

Dimensions in millimetres

Diagonal play $\mu\text{m max.}$	Radial Limit Load Rating in kN	Thrust Limit Load Rating in kN	Radial Load Rating for Average life of 10.000 Complete 90° Cycles		Limit Moment Rating Ncm	Moment Constant $\frac{1}{\text{cm}}$	Mass g	Bearing Number
			Case I in kN	Case II in kN				
	7,65	3,55	7,65	7,65	1070	3,49	18	P 4K
	7,65	3,55	7,65	7,65	1062	3,34	18	P 5K
325	15,30	4,55	14,60	12,50	3965	1,15	32	PD 5K
	52,00	23,20	41,50	34,50	13220	1,75	109	P 8
	10,80	4,90	10,80	9,65	2248	2,18	27	P 10K

## Designation

Each bearing is designated as in the following example:

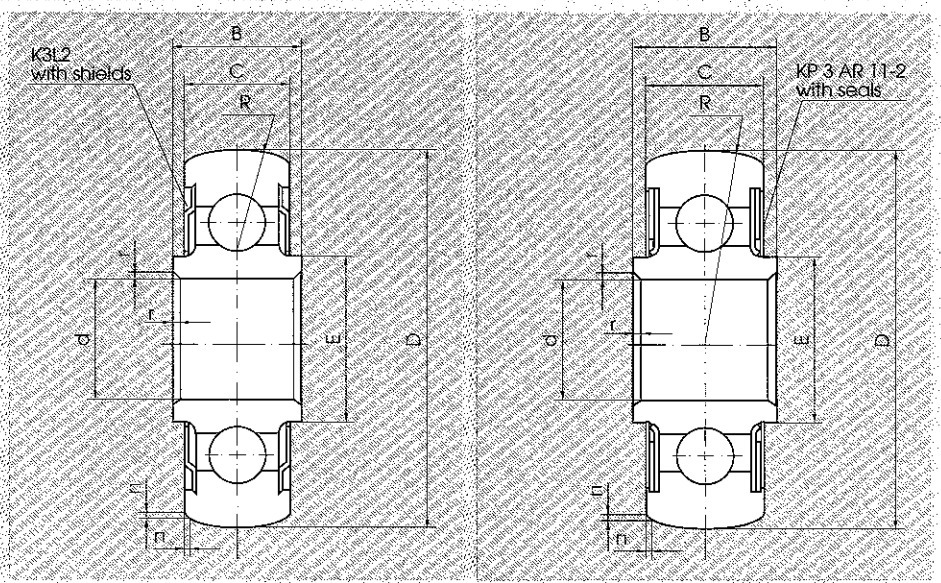
Number of Standard \_\_\_\_\_ **P 5 K G 1.3544.9**  
 5 = Dash No. \_\_\_\_\_  Stainless steel  
 K = Retainer type \_\_\_\_\_  G = Grease NATO G 354/MIL-G-23 827

# BALL BEARINGS



## Track roller, single row, sealed or shielded.

**Series:** K...  
**Material:** EN 2031 (1.3505.9)  
 Cadmium plated except bore, yellow passivated  
**Seals:** PTFE (KP... types)  
**Shields:** Stainless steel (K... types)  
**Seal Retainers:** Stainless steel

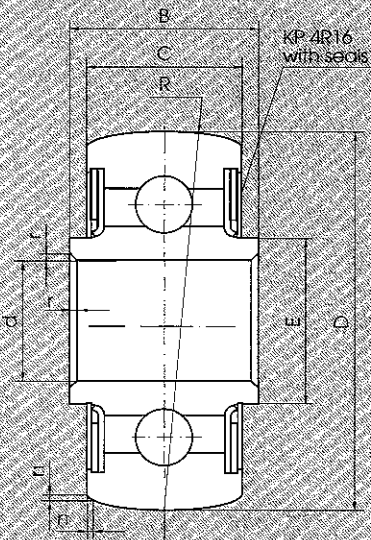


Dimensions in millimetres

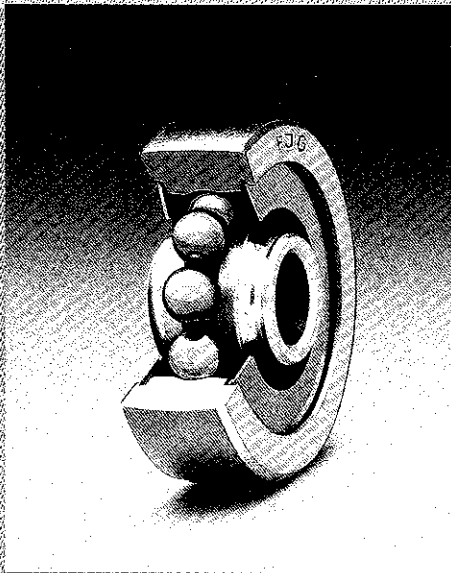
Bearing Number	d	D	B	C	E	R	R	r x 45°	r <sub>1</sub>	Out of round μm Δds	Axial play μm	Max.Safe Mass					
												Working g	Radial in kN				
K 3 L 2	4,826	17,449	6,223	5,156	7,112	4,749	4,620		0,50			0,88	5				
K 3 L 3	4,826	16,129	6,223	5,156	7,112	13,970	12,700		to			0,88	5				
K 3 LR-48	4,826	0	17,449	0	6,223	0	5,156	0	7,112	76,581	75,820	0,13	0,88	+2	0,127	0,88	5
KP 3A R11-2	4,826	-13	18,237	-50	7,543	-127	6,731	-127	7,543	9,118	9,090	to	0,38	-14	max.	1,34	9
KP 4A R13	6,350	20,320	7,137	5,562	9,400	20,625	20,370	0,51	to							1,76	9
KP 4 R16	6,350	22,885	12,293	8,509	9,906	25,400	21,150		0,76							1,76	18
KP 4 R16-2	6,350	25,400	9,906	8,509	9,906	25,400	21,150									2,24	27

All Dimensions to be met after plating  
 Procurement specification MIL-B-7949

**Lubricant:** Grease NATO G 395/MIL-G-81 322  
 Grease NATO G 354/MIL-G-23 827, Suffix G



KP 4R16  
with seals



RWG Frankenjura - Track rollers are full-type ball bearings with a spherical outer ring.

The radial load capacity is dependent on the cross-section of the outer ring.

Due to the spherical form of outside diameter edge loading is avoided.

# ROD ENDS



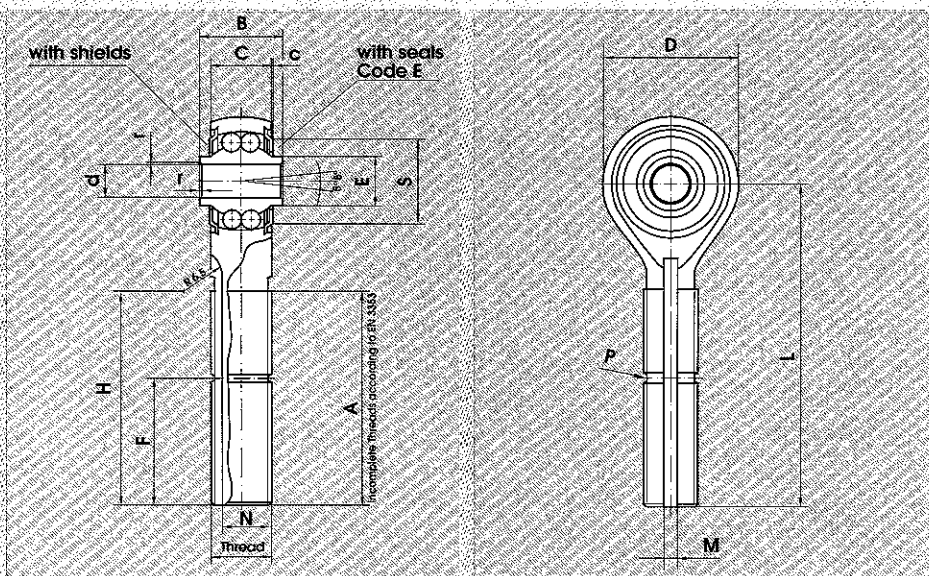
Precision ball bearing type, male thread  
double row, self-aligning, dimensions according to EN 2492.

**Series: FC...M/FCN...M**  
Material: EN 2099 (1.6657.9)  
Rod end: EN 2031 (1.3505.9)  
Inner ring: Cadmium plated except bore; yellow passivated  
Stainless steel

**Series: FC...ME/FCN...ME**  
Material: EN 2099 (1.6657.9)  
Rod end: EN 2031 (1.3505.9)  
Inner ring: Cadmium plated except bore; yellow passivated  
Stainless steel  
Seals: PTFE  
Seal Retainers: Stainless steel

**Series: 60-4082...**  
Material: Corrosion resisting steel  
Rod end: EN 2136 (1.4044)  
Inner ring: EN 2030 (1.3544.9)  
Stainless steel

**Series: 60-4082 E...**  
Material: Corrosion resisting steel  
Rod end: EN 2136 (1.4044)  
Inner ring: EN 2030 (1.3544.9)  
Stainless steel  
Seals: PTFE  
Seal Retainers: Stainless steel



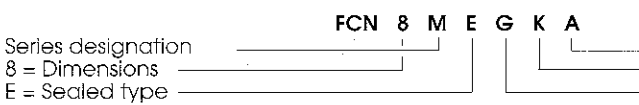
Bearing Number	d	Δdmp		D	ΔDmp		B	ΔBmp		C	ΔCmp		E	rx45°	S	c	L ± 500 μm	Threads ISO 4h6h
		μm	μm		μm	μm		μm	μm									
FC 5M	FC 5ME	5		20,5	12	8,5	7,6											M 8x1,0
FC 5MJ	FC 5MJE	5		20,5	12	8,5	7,6										48	MJ 8x1,0
FCN 6M	FCN 6ME	6		22,5	14	10,0	8,6											M 10x1,0
FCN 6MJ	FCN 6MJE	6	0 +2	22,5	+200	14	0	10,0	+100	8,6	0,3	14,2	0,3	54				MJ 10x1,25
FCN 8M	FCN 8ME	8	-8 -10	28,5	0	15	-120	10,0	0	11,1	to	17,7	0,4	62				M 12x1,0
FCN 8MJ	FCN 8MJE	8		28,5		15		10,0		11,1	0,8							MJ 12x1,25
FCN 10M	FCN 10ME	10		32,0		20		14,0		13,6								M 14x1,50
FCN 10MJ	FCN 10MJE	10		32,0		20		14,0		13,6		22,2	0,1	73				MJ 14x1,50

$F_{a \max} = \frac{C_s}{Y_s}$  where  $Y_s = 3.2$ ; Axial and radial loads may be applied simultaneously.

All Dimensions to be met after plating

## Designation

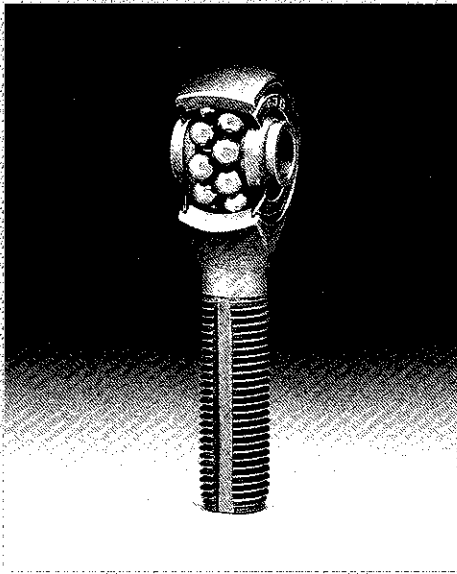
Each bearing is designated as in the following example:



A = Grease type  
K = Keyway in shank  
G = Left-hand thread

Symbols for designation:  
A = Grease NATO G 354/MIL-G-23 827  
B = Grease NATO G 395/MIL-G-81 322

Technical specification per EN 2067

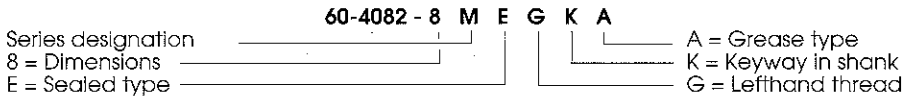


Dimensions in millimetres

F min.	A min.	H	M		N		P	Radial play in $\mu\text{m}$	Axial play in $\mu\text{m}$	Radial Limit Load Rating in kN	Starting torque in mN.m		Mass g	Bearing Number	
			$\Delta\text{Hmp}$ $\mu\text{m}$	$\Delta\text{Mmp}$ $\mu\text{m}$	$\Delta\text{Nmp}$ $\mu\text{m}$						Shields	Seals			
18	33	33		1,6		6,6	0,7			4,70	1	2	35	FC 5M	FC 5MJ
22	37	37	+500 0	2,4	+100 0	8,0	0	0 to 20	0 to 80	6,75	2	4	50	FCN 6M	FCN 6MJ
25	42	42		2,4		10,2	0,8			8,90	5	10	80	FCN 8M	FCN 8MJ
31	48	48		3,2		12,2	1,0			14,00	7	12	130	FCN 10M	FCN 10MJ

### Designation

Each bearing is designated as in the following example:



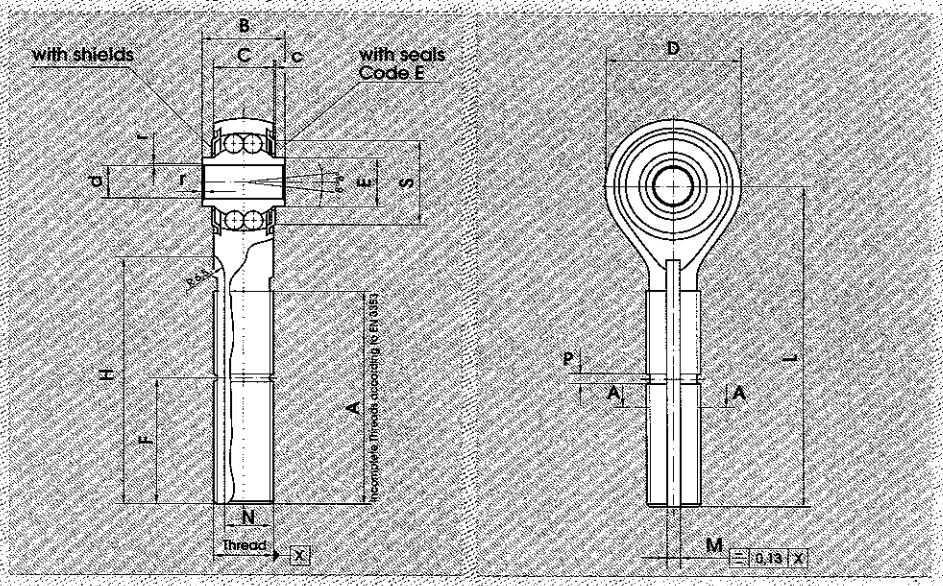
# ROD ENDS



**Precision ball bearing type, male thread  
double row, self-aligning, dimensions according to EN 4036.**

**Series: EN 4036 P**  
Material: Corrosion resisting steel  
Rod end: EN 2136 (1.4044)  
Inner ring: EN 2030 (1.3544.9)  
Shields: Stainless steel

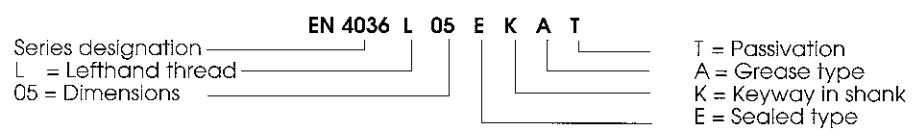
**Series: EN 4036 E**  
Material: Corrosion resisting steel  
Rod end: EN 2136 (1.4044)  
Inner ring: EN 2030 (1.3544.9)  
Seals: PTFE  
Seal Retainers: Stainless steel



Bearing Number	d		D	B		C		E	rx 45°	S	c	L ± 500 µm	Threads ISO 4h6h	F min.	A min.
	Δdmp µm	Δds µm		ΔDmp µm	ΔBmp µm	ΔCmp µm									
05	5		20,5	12	8,5	7,6		0,3	-	-	48	MJ 8x1,0	18	33	
06	6	0 0	22,5	14	10,0	8,6	+100	to	14,2	0,3	54	MJ 10x1,25	23	37	
08	8	-8 -10	28,5	15	10,0	11,1	0	0,8	17,7	0,4	62	MJ 12x1,25	27	42	
10	10		32,0	20	14,0	13,6			22,2	0,1	73	MJ 14x1,50	31	48	

## Designation

Each bearing is designated as in the following example:



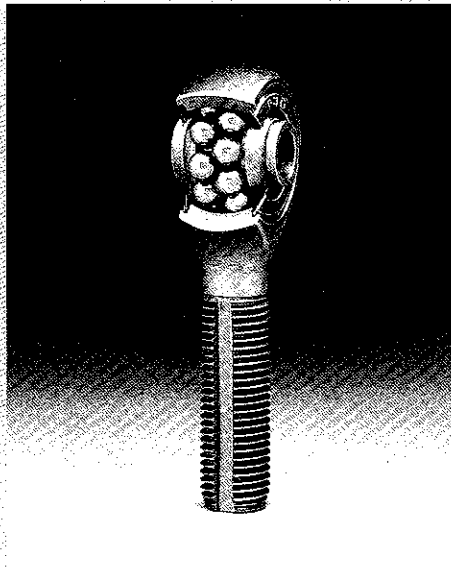
Procurement specification per EN 2067

Section A-A

Typ 1  
Code K



Typ 2  
Code M



Dimensions in millimetres

H	M	N	P	Radial play in $\mu\text{m}$		Axial play in $\mu\text{m}$		Permissible static loads		Starting torque in mN.m		Swivelling torque max. Nm	Mass g	Bearing Number
				$\Delta\text{Hmp}$ $\mu\text{m}$	$\Delta\text{Mmp}$ $\mu\text{m}$	$\Delta\text{Nmp}$ $\mu\text{m}$		Radial in kN	Axial in kN	Shields	Seals			
33	1,6	6,6		1	0	4,70	1,47	4,3	6,5			0,15	35	05
37	2,4	8,0	1,4	to	to	6,75	2,11	4,6	7,0				60	06
42	2,4	10,2		5	80	8,90	2,78	10,6	16,0				85	08
48	3,2	12,2	2,0			14,00	4,38	12,5	19,0			0,20	130	10

Symbols for designation:

R = Right hand thread

L = Left hand thread

P = Shielded type

E = Sealed type

K = Longitudinal groove type 1

M = Longitudinal groove type 2

A = Grease NATO G 354 / MIL-G-23827

B = Grease NATO G 395 / MIL-G-81322

T = Inner ring passivation ISO 8075 without surface treatment; no code

Rod end: passivation according to ISO 8074

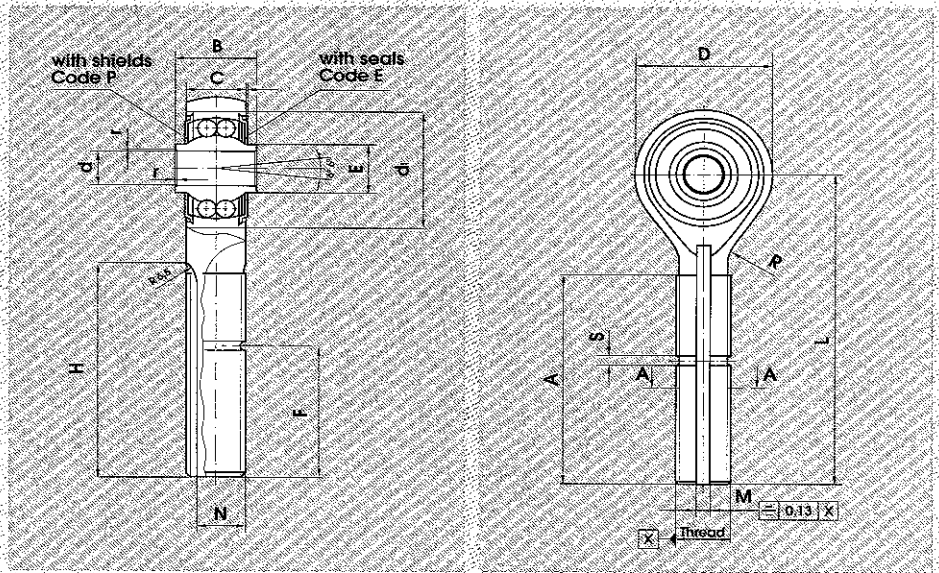
# ROD ENDS



Precision ball bearing type, male thread, double row, self-aligning, corrosion resisting steel, reduced internal radial clearance, threaded shank in titanium alloy, dimensions according to EN 4035.

**Series: EN 4035 P**  
 Material: EN 3315 / EN 3353  
 Rod end: EN 2030 (1.3544.9)  
 Bearing: EN 2030 (1.3544.9)  
 Shields: Stainless steel

**Series: EN 4035 E**  
 Material: EN 3315 / EN 3353  
 Rod end: EN 2030 (1.3544.9)  
 Bearing: EN 2030 (1.3544.9)  
 Seals: PTFE  
 Seal Retainers: Stainless steel



Bearing Number	d	$\Delta c_{mp}$ $\mu m$	$\Delta c_s$ $\mu m$	D	B	C	E	$r \times 45^\circ$	S	L	Threads ISO 4h6h	F min.	A min.	H	M	N	$d_1$
05	5			+0,2 0	0 -0,12	+0,1 0	min.		$\pm 0,2$	$\pm 0,5$	MJ 8x1,0	18	33	33	1,6	6,6	16
06	6	0	+2	26	14	10,5	8,6	0,3	1,4	54	MJ 10x1,25	23	37	37	2,4	8,0	19
08	8	-8	-10	32	15	10,5	11,1	to	2,0	62	MJ 12x1,25	27	42	42	2,4	10,2	24
10	10			38	20	14,5	13,6	0,8	2,0	73	MJ 14x1,50	31	48	48	3,2	12,2	30

## Designation

Each bearing is designated as in the following example:

Series designation EN 4035 L 05 P K A T

L = Left hand thread  
 05 = Dimensions

T = Bearing passivation  
 A = Grease type  
 K = Longitudinal groove type  
 P = Shields type

Procurement specification per EN 2067

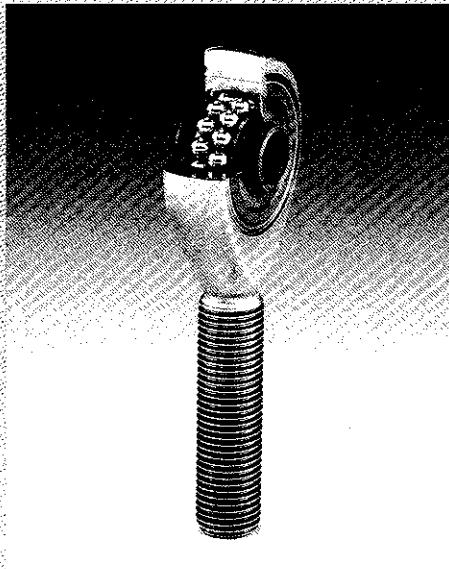


Section A-A

Typ 1  
Code K



Typ 2  
Code M



Dimensions in millimetres

R	Radial play in $\mu\text{m}$	Axial play in $\mu\text{m}$ max.	Permissible static loads		Starting torque in mN.m		Swelling torque max. Nm	Mass g	Bearing Number
			Radial in kN	Axial in kN	Seals	Shields			
6	2	70	3,7	1,16	9,8	6,5	0,15	21	05
7			5,7	1,78	10,5	6,9			06
7	7	80	9,1	2,84	24,0	15,9	0,20	49	08
10			14,1	4,41	28,5	18,8			10

Symbols for designation:

R = Right hand thread

L = Left hand thread

P = Shielded type

E = Sealed type

K = Longitudinal groove type 1

M = Longitudinal groove type 2

A = Grease NATO G 354 / MIL-G-23827

B = Grease NATO G 395 / MIL-G-81322

T = Bearing passivation ISO 8075 without surface treatment; no code

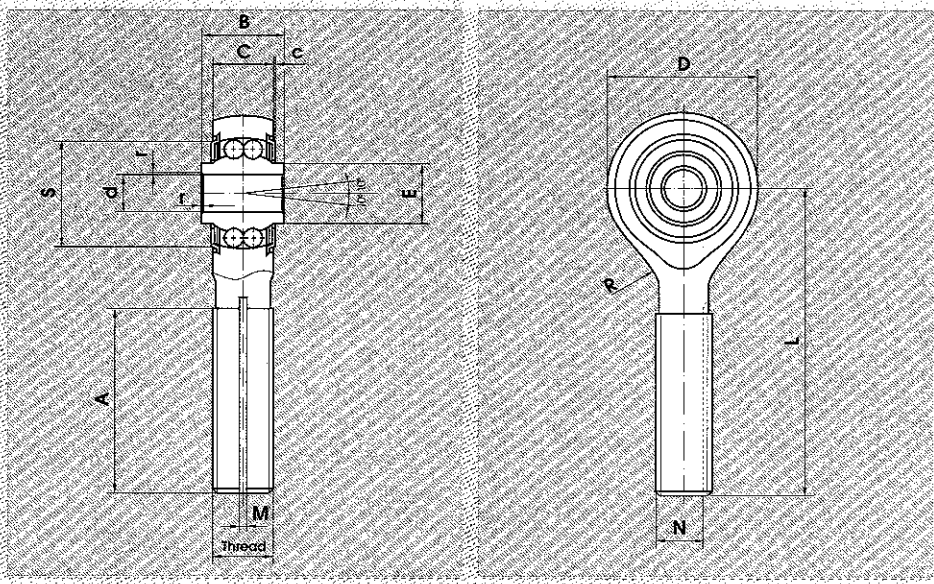
Rod end: anodizing according to EN 2808

# ROD ENDS



**Precision ball bearing type, male thread, double row, self-aligning, dimensions according to specification MS 21 151.**

**Series:** REP  
**Material:** EN 2099 (1.6657-9)  
**Rod end:** EN 2031 (1.3505-9)  
**Inner ring:** Cadmium plated except bore; yellow passivated  
**Seals:** PTFE  
**Seal Retainers:** Stainless steel



Bearing Number	MS 21151	d	D	B	C	E min.	S	c	R	r x 45°	A	Δamp μm
		Δdmp μm	ΔD m.p μ.m		ΔBmp μm	ΔCmp μm						
REP3MR3	-2											
REP3ML3	-1	4,826	19,84	11,10	8,33	7,01	14,40	0,30	10,72		19,05	
REP3M4-6	-7											
REP3MS4-6K	-7C	4,826	19,84	11,10	8,33	7,01	14,40	0,30	8,74		25,40	
REP3M6-2N	-4									0,13		
REP3MS6-2NK	-4C	4,826	19,84	11,10	8,33	7,01	14,40	0,30	9,91	to	19,05	
REP3ML6-2N	-5											
REP3MLS6 K	-5C	4,826	19,84	11,10	8,33	7,01	-	-	9,91	0,51	19,05	
RAP3M4-2	-6											
RAP3MS4-2 K	-6C	4,826	19,84	12,70	11,13	7,80	-	-	14,27		23,83	
REP3M6A	-3											
REP3MS6A K	-3C	4,826	24,61	12,70	10,34	7,59	14,40	0,30	12,70		33,35	
REP4M6	-8											
REP4M6-4 K	-8C	6,350	23,83	15,06	11,13	8,64	-	-	11,91		28,58	±0,79
REP4ML6	-9											
REP4ML6-4 K	-9C	6,350	23,83	15,06	11,13	8,64	-	-	11,91		28,58	
REP5M6	-10											
REP5M6-2 K	-10C	7,938	31,75	22,10	16,66	12,73	-	-	12,70		39,70	
REP5M7	-11									0,38		
REP5MS7 K	-11C	7,938	31,75	22,10	16,66	12,73	-	-	12,70	to	39,70	
REP5M10	-12											
REP5MS10 K	-12C	7,938	31,75	22,10	16,66	12,73	-	-	12,70	0,76	39,70	
RAP10M10	-13											
RAP10MS10 K	-13C	15,875	50,80	28,58	23,83	22,23	-	-	12,70		38,10	

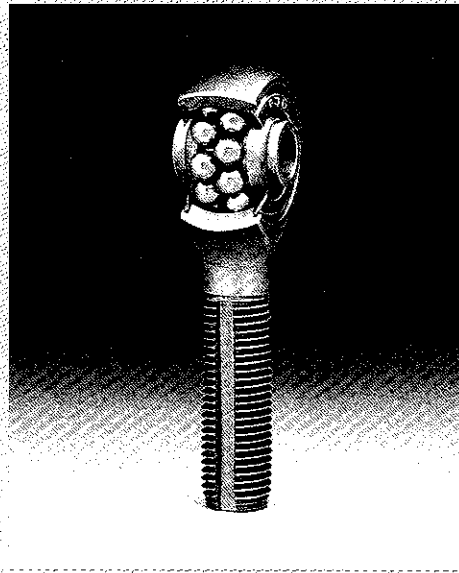
All Dimensions to be met after plating

10° permissible misalignment in either direction

Lubricant: Grease NATO G 395/MIL-G-81 322 - Code G = Grease NATO G 354/MIL-G-23 827  
 Threads: Length Includes maximum of two incomplete threads. Keyway in shank = NAS 513

Load Ratings are for operation up to 121°C. For operation above 12°C the ratings should be reduced by 20 %.

Case I = Load fixed with respect to outer race  
 Case II = Load fixed with respect to inner race



Dimensions in millimetres

L	Threads UNJF-3A MIL-S-8879	M	N	$\Delta$ Imp $\mu$ m	$\Delta$ Nmp $\mu$ m	Radial play $\mu$ m	Axial play $\mu$ m	Radial Limit Load Rating in kN	Axial Limit Load Rating in kN	Radial Load Rating for Average life of 10.000 Complete 90° Cycles Case I in kN Case II in kN	Mass g	Bearing Number
34,92	.1900-32 RH	-	-					4,45	0,89	4,45	18	REP3MR3
	.1900-32 LH	-	-									REP3ML3
39,70	.2500-28 RH	1,574	5,105					4,45	0,89	4,45	23	REP3M4-6
												REP3MS4-6K
34,92	.3750-24 RH	2,362	7,899					4,45	0,89	4,45	23	REP3M6-2N
												REP3MS6-2NK
34,92	.3750-24 LH	2,362	7,899					4,45	0,89	4,45	23	REP3ML6-2N
												REP3MLS6 K
46,02	.2500-28 RH	1,574	5,105					4,45	0,89	4,45	45	RAP3M4-2
												RAP3MS4-2K
51,59	.3750-24 RH	2,362	7,899	0	0	0	0	5,34	1,07	5,34	23	REP3M6A
												REP3MS6A K
47,62	.3750-24 RH	2,362	7,899	+0,127	-0,127	to 10	to 76	7,65	1,53	7,65	45	REP4M6
												REP4M6-4K
47,62	.3750-24 LH	2,362	7,899					7,65	1,53	7,65	45	REP4ML6
												REP4ML6-4 K
61,93	.3750-24 RH	2,362	7,899					13,0	2,60	13,0	109	REP5M6
												REP5M6-2K
61,93	.4375-20 RH	2,362	9,398					13,0	2,60	13,0	109	REP5M7
												REP5MS7 K
61,93	.6250-18 RH	3,175	13,741					13,0	2,60	13,0	109	REP5M10
												REP5MS10K
69,85	.6250-18 RH	3,175	13,741					31,54	6,32	27,40	322	RAP10MT10
												RAP10MS10 K

## Designation

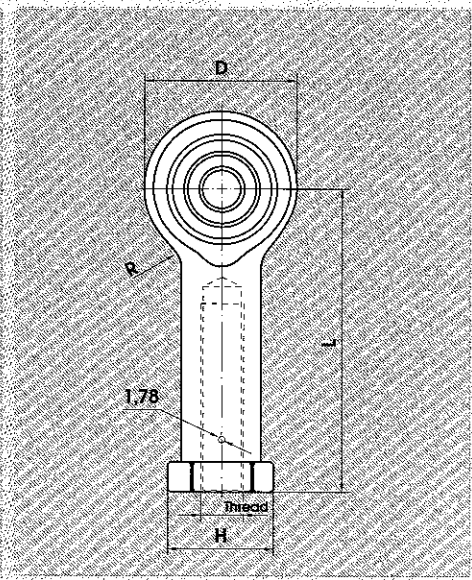
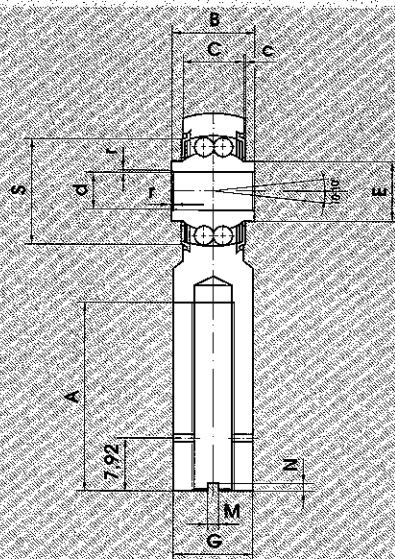
Each bearing is designated as in the following example:

Bearing Number REP 4M6-4 K G  
 G = Grease NATO G 354/MIL-G-23 827  
 K = Keyway in shank

# ROD ENDS

Precision ball bearing type, female thread, double row, self-aligning, dimensions according to specification MS 21 153.

**Series:** REP  
**Material:** EN 2099 (1.6657.9)  
**Rod end:** EN 2031 (1.3505.9)  
**Inner ring:** Cadmium plated except bore; yellow passivated  
**Seals:** PTFE  
**Seal Retainers:** Stainless steel



Bearing Number	MS 21153	d	D	B	C	E min.	rx 45°	S	c	R	L	H
		$\Delta d_{mp}$ $\mu m$	$\Delta D_{mp}$ $\mu m$	$\Delta B_{mp}$ $\mu m$	$\Delta C_{mp}$ $\mu m$						$\Delta L_{mp}$ $\mu m$	$\Delta H_{mp}$ $\mu m$
REP3N	-1	4,826	19,84	11,10	8,33	7,01		14,30	0,30	9,91	34,92	9,52
REP3NK	-1C											
REP3FL4-3	-5	4,826	19,84	11,10	8,33	7,01		14,30	0,30	9,91	34,92	9,52
REP3FL4-3K	-5C											
REP3N-2	-2	4,826	19,84	11,10	8,33	7,01		14,30	0,30	9,91	34,92	11,13
REP3N-2K	-2C											
REP3F4	-3	4,826	19,84	12,70	8,33	7,01		14,30	0,30	9,91	34,92	9,52
REP3F4K	-3C											
REP3FL4	-4	4,826	19,84	12,70	8,33	7,01	0,127	to 14,30	0,30	9,91	34,92	9,52
REP3FL4K	-4C						0,508					
REP4F5	-6	6,350	23,83	15,06	11,13	8,64		-	-	11,89	37,31	11,13
REP4F5K	-6C											
REP4FL5	-7	6,350	23,83	15,06	11,13	8,64		-	-	11,89	37,31	11,13
REP4FL5K	-7C											
REP4F7	-8	6,350	23,83	15,06	11,13	8,64		-	-	11,89	47,62	15,88
REP4F7K	-8C											
REP4FL7	-9	6,350	23,83	15,06	11,13	8,64		-	-	11,89	47,62	15,88
REP4FL7K	-9C											
REP5F5	-10	7,938	31,75	22,10	16,66	12,73	0,381	-	-	12,70	47,62	11,13
REP5F5K	-10C						to 0,762					
REP5FL5	-11	7,938	31,75	22,10	16,66	12,73		-	-	12,70	47,62	11,13
REP5FL5K	-11C											

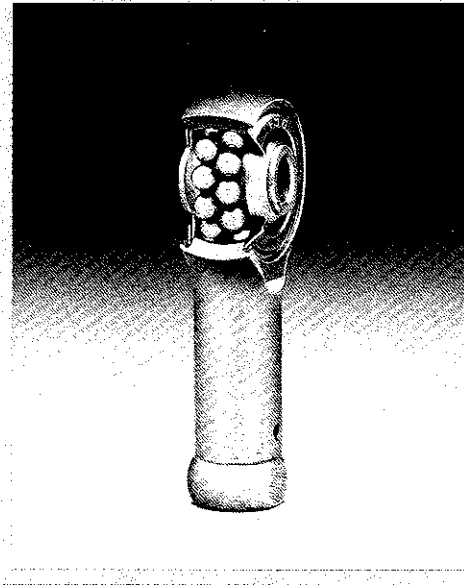
All Dimensions to be met after plating

10° permissible misalignment in either direction

Lubricant: Grease NATO G 395/MIL-G-81 322 - Code G = Grease NATO G 354/MIL-G-23 827

Threads: Length includes maximum of two incomplete threads. Keyway in shank = NAS 513  
 Load Ratings are for operation up to 121°C. For operation above 121°C the ratings should be reduced by 20 %.

Case I = Load fixed with respect to outer race  
 Case II = Load fixed with respect to inner race



Dimensions in millimetres

Threads UNJF-3B MIL-S-8879	A	G	M	N	$\Delta$ Mmp $\mu$ m	$\Delta$ Nmp $\mu$ m	Radial play $\mu$ m	Axial play $\mu$ m	Radial Limit Load Rating in kN	Axial Limit Load Rating in kN	Radial Load Rating for Average life of 10.000 Complete 90° Cycles Case I in kN Case II in kN	Mass g	Bearing Number
.2500-28 RH		Bead 11,125	1,57	1,42	-	-			4,45	0,89	4,45 4,45	23	REPB3N REPB3NK
.2500-28 LH			1,57	1,42	-	-			4,45	0,89	4,45 4,45	23	REP3FL4-3 REP3FL4-3K
.3125-24 RH		Hex. 11,125	1,57	1,42	-	-			4,45	0,89	4,45 4,45	27	REPB3N-2 REPB3N-2K
.2500-28 RH	19,05	Bead 11,125	1,57	1,42	-	-			4,45	0,89	4,45 4,45	27	REP3F4 REP3F4K
.2500-28 LH			1,57	1,42	-	-			4,45	0,89	4,45 4,45	27	REP3FL4 REP3FL4K
.3125-24 RH	$\pm 787$	Hex. 11,125	1,57	1,42	+127 0	+127	0 to 10	0 to 76	7,65	1,53	7,65 7,65	32	REP4F5 REP4F5K
.3125-24 LH			1,57	1,42	-	-			7,65	1,53	7,65 7,65	32	REP4FL5 REP4FL5K
.4375-20 RH	28,58		2,36	1,75	-	-			7,65	1,53	7,65 7,65	36	REP4F7 REP4F7K
.4375-20 LH		None	2,36	1,75	-	-			7,65	1,53	7,65 7,65	36	REP4FL7 REP4FL7K
.3125-24 RH	25,46		1,57	1,42	-	-			13,0	2,60	13,0 11,56	45	REP5F5 REP5F5K
.3125-24 LH			1,57	1,42	-	-			13,0	2,60	13,0 11,56	45	REP5FL5 REP5FL5K

## Designation

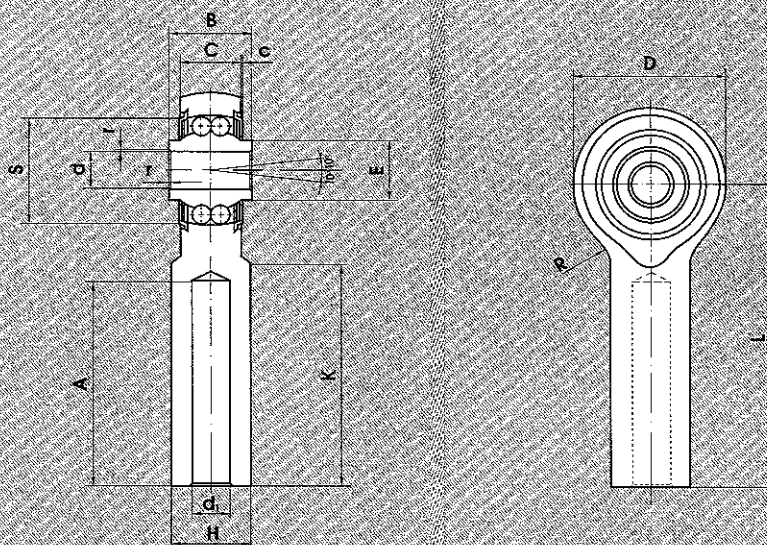
Each bearing is designated as in the following example:

Bearing Number REP 4F5 K G  
 G = Grease NATO G 354/MIL-G-23 827  
 K = locking slot

# ROD ENDS

Precision ball bearing type, hollow and solid shank, double row, self-aligning, dimensions according to specification MS 21 152 and MS 21 150.

**Series:** REP  
**Material:** EN 2099 (1.6657.9)  
**Rod end:** EN 2031 (1.3505.9)  
**Inner ring:** Cadmium plated except bare; yellow passivated  
**Seals:** PTFE  
**Seal Retainers:** Stainless steel



Bearing Number	MS	d	D	B	C	E	rx45°	S	c	R	L	K
Hollow Shank	21152	$\Delta$ mp $\mu$ m	$\Delta$ Dmp $\mu$ m	$\Delta$ Bmp $\mu$ m	$\Delta$ Cmp $\mu$ m	min.						$\Delta$ mp $\mu$ m
REP3H5	-1	4,826	19,84	11,10	8,33	7,01		14,40	0,30	9,91	34,92	22,22
REP4H8	-3						0,13			12,70	41,28	24,61
REP4H5-2	-4	6,350	0	±254	0		to			11,89	47,62	±254
REP4H8-2	-5		-8		-127	8,64	0,51			12,70	47,62	30,96
REP4H6	-2									12,45	47,62	30,96

Bearing Number	MS	d	D	B	C	E	rx45°	S	c	R	L	K					
Solid Shank	21150	$\Delta$ mp $\mu$ m	$\Delta$ Dmp $\mu$ m	$\Delta$ Bmp $\mu$ m	$\Delta$ Cmp $\mu$ m	min.						$\Delta$ mp $\mu$ m					
REP3S7	-1	4,826	0	19,84	±254	11,10	0	8,33		7,01	0,13	14,40	0,30	9,91	34,92	±254	22,22
REP4S10	-2	6,350	-8	23,83		15,06	-127	11,13	±254	8,64	to 0,51			12,70	47,62		30,96

All Dimensions to be met after plating

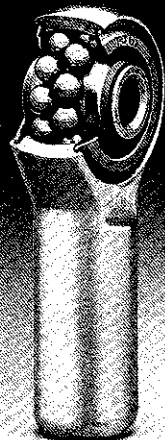
10° permissible misalignment in either direction

Lubricant: Grease NATO G 395/MIL-G-81 322 - Code G = Grease NATO G 354/MIL-G-23 827

Load Ratings are for operation up to 121°C. For operation above 121°C the Ratings should be reduced by 20%.

Case I = Load fixed with respect to outer race

Case II = Load fixed with respect to inner race



Dimensions in millimetres

A	H	$\Delta H_{mp}$ $\mu m$	$d_1$	Radial play $\mu m$	Axial play $\mu m$	Radial Limit Load Rating in kN	Axial Limit Load Rating in kN	Radial Load Rating for Average life of 10.000 Complete 90° Cycles Case I in kN	Radial Load Rating for Average life of 10.000 Complete 90° Cycles Case II in kN	Mass g	Bearing Number Hollow Shank
22,22	10,92		6,91			4,45	0,89	4,45	4,45	27	REP3H6
22,22	15,88		13,08	0	0					36	REP4H8
19,05	11,13	0	8,79	to	to	7,65	1,53	7,65	7,65	54	REP4H5-2
28,58	15,88	-51	12,70	10	76					41	REP4H8-2
30,96	15,88		9,80							54	REP4H6

Dimensions in millimetres

A	H	$\Delta H_{mp}$ $\mu m$	$d_1$	Radial play $\mu m$	Axial play $\mu m$	Radial Limit Load Rating in kN	Axial Limit Load Rating in kN	Radial Load Rating for Average life of 10.000 Complete 90° Cycles Case I in kN	Radial Load Rating for Average life of 10.000 Complete 90° Cycles Case II in kN	Mass g	Bearing Number Solid Shank
-	10,92	0	solid	0	0	4,45	0,89	4,45	4,45	32	REP3S7
-	15,88	-51	solid	to 10	to 76	7,65	1,53	7,65	7,65	73	REP4S10

### Designation

Each bearing is designated as in the following example:

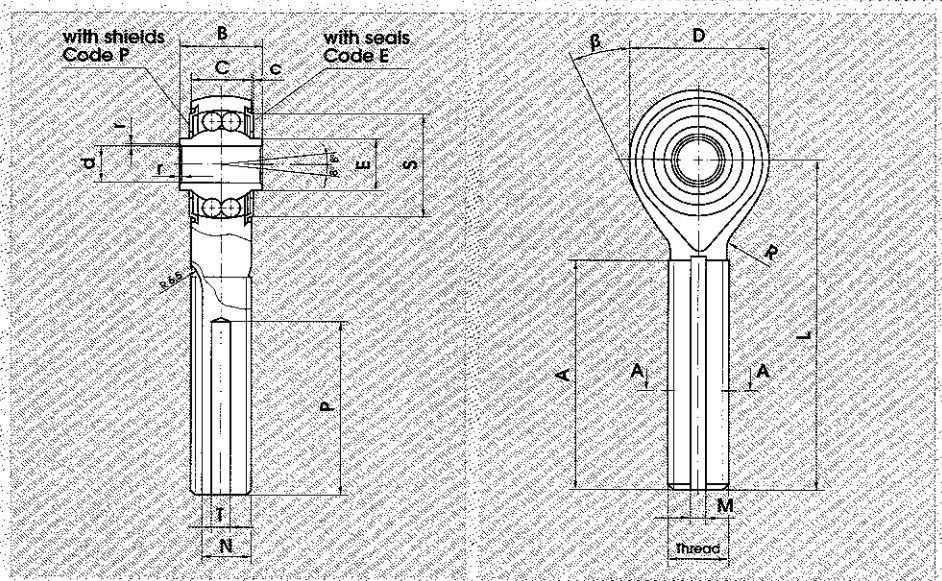
Bearing Number REP 4H6 G G = Grease NATO G 354/MIL-G-23 827

# ROD ENDS

Precision ball bearing type,  
male thread, double row, self-aligning.

**Series: NSA 8159-...E**  
**Material:** EN 2099 (1.6657.9)  
**Rod end:** Cadmium plated;  
 yellow passivated  
 EN 2030 (1.3544.9)  
 Cadmium plated except  
 bore; bright passivated  
**Inner ring:** Stainless steel  
**Shields:** Stainless steel  
**Seals:** PTFE  
**Seal Retainers:** Stainless steel

**Series: NSA 8159-...P**  
**Material:** EN 2099 (1.6657.9)  
**Rod end:** Cadmium plated;  
 yellow passivated  
 EN 2030 (1.3544.9)  
 Cadmium plated except  
 bore; bright passivated  
**Inner ring:** Stainless steel  
**Shields:** Stainless steel



Bearing Number	Right hand Thread	Left hand Thread	d	D	B	C	E	r x 45°	S	c	L	Threads UNJF-3A MIL-S-8879
010	011										54,0	.2500-28
012	013										54,0	.3125-24
014	015										54,0	.3750-24
016	017	6,350		22,5	14,0		8,40		14,20	0,30	60,0	.4375-20
018	019										77,5	.5000-20
020	021										85,0	.5625-18
022	023										80,0	.6250-18
024	025					10,0					60,0	.3125-24
026	027		0		0			0,3			60,0	.3750-24
028	029	7,938	-13	28,5	$\pm 250$	15,0	-120	$\pm 120$	10,80	to	62,0	$\pm 250$ .4375-20
030	031							0,8			74,0	.5000-20
032	033										80,0	.5625-18
034	035										83,0	.6250-18
036	037										62,0	.3750-24
038	039										67,0	.4375-20
040	041	9,525		32,0	20,0	14,0	13,80				75,0	.5000-20
042	043										73,0	.5625-18
044	045										85,0	.6250-18

All Dimensions to be met after plating

Procurement Specification MIL-B-6039

Lubricant: Grease NATO G 354/MIL-G-23 827

Keyway in shank = NAS 559

Uncrimping of protection flang: 5mN min.

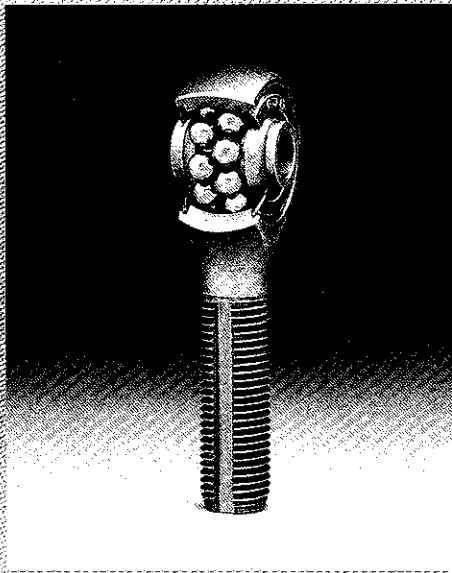


Section A-A

Typ 1



Typ 2



Dimensions in millimetres

R	A	T	P	$\beta$	M	N	Type	Axial play $\mu\text{m}$	Radial Limit Load Rating in kN	Mass g	Bearing Number Right hand Thread	Left hand Thread
	$\Delta\text{Amp}$ $\mu\text{m}$	$\Delta\text{Tmp}$ $\mu\text{m}$	$\Delta\text{Pmp}$ $\mu\text{m}$		$\Delta\text{Mmp}$ $\mu\text{m}$	$\Delta\text{Nmp}$ $\mu\text{m}$						
7,0	27,0	-	-	32°	1,57	5,11				37	010	011
6,0	37,0	-	-	32°	1,57	6,60	1			41	012	013
5,0	37,0	-	-	32°	2,36	7,90	2			46	014	016
7,0	42,0	-	-	32°	2,36	9,40				56	016	017
6,0	52,0	4,0	56,0	32°	2,36	11,07			6,81	73	018	019
6,0	59,0	4,0	63,0	32°	3,18	12,14				77	020	021
7,0	63,0	6,0	65,0	19°	3,18	13,74	1			98	022	023
5,0	37,0	-	-	35°	1,57	6,60				60	024	025
5,0	37,0	$\pm 500$	0	35°	2,36	7,90		80		64	026	027
5,0	42,0	-	-250	35°	2,36	9,40				71	028	029
5,0	52,0	4,0	55,0	35°	2,36	11,07	2	max.		86	030	031
7,0	59,0	4,0	61,0	30°	3,18	12,14			10,78	103	032	033
7,0	63,0	6,0	65,0	30°	3,18	13,74				114	034	035
5,0	37,0	-	-	35°	2,36	7,90	1			94	036	037
5,0	42,0	-	-	35°	2,36	9,40				106	038	039
5,0	52,0	-	-	35°	2,36	11,07			12,75	122	040	041
5,0	48,0	-	-	30°	3,18	12,14	2			132	042	043
5,0	63,0	6,0	65,0	30°	3,18	13,74	1			144	044	045

Designation

Each bearing is designated as in the following example:

NSA 8159 - 014 E A  
 Number of standard \_\_\_\_\_  
 014 = Dash No. right hand thread \_\_\_\_\_  
 E = sealed type \_\_\_\_\_  
 A = Inner ring and balls - material EN 2031 (1.3505.9)

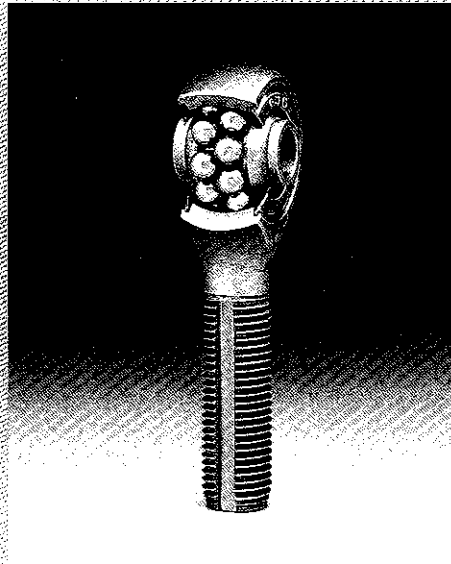


Section A-A

Typ 1  
Code K



Typ 2  
Code M



Dimensions in millimetres

R	A	$\beta$	M	N	Type	clearance in $\mu\text{m}$		Permissible static loads		Starting torque in mN.m		Mass g	Bearing Number
						Radial	Axial max.	Radial in kN	Axial in kN	Seals	Shields		
7,0	27,0	32°	1,57	5,11									
6,0	37,0	32°	1,57	6,60	1								01
5,0	37,0	32°	2,36	7,90	2								02
7,0	42,0	32°	2,36	9,40				6,81	2,128	9	4,5		03
6,0	52,0	32°	2,36	11,07									04
6,0	59,0	32°	3,18	12,14									05
7,0	63,0	19°	3,18	13,74	1								06
5,0	37,0	35°	1,57	6,60		1							07
5,0	37,0	±500 35°	2,36	7,90	0	to	80						10
5,0	42,0	35°	2,36	9,40	-130	2	5	10,78	3,369	10	5,5		11
5,0	52,0	35°	2,36	11,07									12
7,0	59,0	30°	3,18	12,14									13
7,0	63,0	30°	3,18	13,74									14
5,0	37,0	35°	2,36	7,90	1								15
5,0	42,0	35°	2,36	9,40									20
5,0	52,0	35°	2,36	11,07				12,75	3,984	12	7,5		21
5,0	48,0	30°	3,18	12,14	2								22
5,0	63,0	30°	3,18	13,74	1								23
													24

Designation

Each bearing is designated as in the following example:

EN 4156 L 05 E K1 A  
 EN 4157 L 05 E K1 A  
 EN 4351 L 05 E K1 A

Number of standard  
 L = Left hand thread  
 R = right hand thread  
 05 = Diameter code

A = Letter for grease  
 K1 = for longitudinal groove type  
 E = sealed type

# SPHERICAL BEARINGS

## Engineering Information

### Metal-to-metal

These series are represented by two different designs:

1. Spherical plain bearing, steel-to-steel, with two slots in the outer ring for insertion to the inner ring. These bearings are mainly manufactured of through-hardened ball bearing and corrosion resistant steel and are available in two types for use as structural bearings and Linkage bearings.

Structural bearings feature an extremely tight radial clearance. Intended to connect fixed components in the structure they eliminate misalignment stresses. The load is mostly static.

2. Integral spherical bearings, metal-to-metal, without assembling slots in the outerring.

Following combinations of materials for the inner and outer rings are used:

- Ball-bearing quality steel (1.3505.9), hardened and chromium plated, outer ring Bronze (2.0966) cadmium plated or Alloysteel (1.7734.6) cadmium plated.
- Corrosion resistant steel (1.3544.9), hardened, outer ring Bronze (2.0966) cadmium plated or corrosion-resistant-steel (1.4044.6) or (1.4548.4).

Special design Ball-Beryllium copper (2.1247.75), outerring corrosion resistant steel (1.4548.4).

RWG Frankenjura offers also a special design: Ininnering made of Beryllium copper (2.1247.75) and outerring made of corrosion resistant steel (1.4548.4).

The hardness of the ring materials and the specifications to which these series apply are shown in the dimensional tables. Direction of the radial load must be perpendicular to the plane of the filling slots.

3. To avoid fretting of the spherical gliding surfaces in the metal-to-metal bearing a dry film lubricant is applied on one of the gliding surface (inner-ring or outerring).

This dry film lubricant is compatible with the current standard greases, indicated in the tables of our catalogue. Spherical metal-to-metal bearings with lubrication grooves and lubrication holes secure a proper distribution of the grease in the bearing.

#### 4. Qualification and Acceptance

The qualification and acceptance of the metal-to-metal spherical bearing are carried out according to the following technical specifications: DIN 65237 EN 2337 for metric series and MIL-B-8976 for inch series.

In these specifications all the requirements, tests and acceptance conditions are laid down.

In case of special bearings, bearings according to customer's drawing these specifications can be referred to.

#### 5. Bearing clearance

The radial and axial clearance is checked according to the technical specifications EN 2337, LN 29637 and MIL-B-8976.

Note: Bearing has to be ungreased.

6. Spherical bearing, metal-to-metal type, are mainly mounted in structural components of aircrafts. They are also fitted into rod ends.

### Mounting fits

metric - size	
housing	shaft
J 6	h 6

inch - size	
+ 8 $\mu$ m - 5 $\mu$ m	g 6