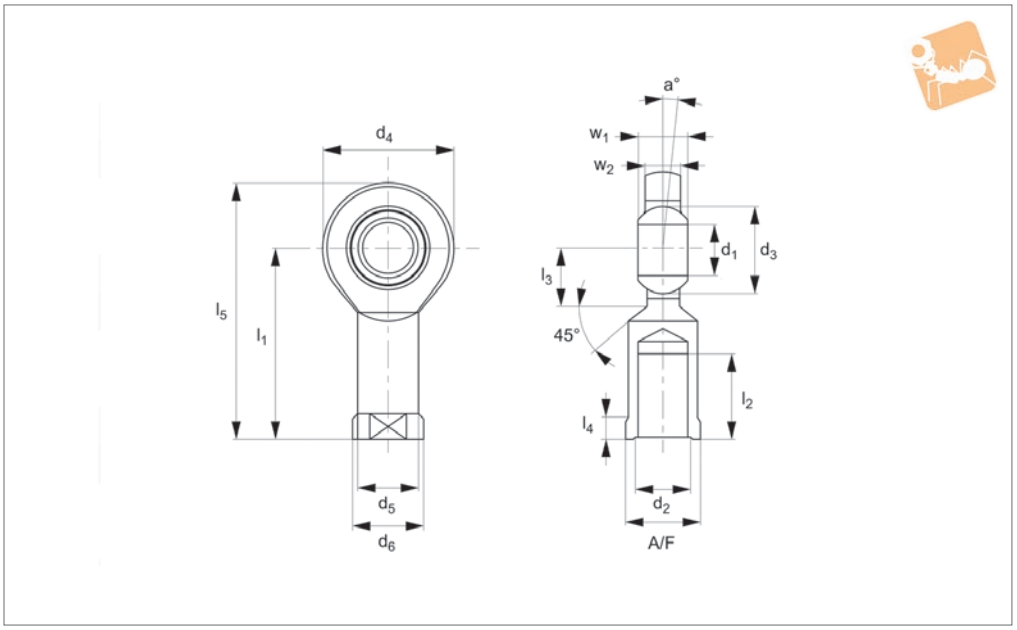
Low Cost Rod End - Female

with integral spherical plain bearings



R3574

Material
Housing: Heat treated steel, surface galvanized, free of Cr VI. Outer ring: heat treated steel,
hardened, single split, bonded with PTFE fabric.

Joint Ball: Ball bearing steel, hardened, ground, polished up to size 12, hard chromium plated.

Technical Notes
Standard thread is right hand thread, series E, maintenance free.

Tips
For tolerances see technical page 123

Important Notes
*Denotes fine pitch thread.

Order No.	Thread hand	d_1 tol. K6	l_1	d_2	d_3	d_4	d_5	d_6	Weight g
R3574.R006	Right	6	30	M6	10	21	10.0	13	21
R3574.R008	Right	8	36	M8	13	24	12.5	16	39
R3574.R010	Right	10	43	M10	16	29	15	19	61
R3574.R012	Right	12	50	M12	18	34	17.5	22	96
R3574.R015	Right	15	61	M14	22	40	21	26	180
R3574.R017	Right	17	67	M16	25	46	24	30	220
R3574.R020	Right	20	77	M20x1,5*	29	53	27.5	35	350
R3574.R025	Right	25	94	M24x2*	35.5	64	33.5	42	640
R3574.R030	Right	30	110	M30x2*	40.7	73	40	50	930
R3574.R035	Right	35	125	M36x3*	47	82	47	58	1300
R3574.R040	Right	40	142	M39x3*	53	92	52	65	2000
R3574.R041	Right	40	142	M42x3*	53	92	52	65	1960
R3574.R045	Right	45	145	M42x3*	60	102	58	70	2500
R3574.R046	Right	45	145	M45x3*	60	102	58	70	2440
R3574.R050	Right	50	160	M45x3*	66	112	62	75	3500
R3574.R051	Right	50	160	M52x3*	66	112	62	75	3400
R3574.R060	Right	60	175	M52x3*	80	135	70	88	5500
R3574.R061	Right	60	175	M60x4*	80	135	70	88	5380
R3574.R070	Right	70	200	M56x4*	92	160	80	98	8600
R3574.R071	Right	70	200	M72x4*	92	160	80	98	8420
R3574.R080	Right	80	230	M64x4*	105	180	95	110	12000
R3574.R081	Right	80	230	M80x4*	110	180	95	110	11800
R3574.L006	Left	6	30	M6	10	21	10.0	13	21
R3574.L008	Left	8	36	M8	13	24	12.5	16	39
R3574.L010	Left	10	43	M10	16	29	15	19	61
R3574.L012	Left	12	50	M12	18	34	17.5	22	96
R3574.L015	Left	15	61	M14	22	40	21	26	180
R3574.L017	Left	17	67	M16	25	46	24	30	220
R3574.L020	Left	20	77	M20x1,5*	29	53	27.5	35	350
R3574.L025	Left	25	94	M24x2*	35.5	64	33.5	42	640
R3574.L030	Left	30	110	M30x2*	40.7	73	40	50	930
R3574.L035	Left	35	125	M36x3*	47	82	47	58	1300

Low Cost Rod End - Female

with integral spherical plain bearings

Order No.	Thread hand	d_1 tol. K6	l_1	d_2	d_3	d_4	d_5	d_6	Weight g
R3574.L040	Left	40	142	M39x3*	53	92	52	65	2000
R3574.L041	Left	40	142	M42x3*	53	92	52	65	1960
R3574.L045	Left	45	145	M42x3*	60	102	58	70	2500
R3574.L046	Left	45	145	M45x3*	60	102	58	70	2440
R3574.L050	Left	50	160	M45x3*	66	112	62	75	3500
R3574.L051	Left	50	160	M52x3*	66	112	62	75	3400
R3574.L060	Left	60	175	M52x3*	80	135	70	88	5500
R3574.L061	Left	60	175	M60x4*	80	135	70	88	5380
R3574.L070	Left	70	200	M56x4*	92	160	80	98	8600
R3574.L071	Left	70	200	M72x4*	92	160	80	98	8420
R3574.L080	Left	80	230	M64x4*	105	180	95	110	12000
R3574.L081	Left	80	230	M80x4*	110	180	95	110	11800

Order No.	l_2	l_3	l_4	l_5	w_1	w_2	A/F	a °	Static load C_0 kN max.
R3574.R006	11	12	5	40.5	6	4.4	11	13	6.6
R3574.R008	15	14	5	48	8	6	14	15	10.3
R3574.R010	20	15	6.5	57.5	9	7	17	12	14.1
R3574.R012	23	18	6.5	67	10	8	19	11	19.6
R3574.R015	30	20	8	81	12	10	22	8	28.8
R3574.R017	34	23	10	90	14	11	27	10	36.0
R3574.R020	40	27	10	103.5	16	13	32	9	48.0
R3574.R025	48	32	12	126	20	17	36	7	66.4
R3574.R030	56	37	15	146.5	22	19	41	6	88.0
R3574.R035	60	42	15	166	25	21	50	6	117
R3574.R040	65	48	18	188	28	23	55	7	144
R3574.R041	65	48	18	188	28	23	55	7	144
R3574.R045	65	52	20	196	32	27	60	7	192
R3574.R046	65	52	50	196	32	27	60	7	192
R3574.R050	68	60	20	216	35	30	65	6	232
R3574.R051	68	60	20	216	35	30	65	6	232
R3574.R060	70	75	20	242.5	44	38	75	6	360
R3574.R061	70	75	20	242.5	44	38	75	6	360
R3574.R070	80	87	20	280	49	42	85	6	488
R3574.R071	80	87	20	280	49	42	85	6	488
R3574.R080	85	100	24	320	55	47	100	6	600
R3574.R081	85	100	25	320	55	47	100	6	600
R3574.L006	11	12	5	40.5	6	4.4	11	13	6.6
R3574.L008	15	14	5	48	8	6	14	15	10.3
R3574.L010	20	15	6.5	57.5	9	7	17	12	14.1
R3574.L012	23	18	6.5	67	10	8	19	11	19.6
R3574.L015	30	20	8	81	12	10	22	8	28.8
R3574.L017	34	23	10	90	14	11	27	10	36.0
R3574.L020	40	27	10	103.5	16	13	32	9	48.0
R3574.L025	48	32	12	126	20	17	36	7	66.4
R3574.L030	56	37	15	146.5	22	19	41	6	88.0
R3574.L035	60	42	15	166	25	21	50	6	117
R3574.L040	65	48	18	188	28	23	55	7	144
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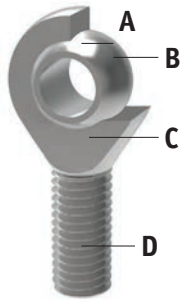
R3574.L045	65	52	20	196	32	27	60	7	192
R3574.L046	65	52	50	196	32	27	60	7	192
R3574.L050	68	60	20	216	35	30	65	6	232
R3574.L051	68	60	20	216	35	30	65	6	232
R3574.L060	70	75	20	242.5	44	38	75	6	360
R3574.L061	70	75	20	242.5	44	38	75	6	360
R3574.L070	80	87	20	280	49	42	85	6	488
R3574.L071	80	87	20	280	49	42	85	6	488
R3574.L080	85	100	24	320	55	47	100	6	600
R3574.L081	85	100	25	320	55	47	100	6	600

All of our rod ends incorporate either a plain spherical bearing, ball bearing, or roller bearing. Below is an overview of each type.

Plain spherical bearings



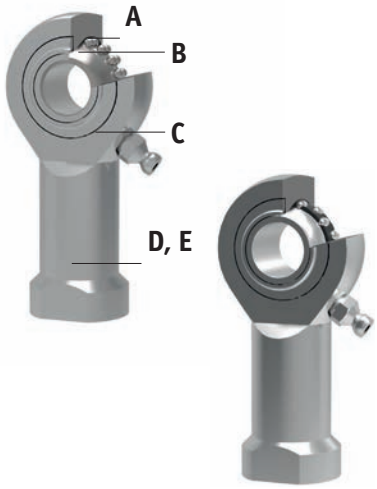
A Made from Polyamid-PTFE-fibreglass-compound, maintenance free, absorbs any foreign particles

B Ball made of bearing steel, hardened, ground, polished and hard chromium plated, ensures reliable corrosion wwprotection

C No clearance - radial clearance 0-10µm

D All rod ends housings made of forged steel, tempered, extremely high loads resistant

Ball and roller bearings



A Radial clearance: 10-30µm, low friction

B Inner ring made of bearing steel, hardened ball grooves polished

C Shields on both sides protect against rough dirt penetration

D All rod ends housings are made of forged steel, case hardened bearing race

E Low maintenance due to long-term greasing, especially suitable for high speed large swiveling angles or rotating movements

Rod ends and water

Stainless steel versions

Most of our rod ends are available in stainless steel as standard

High grade AISI 316 stainless steel available on request

Rod Ends from Automotion Components

ROD ENDS

Technical Information

Rod End Bearings

Rod ends with integral maintenance-free spherical plain bearings

In many cases heavy-duty rod ends with integral spherical plain bearings are most often used. They are above all used for small swivelling or tilting movements at low speeds. They stand out for their high load capacity and can also be used for shock-like loads. The rod end ball slides on a plastic bearing shell consisting of a glass fibre-filled nylon/teflon compound. This design assures a maintenance-free rod end. Heavy-duty plain bearing rod ends have slight initial movement friction and virtually no clearance. The plastic material used has another advantage in that it can absorb many foreign particles so that no damage can occur. The balls of heavy-duty rod ends with integral spherical plain bearings are hard chrome plated. This reliable corrosion protection ensures that the function of the rod end will not be affected by a corroded ball surface under humid operating conditions.

Rod ends with integral ball bearings

This design is especially suitable for high speeds, large swivelling angles or rotating movements with relatively low or medium loads. Prominent technical features are the low bearing friction, long-time greasing as well as the sealing against some dirt penetration (by means of shields on both sides). Under normal operating conditions the rod ends are maintenance-free.

Greasing nipples are provided for lubrication in case of rough operations and maximum loads. To avoid incompatibility with the production lubrication, we recommend lubrication with a calcium-complex-soap-grease. A special heat treatment procedure gives the rod end housing a raceway hardness adapted to the antifriction bearing, ensuring at the same time high stability with changing loads.

Rod ends with integral roller bearings

This design based on the structure of a self-aligning roller bearing is preferably used for high speed, large tilting angles or rotating movements under high loads. Compared to rod ends with ball bearings, rod ends with self-aligning roller bearings have essentially higher basic load ratings. This design is equipped with a cage to minimise the rolling friction and heat build-up. These rod ends, with long-time lubrication are under normal operating conditions maintenance-free.

Greasing nipples are provided for lubrication in case of rough operations and maximum loads. To avoid incompatibility with the production lubrication, we recommend lubricating with a calcium-complex-soap-grease.

Shields on both sides limit dirt particles from penetrating into the bearing. The rod ends with roller bearings are, subjected to a special heat treatment to obtain a raceway hardness adapted to the antifriction bearings, ensuring at the same time a high stability with changing loads.

Static load capacity C_0 (plain bearings)

The static load capacity C_0 is the radially acting static load which does not cause any permanent deformation of the components when the spherical bearing or rod end is stationary, (i.e. the load condition without pivoting, swivelling or tilting movements).
It is also a precondition here that the operating temperature must be at normal room temperature and the surrounding components must possess sufficient stability.

The values specified in the tables are determined by static tension tests on a representative number of series components at 20°C normal room temperature. The static load capacity may vary with lower or higher temperature depending on the material.

In the case of all rod ends with plain bearings, the static load rating refers to the maximum permissible static load of the rod end housing in a tensile direction up to which no permanent deformation occurs at the weakest housing cross-section. The value in the product tables has a safety factor of 1.2 times the tensile strength of the rod ends housing material.

Static load capacity C_0 (roller and ball bearings)

For our rod ends with roller and ball bearings, the static load rating is the load at which the bearing can operate at room temperature without its performance being impaired as a result of deformations, fracture, or damage to the sliding contact surfaces (max 1/10,000th of the ball diameter).

Dynamic load capacity C (plain bearings)

Dynamic load ratings serve as values for calculation of the service life of dynamically-loaded spherical bearings and rod ends. The values themselves do not provide any information about the effective dynamic load capacity of the spherical bearing or rod end. To obtain this information, it is necessary to take into account the additional influencing factors such as load type, swivel or tilt angle, speed characteristic, max. permitted bearing clearance, max. permitted bearing friction, lubrication conditions and temperature, etc.

Dynamic load capacities depend on the definition used to calculate them. Comparison of values is not always possible owing to the different definitions used by various manufacturers, and because the load capacities are often determined under completely different test conditions.

Dynamic load capacity C (roller and ball bearings)

For our rod ends with roller and ball bearings, the dynamic load capacity is the load at which 90% of a large quantity of identical rod ends reach 1 million revolutions before they fail (due to fatigue of the rolling surfaces).

Rod Ends from Automotion Components

Rod Ends from Automotion Components

Low cost rod ends load ratings
The ultimate radial static load rating is measured as the failure point when a load is increasingly applied to a pin through the rod end's bore and pulled straight up while the rod end is held in place. Note that the actual rating is determined by calculating the lowest of the following three values:

1: Raceway material comprehensive strength (R value):

$$R = E \times T \times X$$

2: Rod end head strength (H value, cartridge type construction):

$$H = \left[\left(\frac{T}{2}\sqrt{D^2 - T^2}\right) + \left(\frac{D^2}{2} \times \text{SIN}^{-1}\frac{T}{2}\right) - \left(\text{O.D. of Bearing} \times T\right)\right] \times X$$

Angle of $\frac{T}{2}$ expressed in radians

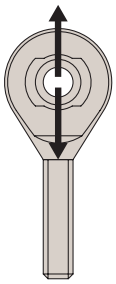
3: Shank strength (S Value) male threaded rod end:

$$S = [(\text{root diameter of thread}^2 \times .78) - (N^2 \times .78)] \times X$$

female threaded rod end:

$$S_2 = [(J^2 \times .78) + (\text{major diameter of thread} \times .78)] \times X$$

Where:
- E = Ball diameter
- T = Housing width
- X = Allowable stress
- D = Head diameter
- N = Diameter of drilled hole in shank of male rod end
- J = Shank diameter of female rod end

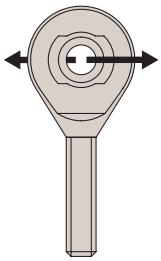


The axial static load capacity is measured as the force required to cause failure via a load parallel to the axis of the bore. Depending on the material types and construction methods, the ultimate axial load is generally 10-20% of the ultimate radial static load. The formula does not account for the bending of the shank due to a moment of force, nor the strength of the stake in cartridge-type construction.

Axial strength (A Value):

$$A = .78\ [\ (E + .176T)^2 - E2\ ] \times X$$

Where:
- X = Allowable stress (see table below)
- E = Ball diameter
- T = Housing width



Material	Allowable stress (PSI)
300 Series Stainless Steel	35,000
Low Carbon Steel	52,000