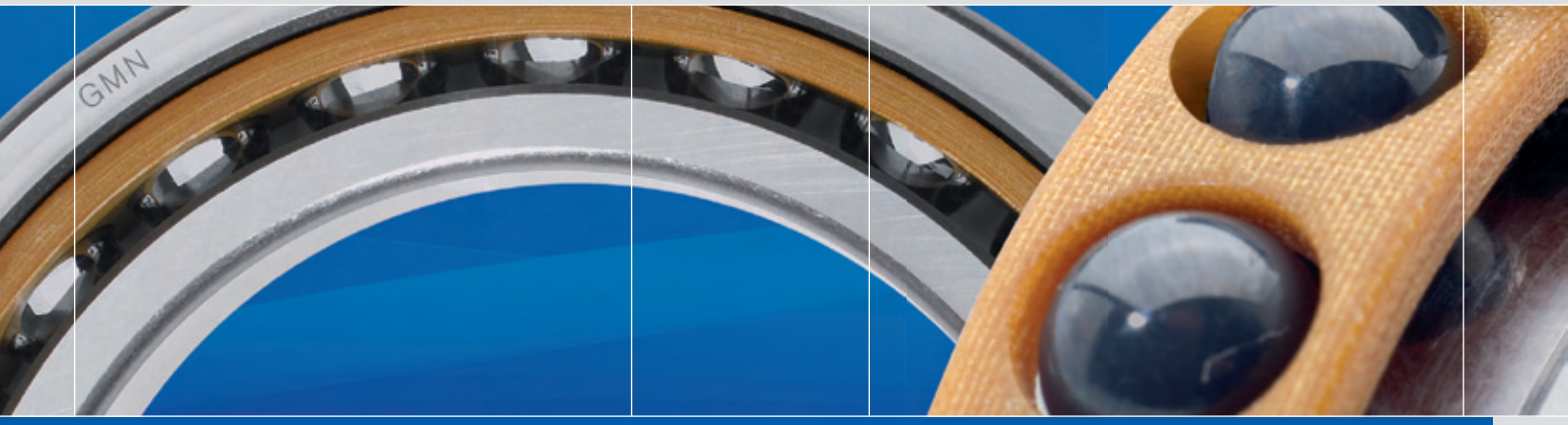
GMN



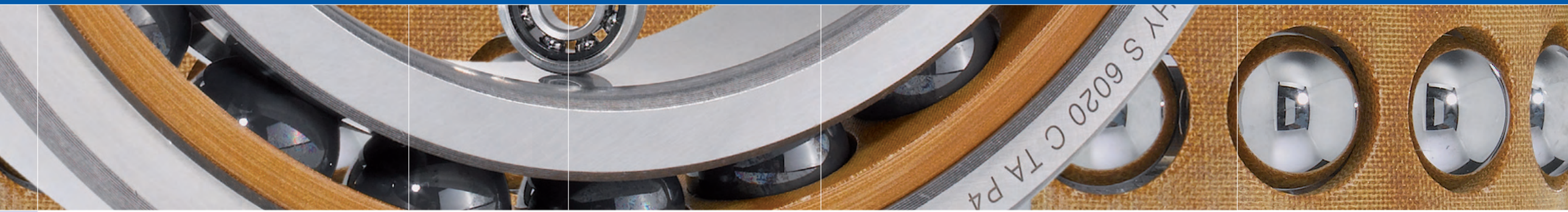
BIGspi

Spindle bearings from 75 to 120 mm

4003 1208 ENG

Contents:

BIGspi
The big solution.



Over the last years, the requirements and the general conditions for the use of high precision bearings have changed a lot.

GMN has expanded its spindle bearing product range with BIGspi, to offer the best possible solution to the consistently growing demand of their customers in regard of technical and economical performance. BIGspi bearings are high precision ball bearings, produced as design series “S” in precision class P4 with a bore diameter of 75 to 120 mm.

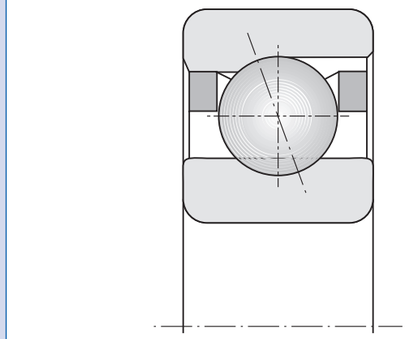
They fulfill highest requests concerning production quality (DIN ISO 9001:2000) and environmentalism. The development of BIGspi bearings is based on GMN’s long experience in the area of applications of high performance ball bearings up to a bore diameter of 70 mm.

Through BIGspi, GMN extends its unique selling point as the only manufacturer of high precision ball bearings with a focus on spindle bearings. That assures products which set international benchmarks for optimized performance, highest reliability and efficiency.

For your successful use of BIGspi bearings, you can count on GMN quality, proved a million fold, highest precision, complete service, market understanding, individual consulting, highest flexibility and delivery dependability.

Bearing design Materials

Bearing series S



GMN standard spindle bearing – non-separable type
Bearing series 60 .. / 619 ..

Materials and characteristics	
Ball bearing-rings	
Material	Vacuum degassed chrome steel 100 Cr 6 equivalent to material no. 1.3505, SAE 52100, SUJ2
Permissible operating temp.	150°C
Balls	
Material (ball bearing steel)	Vacuum degassed chrome steel 100 Cr 6 equivalent to material no. 1.3505, SAE 52100, SUJ2
Material (Ceramic)	Silicon nitride Si_3N_4
Cage	TA
Material	Textile reinforced phenolic resin
Permissible operating temp.	120°C
Cage guidance	On outer ring
Manufacture	Machined
Notes	Standard cage
Mounting	For bearing series S

Hybrid ball bearings

GMN Hybrid ball bearings: Mix of materials for extremes.

Hybrid ball bearings show a material mix of chrome steel 100 Cr 6 (inner- and outer rings) and ceramics (balls). Conventional ball bearings are made out of chrome steel 100 Cr 6 only (rings and balls).

Compared to ball bearings with steel balls, the material characteristics of ceramic balls in hybrid ball bearings lead to an enormous increase in performance of machining – especially at demanding applications.

Numerous tests and practical applications with hybrid ball bearings have shown excellent results.

GMN BIGspi high precision ball bearings (bore diameter 75 to 120 mm) are offered with chrome steel balls as well as with ceramic balls.

Ceramic offers the following advantages:
- small affinity towards 100 Cr 6
- low coefficient of friction
- small thermal conductivity
- corrosion resistance
- no magnetism
- electrically isolating

Advantages of hybrid ball bearings are:

Extended lifetime
The bearing lifetime and equivalent the machinery production time can be doubled compared to conventional ball bearings. That minimizes machine down time.

Higher speed
An increase in speed up to 30% over conventional ball bearings can be achieved due to increased tribological characteristics and reduced mass-forces.

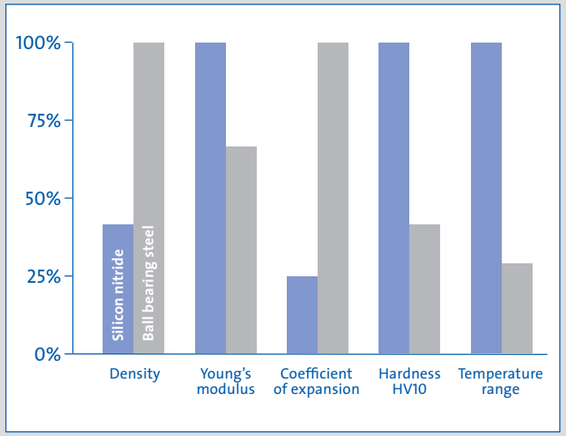
Cost saving lubrication
The maximum attainable speed with grease and oil lubrication is increased. Thus the application range for grease lubrication is extended and a costintensive oil lubrication can often be avoided.

Higher rigidity
The radial and dynamic rigidity improves because of beneficial material properties. Advantages are increased accuracy and a shifting of the critical natural frequency.

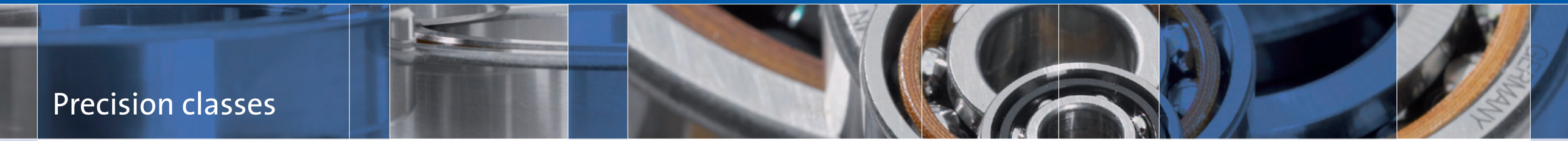
Increased machining accuracy
Higher rigidity, less thermal expansion and less vibrations result in increased machining accuracy.

Application examples:
- machine tool spindles
- high speed machining applications
- lifetime optimized high precision ball bearing applications

Characteristics of silicon nitride and ball bearing steel



Characteristics at ambient temperature	Unit	Silicon nitride Si_3N_4	Ball bearing steel 100 Cr 6
Density	g/cm³	3.2	7.8
Coefficient of expansion	10^{-6}/K	3.2	11.5
Young's modulus	GPa	315	210
Poisson's ratio	-	0.26	0.3
Hardness (Vickers) HV10	-	1600	700
Tensile strength	MPa	700	2500
Fracture toughness	MPa $m^{0.5}$	7	20
Thermal conductivity	W/mK	30–35	40–45
Spec. electric resistance	Ωmm²/m	10^{17}–10^{18}	0.1–1



Precision classes

GMN high precision ball bearings are the result of highest quality demands – starting from development to production. Minimum tolerances for dimensional -, form - and running accuracy enable BIGspi ball bearings to achieve a maximum of performance and lifetime. GMN BIGspi high precision ball bearings are manufactured to precision class P4 (equivalent ABEC 7).

Relationship between international tolerance-standards	ISO	DIN	ABMA
(Tolerance symbols, according to DIN ISO 1132-1)	class 4	P4	ABEC 7

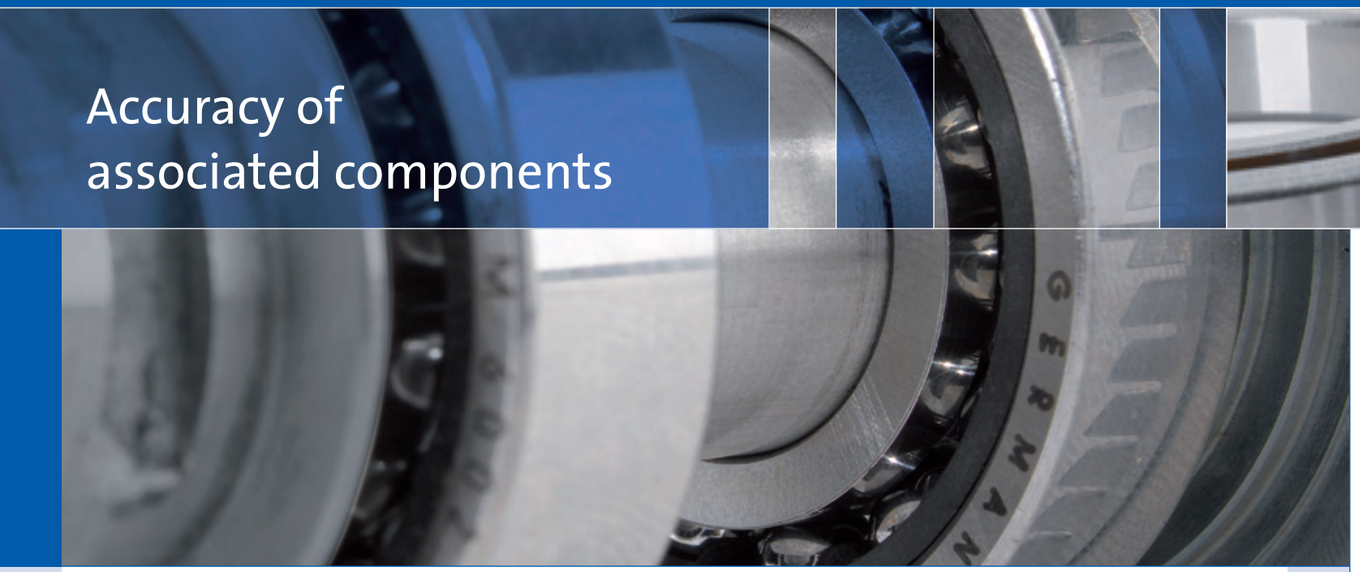
Inner ring limits in micron

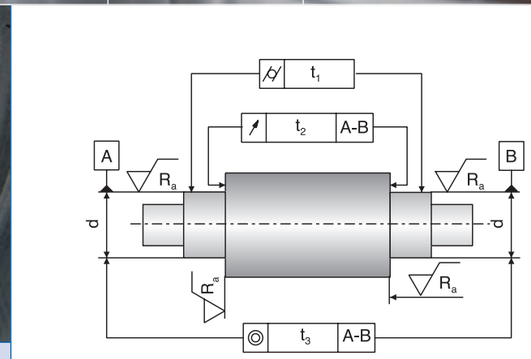
d over **bore diameter, nominal [mm]** to	2.5 10	10 18	18 30	30 50	50 80	80 120
Δ_{dmp} deviation of a single bore mean outside diameter	0 -4.0	0 -4.0	0 -5.0	0 -6.0	0 -7.0	0 -8.0
Δ_{ds} bearing series 60 variation of a single bore diameter	0 -4.0	0 -4.0	0 -5.0	0 -6.0	0 -7.0	0 -8.0
$V_{dp\ max}$ bearing series 619 variation of bore diameter in a single radial plane – out of roundness	4.0	4.0	5.0	6.0	7.0	8.0
$V_{dp\ max}$ bearing series 60 variation of bore diameter in a single radial plane – out of roundness	3.0	3.0	4.0	5.0	5.0	6.0
$V_{dmp\ max}$ variation of mean bore diameter in several planes – taper	2.0	2.0	2.5	3.0	3.5	4.0
$K_{ia\ max}$ radial runout of assembled bearing outer ring	2.5	2.5	3.0	4.0	4.0	5.0
$S_{d\ max}$ inner ring reference face runout with bore – side runout	3.0	3.0	4.0	4.0	5.0	5.0
$S_{ia\ max}$ assembled bearing inner ring face runout with raceway – axial runout	3.0	3.0	4.0	4.0	4.0	5.0
Δ_{BS} single bearing deviation of single width of the inner ring – width tolerance	0 -40	0 -80	0 -120	0 -120	0 -150	0 -200
Δ_{BS} matched bearing deviation of single width of the outer ring – width tolerance	0 -250	0 -250	0 -250	0 -250	0 -250	0 -380
$\Delta_{BS\ max}$ outer ring – width variation	2.5	2.5	2.5	3.0	4.0	4.0

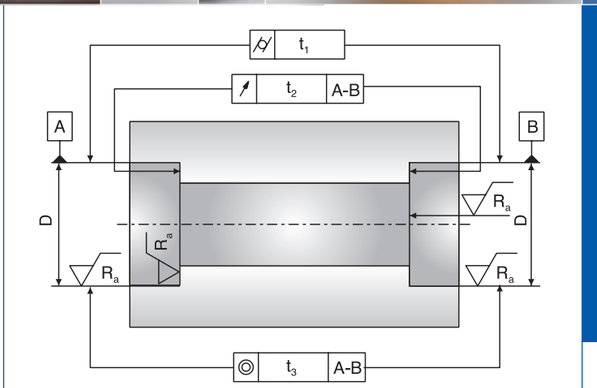
Outer ring limits in micron

D over **outside diameter, nominal [mm]** to	6 18	18 30	30 50	50 80	80 120	120 150	150 180
Δ_{Dmp} deviation of a single plane mean outside diameter	0 -4.0	0 -5.0	0 -6.0	0 -7.0	0 -8.0	0 -9.0	0 -10.0
Δ_{Ds} bearing series 60 variation of a single outside diameter	0 -4.0	0 -5.0	0 -6.0	0 -7.0	0 -8.0	0 -9.0	0 -10.0
$V_{Dp\ max}$ bearing series 619 variation of outside diameter in a single radial plane – out of roundness	4.0	5.0	6.0	7.0	8.0	9.0	10.0
$V_{Dp\ max}$ bearing series 60 variation of outside diameter in a single radial plane – out of roundness	3.0	4.0	5.0	5.0	6.0	7.0	8.0
$V_{Dmp\ max}$ variation of mean outside diameter in several planes – taper	2.0	2.5	3.0	3.5	4.0	5.0	5.0
$K_{ea\ max}$ radial runout of assembled bearing outer ring	3.0	4.0	5.0	5.0	6.0	7.0	8.0
$S_{D\ max}$ variation of outside surface generatrix inclination with outer ring reference face – side runout	4.0	4.0	4.0	4.0	5.0	5.0	5.0
$S_{ea\ max}$ assembled bearing outer ring face runout with raceway – axial runout	5.0	5.0	5.0	5.0	6.0	7.0	8.0
Δ_{CS} single bearing deviation of single width of the outer ring – width tolerance	Identical to Δ_{Bs} for the inner ring of the same bearing						
Δ_{CS} matched bearing deviation of single width of the outer ring – width tolerance	Identical to Δ_{Bs} for the inner ring of the same bearing						
$V_{CS\ max}$ outer ring – width variation	2.5	2.5	2.5	3.0	4.0	5.0	5.0

Accuracy of associated components







More than 90 years of experience – for the customer's benefit

For now nearly a century, GMN develops and produces high precision ball bearings at top level quality.

Permanent R&D processes consistently optimize GMN high precision ball bearings and enhance them in respect of their technically outstanding characteristics. The intense development process at GMN is not only based on in-house research and test procedures, but to a big extent on experiences made in the field worldwide.

Practical applications remain the backbone for the testing procedures of machining components.

In practical operating conditions, the best available potential performance of GMN ball bearings depends on the work quality of the contact surfaces and bearing fits. An increase in fitting accuracy of the associated components enhances the efficiency for the use of the ball bearing and the machine.

Long-term practical experience has led to concrete tolerance and reference values in regard of the accuracy of the associated components that grant an optimum of machine productivity.

To support our customers to optimize the associated components in regard of a maximum ball bearing and machine performance, you can find enclosed experience-based reference values. For further questions, please call our technical support.

Reference values of shaft- and housing fits / Reference values of shaft- and housing tolerances (DIN EN ISO 1101)

Shaft

Nominal diameter d		over to	[mm]	3 6	6 10	10 18	18 30	30 50	50 80	80 120
Tolerance				+2 -2	+2 -2	+3 -3	+3 -3	+4 -4	+4 -4	+5 -5
Cylindricity	⌭	t_1	[micron]	1	1	1.2	1.5	1.2	2	2.5
Axial runout	↗	t_2		1	1	1.2	1.5	1.2	2	2.5
Concentricity	◎	t_3		1	1	1.2	1.5	1.2	2	2.5
Mean surface roughness	R_a	R_a		0.2	0.2	0.2	0.2	0.2	0.2	0.2

Housing

Nominal diameter D		over to	[mm]	10 18	18 30	30 50	50 80	80 120	120 180
Tolerance Locating bearing				+5 +0	+6 +0	+7 +0	+8 +0	+9 +0	+9 +0
Tolerance Floating bearing				+7 +2	+8 +2	+9 +3	+10 +3	+11 +4	+12 +4
Cylindricity	⌭	t_1	[micron]	1.2	1.5	1.5	2	2.5	3.5
Axial runout	↗	t_2		1.2	1.5	1.5	2	2.5	3.5
Concentricity	◎	t_3		1.2	1.5	1.5	2	2.5	3.5
Mean surface roughness	R_a	R_a		0.4	0.4	0.4	0.4	0.4	0.4

Speed limits
Correction factors

GMN develops ball bearings for highest speeds and maximum loads to optimize efficiency and lifetime of machines. Hereby, the maximum speed of the ball bearing is a key figure. In the contact area between the balls and the raceways friction and temperature increase progressively with higher speed.

The friction generated in the ball bearing depends essentially on:

- Speed
- Bearing load
- Viscosity of the lubricant
- Amount of lubricant

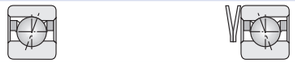
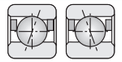
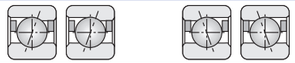
The speeds listed in the enclosed charts are attainable speeds for a single spring-preloaded ball bearing, operating under normal conditions such as:

- Good heat dissipation
- Low external load
- Rotating inner ring
- Oil-mist- or oil-air lubrication
- Good form accuracy of associated components
- Alignment of associated components
- Balancing of turning components

If the operating conditions deviate from the conditions mentioned, correction factors must be taken into account.
Correction factors and speed values are only for guidance

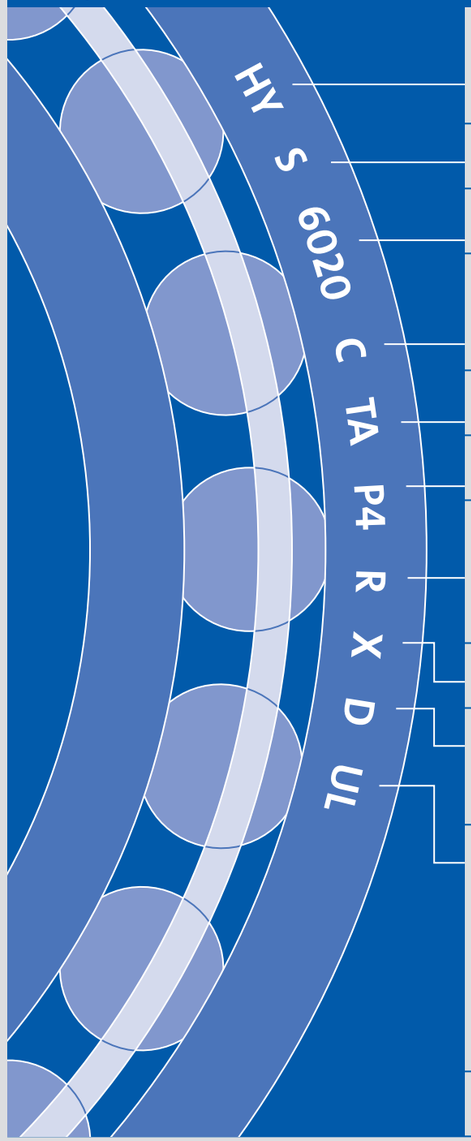
Permissible speed = speed value n · f_{n1} · f_{n2} · f_{n3} · f_{n4}

Correction factors

			Preload			
			F (Spring)	L	M	S
f_{n1}: Lubrication	Grease lubrication (note n · dm factor of grease)	0.75				
	Oil-air- or Oil-mist lubrication	1.0				
f_{n2}: Bearing arrangement bearing pairs	Single bearing with spring preload					
			1.0			
	Rigid					
				0.8	0.7	0.5
				0.75	0.6	0.4
				0.7	0.6	0.4
				0.6	0.5	0.3
				0.65	0.5	0.3
f_{n3}: Kinematics	Rotating inner ring Rotating outer ring	1.0 0.6				
f_{n4}: Ball material	Steel Ceramic Si_3N_4	1.0 1.25				

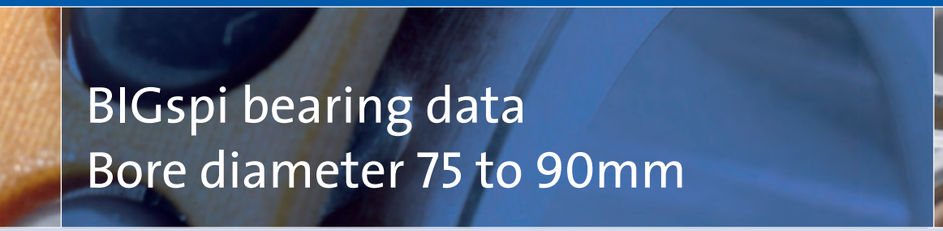
GMN
Bearings marking

Example



Material	– HY	Bearings made from chrome steel have no prefix Balls and rings from different materials (Hybrid bearings)
Bearing type	S	Two lands on the inner ring
Bearing size	6020	Designation of dimension series and bore
Contact angle	C E 18°	15° 25° Special feature (available on request)
Cage	TA	Laminated phenolic resin, outer-land-riding
Precision	P4	Tolerance class P4 according to DIN 620
High pointing	R R_i R_a	Indication of the point of radial runout (maximum wall thickness) on inner and outer ring Like R, however only on the inner ring Like R, however only on the outer ring
Grading	X	Grading of bore and outer diameter
Bearing sets	D T Q	2 bearings 3 bearings 4 bearings
Matching	UL UM US UV F B T	Universal matching - light preload Universal matching - medium preload Universal matching - heavy preload Universal matching - preload by agreement Face-to-Face arrangement Back-to-Back arrangement Tandem arrangement
Lubrication	L252	Designation of grease, e.g. Turmogrease L 252

BIGspi bearing data
Bore diameter 75 to 90mm



Character assignment (BIGspi bearing data)

d	[mm]	Bore diameter	**m**	[kg]	Weight of bearing	**C**	[N]	Dynamic load rating
D	[mm]	Outer diameter	**d_1**	[mm]	Outer diameter inner ring	**C_0**	[N]	Static load rating
B	[mm]	Width single bearing	**d_k**	[mm]	Cage bore	**F_v**	[N]	Preload
$r_{s\,min}$	[mm]	Chamfer	**d_m**	[mm]	Pitch circle diameter	**$F_{a\,max}$**	[N]	Lift off force
$r'_{s\,min}$	[mm]	Chamfer, open side	**D_1**	[mm]	Bore outer ring	**C_{ax}**	[N/µm]	Axial rigidity (bearing pair)
D_w	[mm]	Ball diameter	**D_2**	[mm]	Bore outer ring (open side)	**F_f**	[N]	Minimum spring preload
Z	pieces	Ball complement	**n**	[1/min]	Speed value	**α_0**	[°]	Contact angle

Designation	Boundary dimensions			Ball		Chamfer		Dimensions					Weight		Contact angle	Load rating		Speed value	Light preload			Medium preload			Heavy preload			Spring prel.	Designation
	d	D	B	D_w	Z	$r_{s\,min}$	$r'_{s\,min}$	d_1	d_k	d_m	D_1	D_2	m		α_0	C	C_0	n	F_v	$F_{a\,max}$	C_{ax}	F_v	$F_{a\,max}$	C_{ax}	F_v	$F_{a\,max}$	C_{ax}	F_f	
75mm																												**75mm**
S 61915 C TA	75	105	16	8.731	25	0.6	0.3	84.7	90.2	90	95.3	98.8	0.35		15	29500	31000	19000	150	470	75	440	1491	120	890	3238	169	760	**S 61915 C TA**
S 61915 E TA	75	105	16	8.731	25	0.6	0.3	84.7	90.2	90	95.3	98.8	0.35		25	27500	29500	16000	230	674	178	700	2122	270	1400	4387	360	1000	**S 61915 E TA**
S 6015 C TA	75	115	20	11.906	22	1.1	0.6	87.8	95.5	95	102.2	107	0.64		15	49500	48500	18000	250	784	91	760	2593	148	1510	5529	208	1270	**S 6015 C TA**
S 6015 E TA	75	115	20	11.906	22	1.1	0.6	87.8	95.5	95	102.2	107	0.64		25	47000	46000	15500	400	1174	219	1190	3616	330	2380	7482	440	1710	**S 6015 E TA**
80mm																												**80mm**
S 61916 C TA	80	110	16	9.525	25	0.6	0.3	89.4	95.3	95	100.75	104.6	0.37		15	35500	38500	18000	180	566	84	540	1849	136	1080	3973	192	910	**S 61916 C TA**
S 61916 E TA	80	110	16	9.525	25	0.6	0.3	89.4	95.3	95	100.75	104.6	0.37		25	33500	36500	15500	280	822	199	840	2556	305	1680	5291	400	1220	**S 61916 E TA**
S 6016 C TA	80	125	22	13.494	20	1.1	0.6	94.3	103	102.5	110.7	116.1	0.84		15	60000	58000	16500	310	980	98	920	3171	159	1830	6783	224	1540	**S 6016 C TA**
S 6016 E TA	80	125	22	13.494	20	1.1	0.6	94.3	103	102.5	110.7	116.1	0.84		25	58000	56500	14000	490	1444	236	1470	4500	360	2940	9338	480	2110	**S 6016 E TA**
85mm																												**85mm**
S 61917 C TA	85	120	18	10.319	25	0.6	0.6	96.2	102.7	102.5	108.75	112.9	0.54		15	40000	43000	16500	200	625	87	610	2068	142	1220	4436	198	1020	**S 61917 C TA**
S 61917 E TA	85	120	18	10.319	25	0.6	0.6	96.2	102.7	102.5	108.75	112.9	0.54		25	37500	40500	14000	320	938	210	960	2909	320	1910	5981	420	1360	**S 61917 E TA**
S 6017 C TA	85	130	22	13.494	21	1.1	0.6	99.3	108	107.5	115.7	121.1	0.89		15	61500	61500	16000	310	977	101	940	3231	165	1880	6951	233	1570	**S 6017 C TA**
S 6017 E TA	85	130	22	13.494	21	1.1	0.6	99.3	108	107.5	115.7	121.1	0.89		25	59500	60000	13500	500	1473	245	1510	4618	375	3010	9546	495	2160	**S 6017 E TA**
90mm																												**90mm**
S 61918 C TA	90	125	18	10.319	26	0.6	0.6	101.2	107.7	107.5	113.75	117.9	0.56		15	40500	45000	16000	210	656	91	620	2098	146	1240	4497	204	1040	**S 61918 C TA**
S 61918 E TA	90	125	18	10.319	26	0.6	0.6	101.2	107.7	107.5	113.75	117.9	0.56		25	38500	42500	13500	320	937	216	970	2936	330	1940	6067	435	1400	**S 61918 E TA**
S 6018 C TA	90	140	24	15.081	20	1.5	0.6	105.8	115.5	115	124.2	130.1	1.15		15	74500	74000	15000	380	1203	110	1130	3903	179	2270	8444	255	1900	**S 6018 C TA**
S 6018 E TA	90	140	24	15.081	20	1.5	0.6	105.8	115.5	115	124.2	130.1	1.15		25	70500	70000	12500	600	1767	265	1790	5472	400	3570	11315	525	2600	**S 6018 E TA**

BIGspi bearing data
Bore diameter 95 to 120mm

Designation	Boundary dimensions			Ball		Chamfer		Dimensions					Weight		Contact angle	Load rating		Speed value	Light preload			Medium preload			Heavy preload			Spring prel.	Designation
	d	D	B	D_w	Z	$r_{s\,min}$	$r'_{s\,min}$	d_1	d_k	d_m	D_1	D_2	m		α_0	C	C_0	n	F_v	$F_{a\,max}$	C_{ax}	F_v	$F_{a\,max}$	C_{ax}	F_v	$F_{a\,max}$	C_{ax}	F_f	
95mm																													**95mm**
S 61919 C TA	95	130	18	10.319	27	0.6	0.6	106.2	112.7	112.5	118.75	122.9	0.59		15	41000	47000	15000	210	655	93	630	2127	150	1250	4518	209	1050	S 61919 C TA
S 61919 E TA	95	130	18	10.319	27	0.6	0.6	106.2	112.7	112.5	118.75	122.9	0.59		25	39000	44500	13000	330	966	223	980	2963	335	1970	6154	445	1420	S 61919 E TA
S 6019 C TA	95	145	24	15.081	21	1.5	0.6	110.8	120.5	120	129.2	135.1	1.2		15	77000	79000	14000	390	1233	114	1160	3998	186	2330	8645	265	1970	S 6019 C TA
S 6019 E TA	95	145	24	15.081	21	1.5	0.6	110.8	120.5	120	129.2	135.1	1.2		25	72000	74500	12000	610	1795	275	1830	5588	415	3660	11584	550	2650	S 6019 E TA
100mm																													**100mm**
S 61920 C TA	100	140	20	11.906	25	0.6	0.6	112.8	120.2	120	127.2	132	0.8		15	51500	57000	14000	260	812	100	790	2674	162	1570	5692	226	1320	S 61920 C TA
S 61920 E TA	100	140	20	11.906	25	0.6	0.6	112.8	120.2	120	127.2	132	0.8		25	48500	54000	12000	410	1201	240	1230	3723	365	2470	7726	480	1760	S 61920 E TA
S 6020 C TA	100	150	24	15.081	22	1.5	0.6	115.8	125.5	125	134.2	140.1	1.25		15	78000	83000	13500	400	1263	118	1190	4093	193	2380	8805	275	1990	S 6020 C TA
S 6020 E TA	100	150	24	15.081	22	1.5	0.6	115.8	125.5	125	134.2	140.1	1.25		25	74000	79000	11500	630	1853	285	1880	5736	430	3750	11853	570	2700	S 6020 E TA
105mm																													**105mm**
S 61921 C TA	105	145	20	11.906	26	0.6	0.6	117.8	125.2	125	132.2	137	0.83		15	52500	60000	13500	270	843	103	800	2701	166	1600	5787	232	1340	S 61921 C TA
S 61921 E TA	105	145	20	11.906	26	0.6	0.6	117.8	125.2	125	132.2	137	0.83		25	49500	56500	11500	420	1230	248	1250	3780	375	2510	7841	495	1800	S 61921 E TA
S 6021 C TA	105	160	26	15.875	22	2	1	122.8	133	132.5	142.2	148.4	1.59		15	86000	92000	13000	440	1390	125	1310	4507	203	2610	9654	285	2200	S 6021 C TA
S 6021 E TA	105	160	26	15.875	22	2	1	122.8	133	132.5	142.2	148.4	1.59		25	81000	87000	11000	690	2030	300	2060	6284	450	4120	13023	595	2950	S 6021 E TA
110mm																													**110mm**
S 61922 C TA	110	150	20	11.906	27	0.6	0.6	122.8	130.2	130	137.2	142	0.86		15	53500	62500	13000	270	841	106	810	2729	170	1620	5844	238	1370	S 61922 C TA
S 61922 E TA	110	150	20	11.906	27	0.6	0.6	122.8	130.2	130	137.2	142	0.86		25	50000	59000	11000	420	1229	255	1270	3837	385	2550	7957	510	1820	S 61922 E TA
S 6022 C TA	110	170	28	17.462	21	2	1	129.4	140.5	140	150.6	157.5	1.98		15	99000	105000	12000	500	1577	130	1510	5190	212	3020	11165	300	2550	S 6022 C TA
S 6022 E TA	110	170	28	17.462	21	2	1	129.4	140.5	140	150.6	157.5	1.98		25	94000	100000	10500	790	2323	310	2380	7258	470	4760	15040	625	3450	S 6022 E TA
120mm																													**120mm**
S 61924 C TA	120	165	22	13.494	27	0.6	0.6	134.3	142.7	142.5	150.65	156	1.18		15	67500	80000	12000	340	1058	119	1030	3469	193	2050	7390	270	1730	S 61924 C TA
S 61924 E TA	120	165	22	13.494	27	0.6	0.6	134.3	142.7	142.5	150.65	156	1.18		25	63500	76000	10000	540	1580	290	1610	4864	435	3220	10042	575	2310	S 61924 E TA
S 6024 C TA	120	180	28	17.462	23	2	1	139.4	150.5	150	160.6	167.5	2.13		15	104000	116000	11500	530	1668	140	1580	5408	227	3170	11663	320	2700	S 6024 C TA
S 6024 E TA	120	180	28	17.462	23	2	1	139.4	150.5	150	160.6	167.5	2.13		25	98000	110000	9700	830	2438	335	2490	7579	510	4990	15727	670	3600	S 6024 E TA

BIGspi in comparison
Quality management and environment

GMN BIGspi comparison chart

GMN	BARDEN	FAFNIR	FAG	NSK	SKF	SNFA	SNR
S 61915 C TA : S 61924 C TA	1915 HC 1924 HC	2 MM 9315 WI CR 2 MM 9324 WI CR	B 71915 C.T. B 71924 C.T.	7915 C TR 7924 C TR	71915 CD 71924 CD	SEB 75 CE1 SEB 120 CE1	71915 C 71924 C
S 61915 E TA : S 61924 E TA	1915 HE 1924 HE	3 MM 9315 WI CR 3 MM 9324 WI CR	B 71915 E.T. B 71924 E.T.	7915 A5 TR 7924 A5 TR	71915 ACD 71924 ACD	SEB 75 CE3 SEB 120 CE3	71915 H 71924 H
S 6015 C TA : S 6024 C TA	115 H 124 H	2 MM 9115 WI CR 2 MM 9124 WI CR	B 7015 C.T. B 7024 C.T.	7015 C TR 7024 C TR	7015 CD 7024 CD	EX 75 CE1 EX 120 CE1	7015 C 7024 C
S 6015 E TA : S 6024 E TA	2115 H 2124 H	3 MM 9115 WI CR 3 MM 9124 WI CR	B 7015 E.T. B 7024 E.T.	7015 A5 TR 7024 A5 TR	7015 ACD 7024 ACD	EX 75 CE3 EX 120 CE3	7015 H 7024 H

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