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PNG POWER LTD

MATERIAL SPECIFICATION

VOCAB. NUMBER.	ITEM DESCRIPTION:
132146	CLAMP, PARRALELL GROOVE, FOR ALUMINIUM TO COPPER CONDUCTORS, RANGE : ALUMINIUM 7.5—22MM : COPPER 3.5— 12.5MM DIAMETER (OR ALUMINIUM 25— 150MM² CROSS SECTIONAL AREA.)

Item Category = A

SPECIFICATION DETAILS.

1. Scope:

The specification provides for the manufacture, testing, supply and delivery of overhead line non-tension Connectors into PNG Power Ltd Warehouses at the stated locations.

2. Requirements:

The Technical description and design particulars on the overhead line non-tension shall be in accordance with Appendix 1. Details of connectors offered shall be stated in Appendix 2. These Appendices are Attached to and form part of this specification.

3. Application:

The overhead non-tension connectors will be used on PNG Power's overhead power lines throughout Papua New Guinea and may be subject to coastal atmospheric conditions and industrial pollutions.

DRAWING REFERENCES:

Manufacturers Product code:

STANDARDS COMMITTEE APPROVAL

APPROVED BY Alex Oa Chairman SIGNATURE: ..... DATE. 18, 7, 2014

DATA REVIEW APPROVAL

NAME	TITLE	SIGNATURE	DATE
G. Peni	T/L—Standards		14/7/14
G. PENI	✓		5H/17

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SPECIFICATION DETAILS

OVERHEAD LINE NON-TENSION CONNECTORS

4. Standards:

All overhead line non-tension connectors supplied under this specification shall comply with the latest amendments to the following issued at a date two (2) weeks prior to the date of closing of quotations unless otherwise altered by this specification.

AS	1444	Wrought Alloy Steels—AISE—SAE, Standards, Harden ability (H) and Stainless series.
AS	1214	Hot Dip Galvanized Coating on Threaded Fasteners.
AS	1531	Aluminum Conductors for Overhead Power Transmission Purposes
AS	1746	Hard Drawn Copper Conductors for Overhead Power Transmission Purposes.
AS	1275	Metric Screw Threads for Fasteners
AS	1110	ISO Metric Hexagon Precision Bolts and Screws
AS	K141	Electroplated Coatings of Tin.
AS	1112	ISO Metric Hexagon Nuts, including Tin Nuts, Slotted Nuts and Castle Nuts.
ESAAD (b) 5		Current Ratings of Bare Overhead line Conductors.
VDE 0212/5.62		Guidelines for Insulator Strings and Conductor Accessories for Overhead power lines
AS	1154	Insulator and Conductor Fittings for Overhead Power lines Performance and General Requirements
AS	1650	Galvanized Coatings.

5. Connector Performance Requirements:

General:

Connectors shall be of materials which are resistant to weathering influences and parts of the connectors which are in direct contact with the conductor must either be of the same material in the form of an alloy or of a material which does not cause interface or environment corrosion.

Connectors shall be generally be of a two part design suitable for the practical non-load disconnection from an energized line.

Stability:

Connectors shall have proven test or service performance results, which shall show the particular connector's long term effectiveness in respect to stability of mechanical load and stability of contact resistance.

Stability of mechanical load shall be achieved by the use of tension plates, spring washers or inherent connector body tension

Installation:

Connectors shall be designed for ease of installation and a bolted design shall allow connection To the largest through conductors and the tap conductor without total removal of clamping screws.

Electrical Ratings:

Connectors shall have a continuous current rating at least equivalent to the current rating of the largest conductor recommended for the fitting In the case of aluminium base conductors, rating shall be referred to the current rating of the aluminium conductors of the maximum cross-sectional area. The connector should not develop a temperature higher than that of the equivalent length of free conductor

Connector Material for Aluminium Based Conductor:

Connectors for aluminium based conductors shall be wrought or cast aluminium alloys as long as these alloys have practically the same corrosion resistance as pure aluminium. **Recast alloys are not acceptable**

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SPECIFICATION DETAILS

OVERHEAD LINES, NON-TENSION CONNECTORS

Surface:

The surface of the connectors, in particular the contact surfaces should not contain impurities, which would impair operational life. The contact surfaces of connectors used on aluminium based conductors shall be provided with accurately designed transverse grooves to provide penetration of the conductor oxide layer and increase contact making areas. Longitudinal grooves are not acceptable.

Ferrous Materials:

Ferrous materials except for stainless steel shall be hot dipped galvanize in accordance with AS 1214 and shall comply with the testing requirements of AS 1650.

Aluminium—Copper Connectors:

These connectors shall be designed such that the aluminium/copper surface junction is well protected against corrosion by a permanent layer or covering of insulating material applied to the exposed bi-metal interface or by other methods which from tests show negligible corrosion effects.

Screws, Nuts and Ancillaries:

Hexagonal head screws, hexagonal nuts and ancillaries such as Bellville washers, spring washers and pressure plates shall be of a material compatible for use with the particular connector and shall generally be as follows;

Aluminium Connectors:

1. Hexagonal head screws	-	Hexagonal head, steel hot dipped galvanized to AS 1214, thread tolerance 8G to AS 1275.
2. Nuts	-	Hexagonal, steel hot dipped galvanize to AS 1214, thread tolerance 6H to AS 1275.
3. Ancillaries	-	Steel, hot dipped galvanize to AS 1650.

Alternatively stainless steel AS 1444/316 may be used in lieu of hot dipped galvanized steel.

Marking:

Connectors shall be marked with the manufacturer's mark and the conductor cross-sectional areas or the Conductor diameters for which the connectors are designed.

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SPECIFICATION DETAILS

OVERHEAD LINES, NON-TENSION CONNECTORS

6. **Samples:**
Samples may be required for inspection during quotation evaluation, particularly if the item being offered Have not previously been purchased by PNG Power Ltd.

7. **Testing:**
General.

Each connector offered shall have been subjected to artificial aging, electrical and mechanical type tests carried out by NATA or equivalent certified test laboratory and copies of test reports shall be submitted with the quotation.

Acceptable type Tests.
Tenderers have the option to apply a recognized type test program. However for the information of tenders A type test program acceptable to PNG Power Limited is as follows;

Mechanical Test.
In accordance with Sub–section 5.2 of AS 1154, Part1—2009.

Electrical Test.
In accordance with Section 18 of VDE 0212/5.62.

8. **Rejection:**
Overhead line non-tension connectors rejected during the acceptance inspection shall remain the responsibility of the contractor. No payment will made for rejected items.

9. **Guarantees:**

For a period of twelve (12) calendar months after the overhead line non-tension connectors have been installed, the Contractor shall be responsible for any defect that may develop under proper use, arising from faulty materials, design or workmanship in the goods. The Contractor shall remedy these defects when the overhead line non– tension connectors are made available by PNG Power Limited, which shall state in writing to what respect any portion is faulty.

PNG power shall notify the Contractor on the failure of any part. Such notification may be given in writing by a responsible officer of PNG Power Limited shall be taken to have been received if left at the Contractor's last known place of business

PNG Power Limited reserves the right to process immediately with repairs to or replacement of any part as may be necessary.

If it becomes necessary for the Contractor to replace or renew any defective portion of the goods under this clause shall apply to the portion of the goods replaced or renewed until the expiration of twelve months from the date of such replacement or renewals.

10. Divisions or orders:

PNG Power Limited reserves the right to devise the order and accept any item from any manufacturer.

11. Information to be supplied with Quotation:

- Appendix 2 to be completed and signed.
- Schedule of Forecast Requirement and Offer Part 1, 2 and 3.
- Copies of Test Reports in accordance with clause 7.0

Failure to furnish the information called for in the specification and the attachment Appendix 2 may render the quotation liable to rejection.

All alternative departures and/or omissions from the specification shall be clearly set out. If there are alternatives, information as requested shall be supplied for each alternative.

12. Packing:

Packi8ng shall be in accordance with PNG Power Limited's condition of Purchase Order sections 2 and 3.

13. Samples:

Samples must be supplied with each offer.