



 **TTTested**®

PROOF-TESTED NEW ZEALAND RADIATA PINE POLES

Why Proof-Test?

The strength and quality of Radiata Pine varies considerably around New Zealand. There are areas of forests that are considered to be high-density, and other areas that are considered normal-density. Even within forests recognised to provide high-density pine there can be variations in strength between each pole. Structural sawn timber is stress-graded as part of the Timber Standards – and now poles can be too!

Innovative pole tester

With engineers and specifiers requiring more knowledge about characteristic strengths of timber poles TTT designed and purpose-built a Pole Tester to proof-test the strength of New Zealand Radiata Pine poles.

TTT poles can be proof-tested to a custom High-Density (HD) specification and optionally an Ultimate Top Load (UTL), or proof-tested to Normal Density (ND) specification, or a custom proof-test can be undertaken. High Density Poles in green condition (freshly felled logs with bark on) have a characteristic bending stress of 52MPa or greater and Normal Density Poles in green condition have a characteristic bending stress of 38MPa or greater.

Use TTTtested Poles in any situation that requires a pole with a proven strength and stiffness as specified by your engineer or specifier. Whether for construction, retaining walls, foundations (driven or concrete encased), utility or marine poles.

Specialised software

We have developed specialised software that takes into account the pole condition (such as peeling and steaming) and the corresponding modification factors, and automatically calculates the bending stress required in strict accordance with NZS 3605:2001 and ISO 15206:2010. The pole is then tested to this specification.



Our Pole Tester is independently calibrated and can provide you with a computer generated Certificate of Proof-Testing for each pole or a Proof-Test Summary for a batch of poles. The Certificate includes data such as Ultimate Top Load (kN), Bending Strength (MPa), Modulus of Elasticity (GPa), Proof Force (kN) and Deflection (mm). The pole type (TTT SED, Utility, Uglie, UniLog, MultiPole, or custom), condition (peeled/debarked/machined, kiln dried, steamed or treated) and grade (as per NZS 3605:2001) is also recorded.

Pole testing

When placed, the pole is oriented with its axis horizontal on the Pole Tester. One or two hydraulic rams (each with a maximum load of 450kN) are used to apply vertical loads to the pole. The rams can be moved into different positions and their shape has been designed to minimise damage to the pole. The load is applied to the pole at a rate sufficient to reach the required load to an accuracy of 2% in not less than three seconds and not more than 30 seconds.

The load applied by the hydraulic ram(s) is held at the proof load level for 15 seconds.

Each pole that successfully passes testing is tagged with a numbered tag. For Utility Poles, a numbered aluminium disc is also attached to the pole.

Pole types

All TTT Poles whether it be SED, Ugliers, Utility, UniLog or MultiPoles can be tested.

Proof-Test methods

The following proof-test methods can be carried out for normal or high density poles.

The Four-Point Proof-Test Method

requires two proof loads to be applied to the pole with each end of the pole resting on a fixed support. One proof load is applied a third of the way along the test span and the other proof load is applied two thirds of the way along the test span. On our Pole Tester, this is achieved by using two hydraulic rams evenly spaced along the test span to apply the proof loads while each pole end is constrained by a pole end stop.

When proof-testing poles using The Four-Point Proof-Test Method, the objective is to prove timber poles meet ISO 15206:2010 for classification as a high or normal density pole.

The minimum pole length is 4.5m.

The maximum pole length is 18.0m

The maximum SED/diameter is 500mm

The Three-Point Proof-Test Method

requires one proof load to be applied at the mid-point of the test span with each end of the pole resting on a fixed support. On our Pole Tester, this is achieved by using one hydraulic ram positioned in the centre of the test span to apply the proof load while each pole end is constrained by a pole end stop.

When proof-testing poles using The Three-Point Proof-Test Method, the objective is to prove timber poles meet NZS 3605:2001 and/or ISO 15206:2010 for classification as a high or normal density pole.

The minimum pole length is 3.0m.

The maximum pole length is 18.0m.

The maximum SED/diameter is 500mm.

The Three-Point Ground Line Proof-Test Method

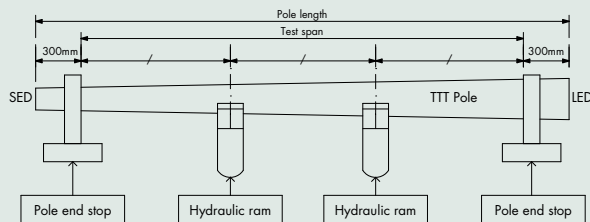
requires one proof load to be applied to the pole at the specified Ground Line as measured from the LED end of the pole with each end of the pole resting on a fixed support. On our Pole Tester, this is achieved by using one hydraulic ram positioned at the Ground Line of the pole to apply the proof load while each pole end is constrained by a pole end stop.

The Three-Point Ground Line Proof-Test Method is used to apply a proof load at the Ground Line to test the pole to a high or normal density specification and also calculate the Ultimate Top Load (e.g. Utility Poles) according to NZS 3605:2001. The customer supplies the Ground Line (m) measured from the LED end of the pole or the Ultimate Top Load (kN) that needs to be achieved.

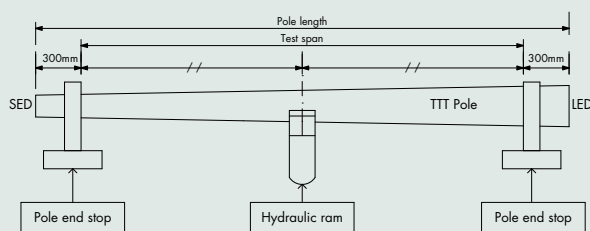
The minimum pole length is 3.0m.

The maximum pole length is 18.0m.

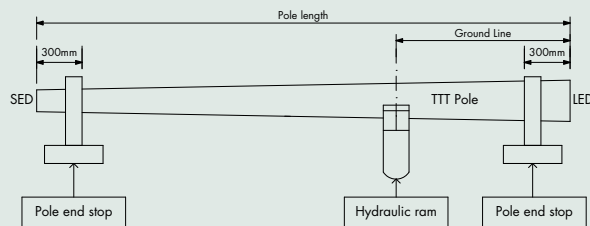
The maximum SED/diameter is 500mm.



Illustrated Four-Point Proof-Test Method



Illustrated Three-Point Proof-Test Method



Illustrated Three-Point Ground Line Proof-Test Method



TTTested pole material specification

For characteristic stresses (MPa) and Modulus of Elasticity (GPa) for naturally round softwood timber in green condition see NZS 3603:1993 Timber Structures, Table 7.1. Proof loads are calculated as per NZS 3605:2001 Timber Piles and Poles for use in Building, Appendix C and/or ISO 15206:2010 Timber Poles – Basic Requirements and Test Methods.

The following values are characteristic strength and elastic modulus for round timber:

Property	ND	HD	Unit
Bending strength (f _b)	38	52	MPa
Tension parallel to grain (f _t)	23	31	MPa
Shear strength (f _s)	3.1	3.5	MPa
Compression parallel to grain (f _c)	16	25	MPa
Elastic modulus (mean E)	8.7	12.1	GPa

TTTested checklist

Specify the following for TTTested Poles:

- Pole species/density: Normal (38MPa) or high (52MPa) density New Zealand Radiata Pine.
- Pole type: TTT SED, Uglie, UniLog, Utility, Marine, MultiPole
- Pole size: TTT Pole SED/diameter/length/quantity
- Hazard class: CCA Hazard Class H5 or H6 or ACQ/MCQ (per order basis only)
- Proof-Test method: Four-Point Proof-Test Method
Three-Point Proof-Test Method
Three-Point Ground Line Proof-Test Method
- For TTT Utility Poles include Ground Line (m) or Ultimate Top Load (kN) and specification for any gaining/drilling/tagging
- Proof certificate: Certificate of Proof-Testing or Proof-Test Summary

The TTTested Certificate of Proof-Testing

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CERTIFICATE OF PROOF TESTING FOR NZ RADIATA PINE POLES

For: Jack Lumber
Order number: NV2986

Pole and Proof Test Information		Pole Grading Results
Certificate/Pole Number	1625	Grain slope is <1.10% PASS
Proof Test Method	Four-Point	Single sweep is <9mm PASS
Distance between Rams (m)	1.80	Check length is <50% pole length & check depth is <50% PASS
Date and Time of Test	03-09-2012 at 13:43	Knot Q is <10% circ & sum of knot Q for knots >205mm is <20% circ PASS
Hydraulic Rams used in Test	Ram 1 and Ram 2	Handling damage is <12mm deep & damage 5-12mm does covers <20% circ & other damage is <25mm deep PASS
Pole Type	TTT SED peeled, naturally tapered	
Small End Diameter (mm)	300	
Pole Length (m)	6.0	
Pole Condition	Peeled, Steamtreated	
(Modification Factors)		

Proof Test Results

	Ram 1	Ram 2
Bending Strength (MPa)	39.13	29.69
Modulus of Elasticity (GPa)	12.58	12.50
Proof Force (kN)	50.20	49.47
Deflection (mm)	103.6	106.7
Ultimate Top Load (kN)	—	—

Proof tested as per ISO 15206:2010 to High Density specification

Force (kN) vs. Deflection (mm)

Force (kN) and Deflection (mm) vs. Time (s)

Pole Tester Operator: NICK NAME SIGNED
Authorised on behalf of TTT Products Ltd by: NAME SIGNED

Printed on 04/07/2012

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Exclusive producers of Unilog machined Poles, Poles Florida Fencing, Bollards, SED Construction poles, Marine poles, Power poles Custom Processing

Keeping you in pole position



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