

Rigging Screws & Turnbuckles – AS 2319:2001



Rigging Screws

Rigging Screws are used to provide a means for length adjustment and tensioning. They are used with guys for masts, towers, tall structures and engineering applications. Rigging

Screws generally have elongated eyes or clevis end fittings for connection to shackles, wire rope assemblies, pad eyes and the like. A central cross-hole is provided in the body to enable the body to be rotated by means of a bar inserted through that hole. An observation hole is provided at the inner end of the thread, at each end of the body, which permits visual observation of the maximum permitted extended position of the end fitting. Rigging Screws bodies are formed from tubular sections of steel and can have an almost infinite size range and scope for length adjustment. Size and adjustment of rigging screws is limited by the available end fittings. Additionally, Rigging Screws have the innate facility for continuing lubrication as the enclosed section of the body provides a suitable reservoir for grease or other lubrication. Hence, they have an advantage in relative corrosive applications such as ships' rigging and permanent outdoor guys.



Turnbuckles

Turnbuckles have the same applications as rigging screws, but have a generally smaller size range and shorter adjustment. The main benefit

of a turnbuckle is that it may have a greater ability to be tightened under load. Also, there may be a wider scope for providing means for locking while in service.

Grade

Rigging Screws and Turnbuckles manufactured in accordance with Australian Standard AS 2319 are available in various Grades L, P and S.

Working Load Limit (WLL)

The WLL may be de-rated for particular conditions of use. The strength of components is adversely affected by excessively elevated temperatures. Where the temperatures are likely to exceed 200°C, the following relevant reduction of WLL is advised:

Temperature, °C	Temporary reduction of WLL while heated, percent
≤200	No reduction
>200 ≤300	10
>300 ≤400	25
>400	Do not use

Load Rating

Rigging Screws and Turnbuckles in accordance with Australian Standards have a safety factor of 6:1. This safety factor helps to counter possible problems from shock, vibration, fatigue, wear, damage and corrosion. This safety factor must be maintained.

When tested to destruction, components must demonstrate ductility. This is achieved if the failed component achieves at least 15% elongation at break.

WLL (tonnes)

Nominal Size	Grade L	Grade P	Grade S
M10	0.30	0.60	0.80
M12	0.50	1	1.2
M16	0.75	1.6	2
M20	1.25	2.5	3.2
M24	2.5	4	5
M27	3	5	6.3
M30	4	6.3	8
M33 / 1 ¼"	5	8	10
M39 / 1 ½"	6	10	12
M42 / 1 ¾"	7.5	12	16
M48 / 2"	10	16	20
M56 / 2 ¼"	15	20	28
M64 / 2 ½"	20	28	36

MAY NOT BE AVAILABLE

Material

Rigging Screws and Turnbuckles are manufactured from raw material complying with the relevant requirements of Table 1 and either AS 1442 or AS 1444, or be of another material that meets the intent of AS 2319 – 2001.

Because of inherent differences between stresses in the component parts, different types of steel may be used in any quality graded Rigging Screws and Turnbuckles. End fittings generally require higher tensile steels than bodies do, to give a matched overall performance.

Townley Manufacture exclusively from Australian made steel.

Table 1 – Material and Heat Treatment

Quality grade of end fittings (see note 1)	Product analysis of elements, maximum allowable percentage			Heat Treatment	Strength of end fittings (see note 2) MPa
	Carbon	Phosphorus	Sulfur		
L	0.37	0.045	0.045	Normalise	450
P	0.45	0.030	0.030	Harden and Temper	675
S	0.45	0.030	0.030	Harden and Temper	875

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Design and Manufacture

Townley Rigging Screws and Turnbuckles are manufactured in accordance with the standard and are graded for quality by letter in the series L, P or S. Refer to Table 1.

Each component is cleanly forged in one piece and Heat Treated in accordance to the standard.

Components that are hardened and tempered are from Australian made steel that is fully killed and fine grained. Surface Finish – Townley components are Hot-Dip galvanized in accordance to AS/NZS 4680.

Other Surface finishes complying with the standard are as follows

- Self Coloured
- Hot Dip Galvanised coating complying with AS 1650.
- Class A1, Class A2 or Class B phosphate coating complying with AS 1627.6.
- Fe/Zn 12c electroplated zinc coating complying with AS 1789.
- Mechanical Galvanizing
- Painted.

Note: In the finished condition, non-galvanized threads are to be protected against corrosion.

Marking

Rigging Screws and Turnbuckles to AS 2319 will have the following markings:

- Manufacturer's Identification
- Nominal size
- The Quality Grade i.e. Grade L
- WLL in tonnes
- Identification Marking to correlate the Rigging Screw or Turnbuckle to the test certificate

Testing of Mechanical Properties

Townley conducts Type tests for every batch. Type tests are also conducted where there is a change in manufacturing process, grade of material, design and size.

Proof Testing

Townley tests each Rigging Screw or Turnbuckle to the proof test force that is specified in Table 2.

The requirements of proof testing are as follows:

- The rigging Screw or Turnbuckle shall withstand the application of the test force, without sustaining any damage that may detrimentally affect its intended function or safety
- After proof loading, be free from deleterious permanent set or defects that can be detected by visual inspection, and screwed shanks shall turn freely by hand.

Townley Issues NATA Test Certificates for proof testing which includes the following:

- Description
- Type of end fittings
- Nominal Size
- Quality Grade
- Surface Finish
- WLL in tonnes
- Proof Force

- Date of Proof Test
- Number Tested
- Identification marking correlating with the rigging screw or turnbuckle
- A Declaration that the rigging screw/Turnbuckle complies with AS2319 -2001
- The name and address of the manufacturer or supplier
- The name and address of the testing establishment
- The name and signature of the signatory

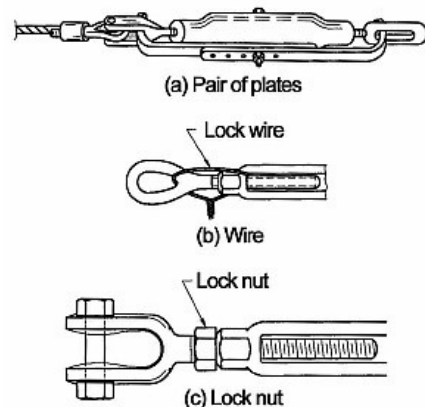
Care in use

- Where components are interfaced, they should readily connect and freely articulate, to ensure that loading will be applied in tension.
- Care should be taken to ensure that rigging screws and turnbuckles are not excessively tightened beyond the specified rating in tension,
- Regular inspection is required by a competent person
- Threads should be protected from corrosion by effective means
- The Rigging Screw or Turnbuckle should be removed from service if it has a damaged screw thread, distorted body, distorted fitting, nicks, gouges, cracks or corrosion

Locking of Threads

Where rigging screws or turnbuckles are to be used in a permanently adjusted position and where a guy is subjected to shock vibration or rope spin it is necessary to prevent the screws from unwinding. Typical methods of locking threads include locknuts, locking plates and wire.

Locknuts, fitted at the ends of the body, are a method of locking, but may not provide positive or reliable locking under all circumstances, such as due to rope spin. Care should be taken to not induce excessive torque during tightening.



Acceptable Methods of Locking

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WORKING LOAD LIMIT AND TEST FORCES

Nominal Size mm	Quality Grade L			Quality Grade P			Quality Grade S		
	WLL t	Test force kN		WLL t	Test force kN		WLL t	Test force kN	
		Destructive Test, min.	Production Proof Test		Destructive Test, min.	Production Proof Test		Destructive Test, min.	Production Proof Test
10	0.30	17.7	5.9	0.60	35.4	11.8	0.80	47.1	15.7
12	0.50	29.5	9.9	1.0	58.9	19.7	1.2	70.7	23.6
16	0.75	44.2	14.7	1.6	94.2	31.4	2.0	118	39.3
20	1.25	73.6	24.6	2.5	148	49.1	3.2	189	62.8
24	2.5	148	49.1	4.0	236	78.5	5.0	295	98.1
27	3.0	177	58.9	5.0	295	98.1	6.3	371	124
30	4.0	236	78.5	6.3	371	124	8.0	471	157
33	5.0	295	98.1	8.0	471	157	10	589	197
39	6.0	354	118	10	589	197	12	707	236
42	7.5	442	148	12	707	236	16	942	314
48	10.0	589	197	16	942	314	20	1180	393
56	15.0	883	295	20	1177	393	28	1650	550
64	20.0	1180	393	28	1648	550	36	2120	707