Mechanical Linkages

Mechanical Linkages

- Rod Ends and Ball Joints

Introduction

Series SEE Rod Ends and Ball Joints are compact self aligning spherical bushings that can support a large radial load and a bi-directional axial load at the same time. They are classified as maintenance free and lubrication type. A smooth rotational and oscillary motion can be achieved with superior anti wear and loading properties in each type.

They are used in control and link mechanisms ideally suited for application in Automobiles, Trucks, Textile machinery, Farm equipment, Earth Moving equipment, Machine Tools, Packaging machinery, Industrial Robots, Ultra Light Aircraft, Compressor industry, amongst others.

Series SEE Rod Ends and Ball Joints have either a female thread or male thread on the body and they can be easily assembled on to machines.

- Rod End Series manufactured dimensionally conforming to ISO 12240 Part IV : 1998. (Series SEF/SEM)
- Ball Joint Series manufactured dimensionally conforming to DIN 71802.(Series SCJ)
- High strength designs with good wear resistance
- Self lubricating reinforced thermoplastic raceway for excellent bearing characteristics and maintenance free operation

Standard Materials (Rod Ends):

Body Housing	low Carbon Steel, zinc plated
Spherical Ball	low Carbon Steel, chrome plated
Bearing Raceway	self lubricating reinforced engineering thermoplastic (Polyamide with Mos2)

Standard Materials (Ball Joints):

Body Housing	low Carbon Steel, zinc plated
Ball Stud	low Carbon Steel, zinc plated
Bearing Bush	self lubricating reinforced engineering thermoplastic (Polyamide with Mos2)
Dust cover	Polychloroprene

Technical & Safety Information

The values shown in the tables are expected minimum results based on actual tests performed on production samples. These results are presented for design guidelines only and do not imply or constitute a warranty. Suitable safety factors are required.

Care should be used in tightening a nut against the ball to prevent distortion. In applications where excessive vibration is encountered, self locking nylon insert nuts or lock washers should be used to secure the ball.

The plated balls may be chipped or distorted by excessive clamping pressure, resulting in increased torque, wear and premature failure.

Please also see note regarding interchangeability of products on back inside page.

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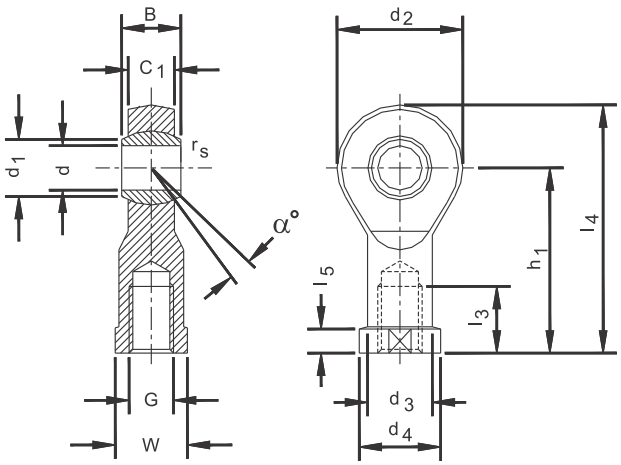
- Rod Ends

SEF



Body	forged low Carbon Steel, Zinc Plated
Ball	52100 Steel, Rc 56 min., Hard Chrome Plated
Race	MoS_2 impregnated Polyamide Engineering Thermoplastic

Product Code	d mm	d_1 » mm	B mm	rs min. mm	a » °	G	C_1 max. mm	d_2 max. mm	h_1 mm	l_3 max. mm	l_4 max. mm	l_5 » mm	d_3 mm	d_4 max. mm	W mm	BALL DIA inch	Dynamic Load Capacity N	Static Load Capacity N
SEF 05	5	7.70	8	0.30	13	M5 x 0.8	6.00	16	27	15	35	4.00	11.00	11	8	7/16"	3270	5730
SEF 06	6	9.00	9	0.30	13	M6 x 1.0	7.00	20	30	14	40	5.00	10.00	13	11	1/2"	4200	6910
SEF 08	8	10.40	12	0.30	14	M8 x 1.25	9.00	24	36	18	48	5.00	12.50	16	14	5/8"	7010	10200
SEF 10	10	12.90	14	0.30	13	M10 x 1.5	11.00	30	43	24	58	6.50	15.00	19	17	3/4"	9810	13300
SEF 12	12	15.40	16	0.30	13	M12 x 1.75	12.00	34	50	27	67	7.50	17.50	22	19	7/8"	13100	16900
SEF 14	14	16.90	19	0.30	16	M14 x 2.0	13.50	37	57	28	74	8.00	20.00	27	22	1"	16800	20900
SEF 16	16	19.40	21	0.30	15	M16 x 2.0	15.00	42	62	30	83	8.00	22.00	29	22	1 1/8"	21000	25400
SEF 18	18	21.90	23	0.30	15	M18 x 1.5	16.50	46	71	32	94	8.00	26.00	32	27	1 1/4"	25700	30200
SEF 20	20	24.40	25	0.30	14	M20 x 1.5	18.00	51	77	32	102	10.00	27.50	37	30	1 3/8"	30800	35500

All dimensions in mm unless otherwise specified

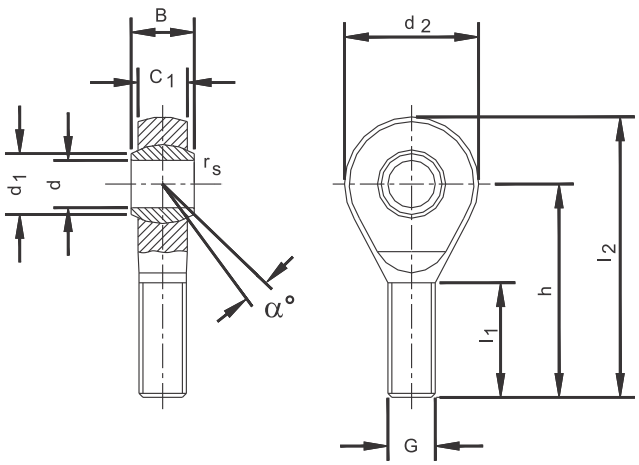
1N : 0.102 Kgf = 0.2248lbs

Suffix 'R' for right hand thread and 'L' for left hand thread
Suffix 'M' for lubrication type metal race with greasing nipple
Suffix 'T' for self Lubricating PTFE impregnated engineering thermoplastic race
Contact factory for metric fine pitch thread requirement
Contact factory for inch thread requirement

Mechanical Linkages

- Rod Ends

SEM



Body	forged low Carbon Steel, Zinc Plated
Ball	52100 Steel, Rc 56 min., Hard Chrome Plated
Race	MoS_2 impregnated Polyamide Engineering Thermoplastic

Product Code	d mm	d_1 » mm	B mm	rs min. mm	a » °	G	C_1 max. mm	d_2 max. mm	h mm	l_1 max. mm	l_2 max. mm	BALL DIA. inch	Dynamic Load Capacity N	Static Load Capacity N
SEM 05	5	7.70	8	0.30	13	M5 x 0.80	6.00	16	33	20	41	7/16"	3270	3340
SEM 06	6	9.00	9	0.30	13	M6 x 1.00	7.00	20	36	22	46	1/2"	4200	4730
SEM 08	8	10.40	12	0.30	14	M8 x 1.25	9.00	24	42	26	54	5/8"	7010	8640
SEM 10	10	12.90	14	0.30	13	M10 x 1.50	11.00	30	48	29	63	3/4"	9810	13300
SEM 12	12	15.40	16	0.30	13	M12 x 1.75	12.00	34	54	32	71	7/8"	13100	16900
SEM 14	14	16.90	19	0.30	16	M14 x 2.00	13.50	37	60	36	79	1"	16800	20900
SEM 16	16	19.40	21	0.30	15	M16 x 2.00	15.00	42	64	40	85	1 1/8"	21000	25400
SEM 18	18	21.90	23	0.30	15	M18 x 1.50	16.50	46	72	44	95	1 1/4"	25700	30200
SEM 20	20	24.40	25	0.30	14	M20 x 1.50	18.00	51	78	47	103	1 3/8"	30800	35500

All dimensions in mm unless otherwise specified

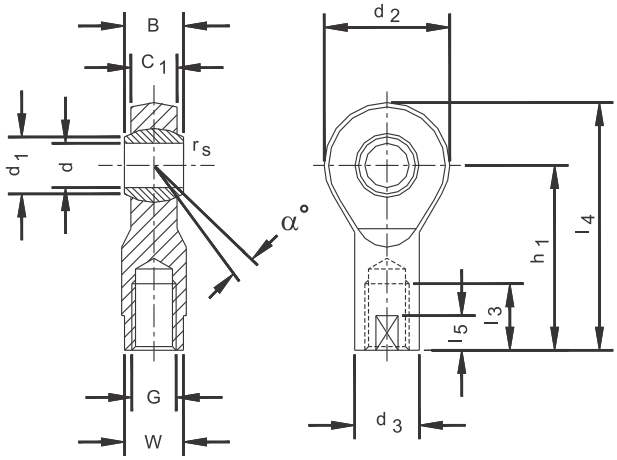
1N : 0.102 Kgf = 0.2248lbs

Suffix 'R' for right hand thread and 'L' for left hand thread
Suffix 'M' for lubrication type metal race with greasing nipple
Suffix 'T' for self Lubricating PTFE impregnated engineering thermoplastic race
Contact factory for metric fine pitch thread requirement
Contact factory for inch thread requirement

Mechanical Linkages

- Rod Ends

SPF



Body	machined low Carbon Steel, Zinc Plated
Ball	52100 Steel, Rc 56 min., Hard Chrome Plated
Race	MoS_2 impregnated Polyamide Engineering Thermoplastic

Product Code	d mm	d_1 » mm	B mm	r_s min. mm	a » °	G	C_1 max. max.	d_2 max. mm	h_1 mm	l_3 max. mm	l_4 max. mm	l_5 » mm	d_3 » mm	W mm	BALL DIA. inch	Dynamic Load Capacity N	Static Load Capacity N
SPF 05	5	7.70	8	0.30	13	M5 x 0.80	6.00	16	27	15	35	8	11	9	7/16"	3270	5730
SPF 06	6	9.00	9	0.30	13	M6 x 1.00	7.00	20	30	14	40	9	12	11	1/2"	4200	6910
SPF 08	8	10.40	12	0.30	14	M8 x 1.25	9.00	24	36	16	48	11	13	11	5/8"	7010	10200
SPF 10	10	12.90	14	0.30	13	M10 x 1.50	11.00	28	43	20	57	12	19	17	3/4"	9810	13300
SPF 12	12	15.40	16	0.30	13	M12 x 1.75	12.00	32	50	25	66	14	22	19	7/8"	13100	16900
SPF 14	14	16.90	19	0.30	16	M14 x 2.00	13.50	36	57	25	75	15	23	22	1"	16800	20900
SPF 16	16	19.40	21	0.30	15	M16 x 2.00	15.00	42	64	28	85	16	25	22	1 1/8"	21000	25400
SPF 18	18	21.90	23	0.30	15	M18 x 1.50	16.50	46	71	30	94	18	28	25	1 1/4"	25700	30200
SPF 20	20	24.40	25	0.30	14	M20 x 1.50	18.00	50	77	30	102	18	29	27	1 3/8"	30800	35500

All dimensions in mm unless otherwise specified *1N : 0.102 Kgf = 0.2248lbs*

Suffix 'R' for right hand thread and 'L' for left hand thread
Suffix 'M' for lubrication type metal race with greasing nipple
Suffix 'T' for self Lubricating PTFE impregnated engineering thermoplastic race
Contact factory for metric fine pitch thread requirement
Contact factory for inch thread requirement
Contact factory for stainless steel construction