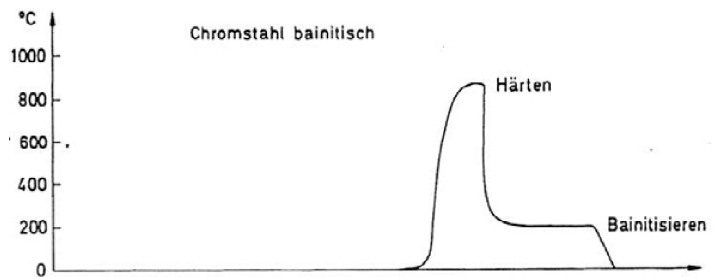
Products

Hardening process

Heat treatment

The third hardening process is case hardening. In many applications, rolling element bearings are subject to high impact or flexural fatigue, or due to mounting conditions, the bearing rings have a loose fit. This can lead to relative movements between bearing

parts and on the shaft, with local overheating and cracking as a result. Case hardening steel and the corresponding hardening process are recommended for these applications. After a guided gas carburization, the components are subjected to a martensitic heat treatment, which generates, apart from the hard edge zone around the viscous core, residual compressive stresses in the surface layer.



Since case hardening produces a hardness and strength that decreases toward the center of the workpiece cross-section, it is necessary to set case hardening depths

according to load and contact geometry to counteract plastic deformation of the contact point or fatigue damage during static or dynamic operation. The case hardening depth is approximated using the following formula: $E_{ht550HV} \geq (0.07 \dots 0.12) \times \text{rolling element diameter}$. Depths up to approx. 2mm are standard, larger depths are very costly, depending on the size of the component, furnace times of up to 90 hours result.

Products

Hardening process

Heat treatment

Further, the methods of flame or inductive hardening are mentioned. In these methods, only parts of a component can be treated.

In recent years, also some mechanical methods for increasing the component properties have established, namely the shot peening or the solid or smooth rolling. In these methods, near-surface favorable residual stress states are generated.

Last but not least, there are the processes of surface technology - coatings. With these methods, also the properties of the components can be influenced application-related. Here, in particular, the browning and phosphating have become established. By these methods, the run-in behavior and the emergency running properties are increased.

Areas of application



- › Continuous casting
- › Furnace bearing
- › Rolling mills
- › Waste incineratorss

Areas of application

Continuous casting



Areas of application

Continuous casting

Eich Roller Bearings in Continuous Casting - Timeline

In 1968, Mannesmann-Sack at Thyssen Grillo in Gelsenkirchen-Schalke equipped a vertical caster with Eich spring roller bearings. The spring roller bearings impressed with their high resistance against the difficult environment, which was influenced by the negative effect of the secondary cooling and the high temperatures from the casting process.

In addition to these influencing factors, the bearings had to carry load from the ferrostatic pressure. The higher internal temperature in the center compared to the solidified shell leads to an expansion of the strand. This expansion can lead to cracks in the surface, the worst case is a so called break-out. The solidified shell breaks and liquid steel flows into the machine. Loss of production, plant damage and in the worst-case danger to the life and limb of employees could be the consequences.

View of a plant breakdown strand looking into the „leaked“ strand



Areas of application

Continuous casting

From a single source - bearing solutions from the casters footrollers to the straightening segment

Eich Roller Bearings were well-known for its robustness in roller conveyors at Sack and thus became a standard for continuous casting plants. Since the late sixties, our products have been used in more than 250 continuous casters as original equipment.

Eich Roller Bearing offers bearing solutions for problems when using rolling bearings in plants for the production and forming of steel. Due to decades of cooperation with equipment manufacturers and operators, Eich Roller Bearings has a strong know-how. Numerous steel mills rely on the products of Eich Roller Bearings, which includes bearing solutions for many bearings applications on casters that have hindered continuous production due to premature failure of the bearings. Numerous steel mills around the world benefit from the quality of tailor-made solutions that enable increasing productivity and maximum reliability to be achieved economically and safely. With our current program for continuous casting plants, consisting of ABC bearings, SACRB and split bearings, Eich offers bearing solutions that are perfectly tailored to the requirements of continuous casting plants.



BR bearing



Split bearing



SACRB bearing

Areas of application

Continuous casting

Spring sleeve bearings in the upper strand guide and casters

ABC bearings are the spring bush bearings for the new millennium. After the spring roller bearing was replaced in the 80s more and more by the Eich spring bush bearing type BR, it was apparent at the beginning of the 2000s that the demands of the systems on the bearings in the upper segments continued to increase.

In some CSP plants and classic slab caster plants, more and more twisted bearing cages were found. It was bearing damage that occurred before the end of the usual life cycle of the bearings. In 2005, Eich presented a solution to address the issues described above that were first reported to our representative for Spain by a plant operator in south of Spain.

The solution continued to consist of two conventional spring bushes and side lateral rings, as these parts of the bearing were inconspicuous and a modified roller cage. So far, the cages of the used types, spring roller bearings and spring bush bearings, were manufactured at Eich by a special riveting process. This connection was overstressed by, for example meandering strand movements, when the strand guide rollers ran to the side of the bearing block and were partially decelerated.

As a result, bearing blocks and the faces of the roller shells were damaged and the rivets on bearing cages loosened or twisted the connecting pins with the rivet heads - twisted. The cage could not fulfill its task of guiding the rolling elements during the rolling process.



Areas of application

Continuous casting

The new solution had to mitigate or ideally solve this problem. Each developed a snap-mechanism, which also gave the cage its internal name „snap cage“, in which it was possible to dispense with riveting and, in the case of lateral pressure, kept the cage rotating.

In this case, the base ring in which the rolling elements are now guided over their entire length, and the cup are connected

by groove and lock principle shaping. Both rings remain against each other capable of rotating, blocking by lateral pressure belonged to the past as well as bearing damage caused by twisted cages.

The new bearing concept is called ABC Bearing or ABC Spring Bush Bearing because it successfully prevented the blockage of the cage during the casting process. ABC means „anti-blocking-cage“. The



problems with twisted cages are no longer encountered in facilities that use ABC bearings. In more and more new plants, these ABC bearings are provided by the leading equipment manufacturers directly in the original equipment - the ABC bearing is in the process of becoming the new standard for successful spring bush bearings in continuous casting plants.



Areas of application

Continuous casting

The concept of „three-ring“ bearings with cross grinding in continuous casting plants

The full complement cylindrical roller bearing has been specially developed for use as a floating bearing in continuous casting plants. Due to the internal design, which optimally fills the cross-section, this rolling bearing achieves an optimum static load capacity.

The SACRB bearing for strand guide rollers as the ideal floating bearing solution allows unconstrained axial displacement and can compensate angular errors >

0.5 °. Due to the full complement design, a maximum static load capacity is possible, which optimally supports the casting strand, especially when the rollers are rotating slowly, even at the main bending points from vertical to horizontal where the greatest forces occur.

The SACRB cylindrical roller bearings by Eich roller bearing receive a special cross-grinding which improves the mobility of the outer ring in the calotte. In the upper segments Eich spring bush bearings are used. Floating bearings in strand guide rollers must balance the longitudinal extent of the waves as casually as possible and compensate for shaft deflection. The high loads require a high static load capacity of the bearings. The common floating bearing solutions usually represent a compromise and do not meet these requirements optimally. The new SACRB three-ring roller bearing (Self-Aligning Cylindrical Roller Bearing) combines the advantages of full complement cylindrical roller bearings with the properties of a toroidal bearing.



Areas of application

Continuous casting

The concept of „three-ring“ bearings with cross grinding in continuous casting plants

High radial load capacity, ease of axial displacement and the ability to compensate for angular errors. All combined in a bearing that does not need to be mounted offset, as in the case of a toroidal bearing, to compensate for the heat expansion of the roller. It can also be easily assembled and disassembled with assembly instructions, films and auxiliary equipment at its disposal. The optimized floating bearing already proves its worth in numerous strand guide rollers. It has been used since 2004 in more and more installations by operators as a substitute for insufficient standard bearings and plant manufacturers in the original equipment of new plants.



Areas of application

Continuous casting

Split bearing units with water cooled housings - split bearings

Ideal bearing solution - low maintenance highest supporting effect

For the installation in driven rollers, there are shared full complement cylindrical roller bearings made by Eich Rollenlager for decades, installed in a housing with included cooling system, also designed by Eich. These fully radially split bearing units complement the range of Eich products for use in continuous casting plants. The operating conditions in continuous casting plants place the highest demands on the bearings used. The bearings are subject to high loads at low speed.

The bearings must work reliably despite high temperatures and thus caused lubricant problems. These split bearing units run as a center bearing to prevent deflection of the roller and accommodate misalignments.

In the down part of the unit a half outer ring, with a special ground spherical surface, ensures the aligning of the bearing in misaligned position. The fact that only a half outer ring is used saves space for the upper part. This space is used for efficient water cooling. The housing is made of steel to offer maximum stability and usually. It can be reused several times, the bearing and the housing can be changed separately and are available as a spare part.



Areas of application

Continuous casting

In the meantime, Eich has also overhauled the housing for customers, which enables the further use of the housing after damage, thus further improving the customers' total cost of ownership (TCO) and life-cycle cost (LCC), similar to the repairable spring-bush bearings.



These bearings also provide a smooth axial displacement and compensation of angular errors and assembly and disassembly without special tools. There are detailed installation videos and instructions for this.

DOWNLOADS ASSEMBLY INSTRUCTIONS

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MOUNTING VIDEOS

**VIDEO 1
MOUNTING OF SPLIT
BEARINGS**



**VIDEO 2
MOUNTING OF SPRING ROLLER
BEARING**



Areas of application

Furnace roller bearing



Areas of application

Furnace roller bearing

2019

Eich Rollenlager has been a provider of special furnace bearings for 80 years. Eich type B and UL spring roller bearings are a special design of spring bush bearing. They are particularly suitable in applications with high temperatures, frequent unforeseen shocks, misalignments and considerable amount of dirt. An ideal, flexible rolling bearing for extreme environmental conditions.

Advantages of the spring roller bearings are:

- _ Suitability for high operating temperatures
- _ Low sensitivity to dirt
- _ The compact design enables optimized bearing cross-sections
- _ The flexible rolling element made of wended steel has a shock absorbing effect
- _ The modular design of the bearings also makes it possible to replace individual parts during revisions



The current spring roller bearings for furnaces are available as floating bearing type B (free side) and as locating bearing type U (fix side). The floating bearing type B consists of the spring outer sleeve, the spring roller cage, two lateral rings (to guide the cage) and a long flexible inner bush (the length of the inner flexible bush depends usually on the expected thermal expansion). The type U/UL bearing consists of the spring outer sleeve, the spring roller cage, the spring inner sleeve and the inner and outer lateral rings arranged on both sides (these lateral rings fix and guide the bearing). Depending on requirements, the bearing is fixed by the use of hardened lateral rings. The application for spring bush bearings for furnaces are designed as a floating (B type series) and a locating bearing (U/UL type series) bearings.

Areas of application

Furnace roller bearing

The inner and outer rings, the so called spring bushes, are made from specially cold-rolled and form-rolled tempered steel. The spring bushes undergo a 6-stage, constantly evolving manufacturing process. Here, the outstanding properties for the function are set as a robust, fault-tolerant functional part (optimum ratio of strength and ductility). A big advantage for the user is the very simple assembly of the spring bushes. The spring inner bush is made with a defined undersize to the shaft / axis and the spring outer bush accordingly with a defined over size to the inner diameter of the furnace roller, the so-called pre-tension.

This pre-tension ensures the safe fit of the spring bushes on the corresponding bearing seat. Compared to standard bearings, there are no special tolerances or surface qualities to be set for the bearing seat surfaces (cost-effective production of the adjacent construction). Another great advantage of the spring bushes is the high adaptability, e.g. In the case of high temperatures any thermal expansions are easily compensated by the structure of the spring bushes. An important note for the use of spring bushes is the restriction that they must not be axially strained.



Outerspringbush



Innerspringbush

Areas of application

Furnace roller bearing

Spring roller cage

The spring roller cage consists usually from the spring rollers, two cage rings and the double neck pins, these are riveted at their ends to connect the assembly and guide the spring rollers. But the special element is the rolling element, the spring roller, which we will discuss separately. Spring roller cages are usually riveted with a flat head. A special design with a round head is used when it is assumed that the cage receives axial forces or movement against the connected construction. The semicircular heads of riveting then serve as sliding elements with point contact. The spring roller is a hollow rolling element, which explains the lower load capacity compared to a solid rolling element. Under load, the contact surfaces (rolling elements / raceways) show some kind of flexible reacting on loads. The spring rolling ele



Spring roller cage

Areas of application

Furnace bearing

Cage design für spring roller

The spring roller is a hollow rolling element, which explains the lower load capacity compared to a solid rolling element. Under load, the contact surfaces (rolling elements / raceways) show some kind of flexible reacting on loads. The spring rolling element "deforms" radially as well as axially, it becomes smaller and longer, in other words it stays round and thus rotatable or continuous to "roll". These properties have been determined in extensive scientific experiments, also to derive from it a corresponding formula work, to establish a method to calculated load ratings and life. The limit of the spring roller is the alternating bending stress, which occurs at the inner diameter of the spring roller. Spring rollers are suitable for a maximum speed of 500 - 1000 revolutions per minute.



Standard FRO

Areas of application

Furnace bearing

Application examples for furnace

Aluminum furnace cars are subject to both high loads and temperatures, as well as increased axial forces. This leads to heavy loads on the installed furnace wheel bearings. Due to the properties of the rolling elements, a spring roller cage safely accommodates the misalignments and temperature effects and reduces downtimes.



Furnace with bearing

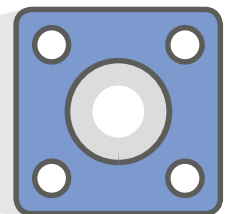
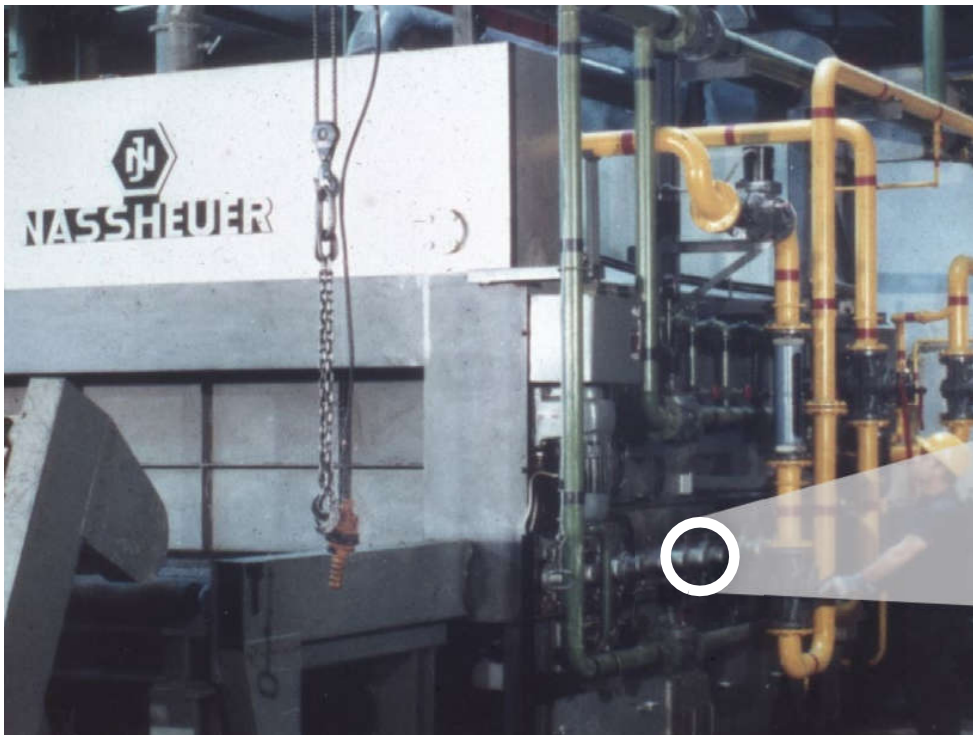


Areas of application

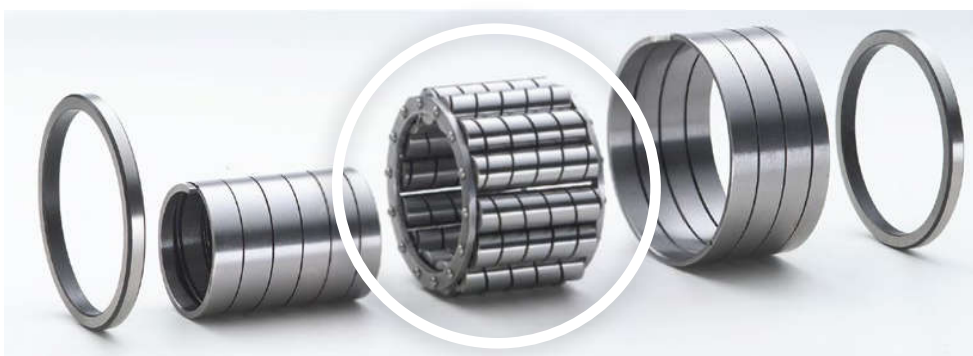
Furnace bearing

Application examples for furnaces

In contrast to the furnace car, the spring roller bearings are mounted in tunnel furnaces as loose and fixed bearing by means of bearing flanges on the furnace wall. The bearings work directly in the furnace atmosphere and are partly also under the stress of flue gas. The bearings are subjected to high loads both by the temperatures, as well as shocks in the transfer of goods between the furnace hearth rolls.



Tunnel furnace with spring roller bearing



Standard spring roller cage

Areas of application

Furnace bearing



- _ Illustration of a B-type free side bearing with spring rollers consisting of the spring roller cage, spring sleeves and lateral stop rings.
- _ Heat stabilized up to 350 ° C
- _ Common use environments are high temperature applications with heavy impact by the medium being transported.
- _ Particularly resistant to the negative effects that can be caused by high temperatures, impacts, insufficient lubrication, penetrating media (flue gas).
- _ Compared to the standard, such as spherical roller bearings or ball bearings, the spring roller bearing is better suited to absorb impacts, impurities and offers better load ratings at a lower overall height.

Areas of application

Furnace bearing

Already used bearing versions of the B / UL bearing

Product type	Product No.	Product Dimension	Weight [kg]	C0 [kN]
b	558e	30/65 mm x 80/40 mm	0,70	41,00
ul	351e	30/65 mm x 40 mm	0,55	41,00
b	499e	40/75 mm x 120/58 mm	1,08	72,00
ul	375e	40/75 mm x 58 mm	0,97	72,00
ul	033e	40/82 mm x 69 mm	1,50	95,00
b	035e	40/82 mm x 140/69 mm	1,70	95,00
ul	5872e	45/95 mm x 70 mm	2,10	115,00
b	11112e	50/92 mm x 106/69 mm	1,84	110,00
ul	10531e	50/92 mm x 69 mm	1,75	110,00
ul	1171e	55/97 mm x 69 mm	1,85	117,00
b	1170e	55/97 mm x 140/69 mm	1,96	117,00
b	042e	65/102 mm x 140/69 mm	2,16	145,00
ul	4854e	65/102 mm x 69 mm	1,96	145,00
b	2464e	70/120 mm x 140/60 mm	3,14	125,00
ul	7864e	70/107 mm x 69 mm	1,97	165,00
ul	8125e	80/140 mm x 50 mm	3,00	130,00
b	8126e	80/140 mm x 55/50 mm	3,10	130,00
b	2751e	110/170 mm x 100/70 mm	5,39	218,00
