



Ergon Energy Corporation Limited

Technical Specification for Compression Lugs and Links

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Technical Specification for Compression Lugs and Links



1. Purpose and Scope

This specification sets out the technical requirements for the manufacture, testing at works, supply and delivery of compression lugs and link for use on overhead and underground electricity distribution systems in a totally exposed environment.

The items covered by the specification include the following:

- a) Compression lugs.
- b) Compression links.
- c) Stalk lugs

2. References

2.1 Applicable Standards

Items shall be manufactured and tested in accordance with the relevant parts of the following Standards and all amendments issued from time to time except where varied by this specification.

| STANDARD | TITLE |
|---------------|---|
| AS 1154 | Insulator and conductor fittings for overhead power lines |
| AS/NZS 4325.1 | Compression and mechanical connectors for power cables with copper or aluminium conductors. |

3. Drawings

3.1 Drawings by the Purchaser

There are no drawings attached to this specification.

3.2 Drawings by the Tenderer

The Tenderer shall supply with the tender, detailed drawings or pamphlets of the items offered.

4. Service Conditions

The items supplied to this specification shall be suitable for operating under the following service conditions:

| |
|---|
| Solar radiation intensity of 1000W/m ² . |
| Tropical summer storms with gust wind speeds above 160km/h and an annual rainfall in excess of 1 500mm. |
| Temperatures between -5 ⁰ C(winter night time)and 45 ⁰ C(summer day time) |
| Extended periods of humidity in excess of 90% |
| Areas of coastal salt spray and/or industrial pollution with equivalent salt deposits densities in the range of 2.0 - 3.0g/m ² . |

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5. Design and Construction

5.1 Requirements

The items offered shall satisfy the following requirements.

- The compression lugs for overhead bare conductor shall satisfy the electrical test requirements of AS 1154.1 and those for underground cables shall satisfy the test requirements of AS4325.1 for Class A type connectors.
- The across flat (A/F) hexagonal die sizes, in mm, for all compression fittings shall comply with the sizes nominated in the item descriptions.
- Compression lugs and links shall be suitable for operation at elevated conductor temperatures up to 900C for extended periods.
- Compression lugs and links shall suit aluminium and/or copper based conductors and/or terminal palms as specified in the item descriptions.
- Bi-metal compression lugs and link must be designed to minimise corrosion due to electrolytic action of dissimilar materials
- Lug palms of aluminium lugs must be fully sealed to prevent ingress of moisture into the cable after installation.
- Lug palms of copper lugs where specified in the item description, must be fully sealed to prevent ingress of moisture into the cable after installation
- Copper lugs and links shall have a tinned finish.
- Contact surfaces of the palms shall be smooth and flat and provided with hole sizes to suit fixing bolt diameters specified in the item descriptions.
- Barrels of aluminium lugs and links shall be pre-packed with sufficient electrical compound and sealed with a hand-tight removable plastic cap. The items shall be individually packed and sealed in plastic bag to exclude dirt and moisture. Full details of the compound including Safety Data Sheets shall be included with the tender.
- Copper lugs and links shall be marked in accordance with the following:
 - Cross sectional area (mm²)
- Aluminium and bimetal lugs and links shall be marked in accordance with the following:
 - Cross sectional area (mm²)
 - Required hexagonal compression die size across flat dimension in mm or nest/indent die sizes as applicable.
 - Lines marking the number and location of crimp positions
- Detailed drawings of the items offered, together with installation instructions and information on service performance shall be included with the tender.

6. Technical Details

Technical details of lugs and links offered are to be set out on **Attachment 1**.

7. Performance and Testing

7.1 Type Tests

Type Test Certificates to AS 1154.1 and AS4325.1 as applicable shall be submitted with the tender.

8. Risk Assessment

There is no requirement for manufacturer provided safety risk assessments for the items covered in this specification.

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9. Quality Assurance

9.1 Purchasers Policy

It is the Purchaser's policy to procure materials from sources that demonstrate the ability to supply quality products.

9.2 Documentary Evidence

Documentary evidence shall be provided concerning the level of quality system certification associated with the supplier and /or the manufacturer. This documentation shall include the Capability Statement associated with the Quality System Certification.

9.3 Quality Certification Program

Tenderers shall provide details of their program to upgrade their Quality Certification to meet the requirements of ISO 9001.

10. Samples

10.1 Production Samples

The Tenderer must submit, when requested, one (1) production sample of each item Tendered to assist in the evaluation of the Tender. Samples shall be delivered to the address nominated within five (5) working days of the request. The Tenderer shall allow the cost of supply and delivery of samples in the Tendered prices.

Each sample shall be suitably packaged and labelled with the following information:

| |
|---|
| Name of Supplier and this Contract No. |
| Contract Item Numbers |
| Any supporting data on features or characteristics |

11. Packaging and Marking

Each packaged lot shall be marked with the following information:

| |
|------------------------------|
| Manufacturers Name |
| Purchase Order Number |
| Contract No. |
| Ergon Stock Code |
| Item Description |
| Pack Size |
| Pack Weight |

12. Service Performance

Suppliers shall state:

- (a) the period of service achieved by the items offered within Australian service conditions;

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- (b) Australian electricity supply authorities who have a service history of the items offered; AND
- (c) Contact names and phone numbers of relevant employees of those supply authorities who can verify the service performance claimed.

13. Reliability

13.1 Service Life

Suppliers are required to comment on the reliability of the equipment and the performance of the materials offered for a service life of 35 years under the specified system and environmental conditions.

13.2 Evidence in Support of Reliability

Such comments shall include evidence in support of the reliability and performance claimed including information on Failure Mode and Effect Analysis.

14. Training

14.1 Training Material

Training material in the form of drawings, instructions and/or audio visuals (in CD format) are required to be provided for the items accepted under the tender. The Tenderers shall allow the cost of production and delivery of training material in the tendered prices.

The training materials should include but not be limited to the following topics:

- Handling
- Storage
- Application (particularly in areas of heavy coastal pollution)
- Installation
- Maintenance
- Environmental performance
- Electrical performance
- Mechanical performance
- Disposal

14.2 Training Audio Visuals

The successful Tenderer is required to provide training audio visuals for the Purchaser's staff/contractors in the correct use of all items to be supplied under the contract. Training audio visuals are to be supplied BEFORE the 1st deliveries are made under the contract.

The format and content of the audio visuals will be subject to negotiation between the Purchaser and the successful tenderer concerned. It is expected that as a minimum, the audio visuals will detail the correct installation practice for all items covered by the contract. The number of audio visuals required, in CD format, is thirty (30). Permission shall be given to the Purchaser to make additional copies if required.

In the production of the audio visuals, the Purchaser will make available suitable staff and equipment to demonstrate the recommended installation techniques.

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15. Environmental Considerations

Suppliers are required to comment on the environmental soundness of the design and the materials used in the manufacture of the items Tendered. In particular, comments should address such issues as recycling and disposal at the end of service life.

16. Information to be Provided

16.1 Specific Technical Requirements

The specific technical requirements for the items Tendered shall be as stated in **Attachment 1** of this specification. The supplier shall provide all details requested by **Attachment 1** and shall guarantee such data.

16.2 Checklist of Supporting Documentation

Attachment 2 details a checklist of supporting technical documentation which is required to be submitted with the Tender.

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17. Attachment 1 – Technical Details

NOTE: A separate schedule is to be provided for each item offered except where information common to all items which only needs to be provided once.

| ITEM NUMBER: | STOCK CODE: | |
|---|-------------|---------|
| Particulars | Units | Details |
| Manufacturer's Name & Address | | |
| Place of Manufacture | | |
| Manufacturer's Product Catalogue Number | | |
| Manufacturer's Drawing Number | | |
| Product Material: Alloy type & Australian Standard | | |
| Will Batch Test Certificates be supplied? | Yes/No | |
| Type Test Report/Certificate No. | | |
| Dimensions: | | |
| Body length | mm | |
| Body width or diameter | mm | |
| Recommended Die Type, Die Size (A/F) and Die Width for 12Tonne Compression Tool | | |
| Palm size Length, Width, Thickness | mm | |
| Bolt size/hole diameter | | |
| Packaging: | | |
| Pack Size | | |
| Pack Weight | (kg) | |

SIGNATURE OF TENDERER: _____

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18. Attachment 2 – Electrical Type Test Details

| ITEM NUMBER: | | |
|---|---------|---------------------|
| Particulars | Units | Tenderer's Response |
| Australian/International Standard for Type Tests | | |
| Heat cycle and contact resistance tests: | | |
| (a) Voltage drop across connector | μV | |
| (b) Voltage drop across equivalent length of conductor | μV | |
| (c) Ratio $\frac{\text{Voltage drop across connector}}{\text{Voltage drop across conductor}}$ | | |
| SHORT CIRCUIT CURRENT TESTS: | | |
| Maximum short circuit current | kA | |
| Duration of maximum short circuit current | seconds | |

SIGNATURE OF TENDERER: _____

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19. Attachment 3 – Technical Document Checklist

| Clause Ref. | Particulars | Tenderer's Response |
|--|--|---------------------|
| Have full and comprehensive details been submitted WITH the Tender documents associated with each of the following items? | | |
| 3.2 | Drawings of items Tendered | Yes/No |
| 7 | Type Test Certificate | Yes/No |
| 9.2 | Documentary evidence of the Quality System Certification of BOTH the SUPPLIER and the MANUFACTURER (including Capability Statement) | Yes/No |
| 9.3 | Program to upgrade Quality Certification to meet the requirements of AS 9001 | Yes/No |
| 12 | Service Performance | Yes/No |
| 13 | Reliability | Yes/No |
| 14 | Training materials | Yes/No |
| 15 | Environmental considerations | Yes/No |
| 16 | Information to be Provided: Completed Attachment 1 & 2 | Yes/No |

NAME OF TENDERER:

ADDRESS OF TENDERER: _____

SIGNATURE: _____ FOR AND ON BEHALF OF TENDERER

DATE: _____