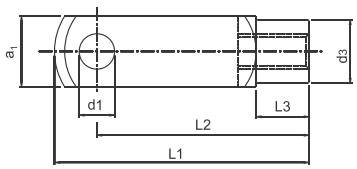
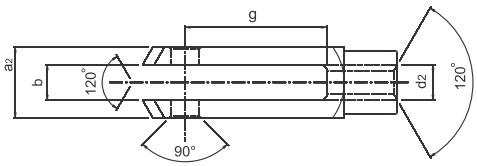
Mechanical Linkages

- Clevis / Yoke

CLE





Body Free Cutting Steel, Zinc Plated

Product Code	d 2	d 1	g	a 1 a 2	b	d3	L 1	L 2	L 3
CLE 04 S	M4 x 0.70	Ø4	8	8	4	Ø8	21	16	6
CLE 04 B	M4 x 0.70	Ø4	16	8	4	Ø8	29	24	6
CLE 05 S	M5 x 0.80	Ø5	10	10	5	Ø9	26	20	7.5
CLE 05 B	M5 x 0.80	Ø5	20	10	5	Ø9	36	30	7.5
CLE 06 S	M6 x 1.00	Ø6	12	12	6	Ø10	31	24	9
CLE 06 B	M6 x 1.00	Ø6	24	12	6	Ø10	43	36	9
CLE 08 S	M8 x 1.25	Ø8	16	16	8	Ø14	42	32	12
CLE 08 B	M8 x 1.25	Ø8	32	16	8	Ø14	58	48	12
CLE 10 S	M10 x 1.50	Ø10	20	20	10	Ø18	52	40	15
CLE 10 B	M10 x 1.50	Ø10	40	20	10	Ø18	72	60	15
CLE 12 S	M12 x 1.75	Ø12	24	24	12	Ø20	62	48	18
CLE 12 B	M12 x 1.75	Ø12	48	24	12	Ø20	86	72	18
CLE 14 S	M14 x 2.00	Ø14	28	27	14	Ø24	72	56	22.5
CLE 14 B	M14 x 2.00	Ø14	56	27	14	Ø24	101	85	22.5
CLE 16 S	M16 x 2.00	Ø16	32	32	16	Ø26	83	64	24
CLE 16 B	M16 x 2.00	Ø16	64	32	16	Ø26	115	96	24
CLE 18 S	M18 x 2.50	Ø18	36	36	18	Ø30	94	72	27
CLE 20 S	M20 x 2.50	Ø20	40	40	20	Ø34	105	80	30
CLE 20 B	M20 x 2.50	Ø20	80	40	20	Ø34	145	120	30

All dimensions in mm unless specified otherwise

Suffix 'R' for right hand thread and 'L' for left hand thread
Contact factory for metric fine pitch thread requirement
Contact factory for inch thread requirement

Mechanical Linkages

Engineering Information

Ball Joint Assembly Tensile Test Procedure

A ball joint assembly is tensile tested by placing the male threaded ball stud in a fixed position and applying increasing tensile force along the axis of the internally threaded housing until rupture occurs. The assembly's ultimate tensile strength, then, is either the maximum tensile stress of the internally threaded housing, or the maximum sheer stress of the male threaded ball stud, whichever ruptures first.

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

Ball Joint Ball Stud Pullout Test Procedure

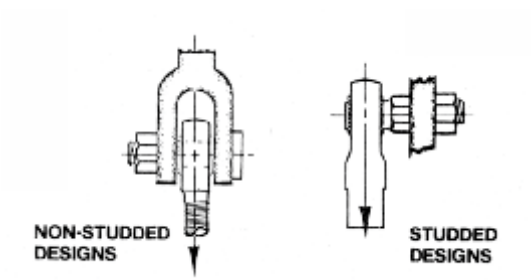
Ball stud pullout strength is tested by locking the internally threaded housing in a fixed position and applying increasing tensile force along the axis of the male threaded ball stud until the ball stud completely disengages from the housing.

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

Rod End Assembly Tensile Test Procedure

Tensile testing is conducted with the ball member, or the male threaded ball stud, held in a fixed position. Increasing tensile force is applied along the housing axis until rupture occurs. The ultimate tensile strength of the assembly, then, is either the maximum tensile stress of the housing or the maximum shear stress of the male threaded stud.

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



Rod End Radial Static Load Capacity

These loads are maximum static based upon the minimum mechanical properties of the design configuration in the stressed areas. Operating loads for rod ends are based on the radial static load rating, incorporating appropriate safety factors utilized to suit the application. When a rod end is to be applied in full rotation, up to maximum of 700 RPM, the operating load should not exceed 10% of the radial static load.

Load ratings listed in the standard detail pages are applicable to rod ends supplied without grease fittings. Load ratings for units employing fittings may be affected due to the lighter cross section in the stressed area.

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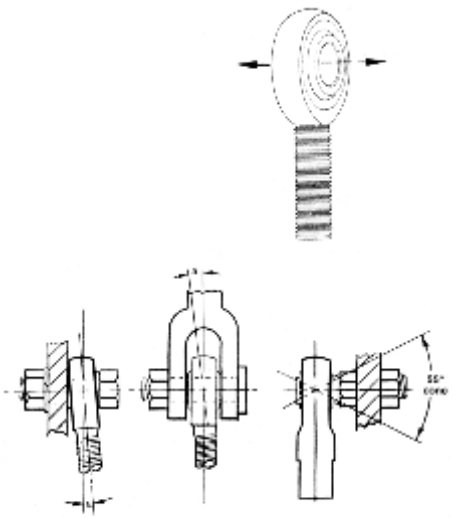
Engineering Information

Rod End Axial Static Load Capacity

Axial static load is the force that is applied through the bore of the ball. Maximum axial static load capacity is recommended at 10 percent of radial static load for



Misalignment in Mounting

Rod end angle of misalignment is determined by two factors: 1) the ball and head dimensions and; 2) the type of mounting utilized.

Engineering Applications and Assembly Suggestions

There are several factors pertaining to a specific engineering application, including proper assembly, that should be taken into consideration to insure optimum performance of the chosen linkage components.

1. When mounting ball studs, the hex should be properly tightened and flat against its mating surface. Adequate countersinks, counterbores, or washers may be necessary to provide a tight, flush joint. Refer to the engineering standards, for recommended mounting nut torque values associated with each grade of threaded fastener. Lockwashers and locking nuts should be incorporated for applications involving vibration.
2. It is recommended that a separate stop be incorporated in the linkage system to eliminate the possibility of exceeding the misalignment capability of the ball joint or rod end bearing. An overtravel condition of this type could result in premature failure of the joint.
3. Ball joints and rod end bearings should be mounted with the housing member on top to best utilize the design of the joint with respect to the gravitational force.
4. To determine a part's useful life for a particular application, sample parts should be tested under actual operating conditions.