



Ergon Energy Corporation Limited

Technical Specification for Steel Forged Fittings

ETS 01-01-01

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Technical Specification for Steel Forged Fittings

1. Purpose and Scope

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

2. References

2.1 Applicable Standards

All items shall be designed, manufactured and tested 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 1111	ISO metric hexagon commercial bolts and screws
AS 1112	ISO metric hexagon nuts, including thin nuts, slotted nuts and castle nuts
AS 1154	Insulator and conductor fittings for overhead power lines
AS 1199	Sampling Procedures for Inspection by Attributes
AS 1214	Hot-dip galvanized coatings on threaded fasteners
AS 1237	Flat metal washers for general engineering purposes
AS 1275	Metric screw threads for fasteners
AS/NZS 1393	Coach screws - Metric series with ISO hexagon heads
AS 1442	Carbon steels and carbon-manganese steels - Hot-rolled bars and semifinished products
AS/NZS 1554	Structural steel welding
AS/NZS 1968	Helical spring lock washers
AS/NZS 3678	Structural steel - Hot-rolled plates, floor plates and slabs
AS/NZS 3679	Structural steel
AS/NZS 4680	Hot-dipped galvanised coatings on ferrous articles
AS 4899	Pin Insulators Porcelain and Glass
AS/NZS/ISO 9001	Quality management systems - Requirements

3. Definitions

'Batch' means as a single production run of a single set of input materials used for the output of the Materials.

'Materials' means items, goods or product.

'Specification' means this technical specification.

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4. Drawings

The drawings listed in Appendix A shall be read in conjunction with, and shall form part of this Specification.

5. Service Conditions

5.1 Environmental Conditions

The items will be exposed to the following environmental conditions:

Ambient Temperatures	50° summer day time -5° winter night time
Maximum Daily Variation	35°C
Solar Radiation Level	1100 watts per square metre with high ultraviolet content
Precipitation	An annual rainfall in excess of 2000 mm (Bureau of Meteorology)
Wind Speed	Tropical summer storms with gust wind speeds above 160km/h
Humidity	Extended periods of relative humidity in excess of 90% R.H.
Atmospheric Classifications	Level IV – very heavy (for installation in polluted ambient air with areas of coastal salt spray and/or industrial pollution refer AS 4436) Equivalent salt deposit densities in the range of 2.0 - 3.0 g/m ² (AS 4436)
Isokeraunic Level	35-40 (Bureau of Meteorology)

5.2 Extreme Conditions

The Queensland electricity supply area also experiences extreme conditions. The items will be required to perform in the following conditions:

- 50°C summer daytime (maximum)
- -10°C winter night time (minimum)
- High relative humidity (90%) combined with rapid temperature drop (20°C in 20 minutes)
- Areas where the use of fertilizers by spraying, or the burning of crop residues, can lead to a higher pollution level than specified above.

Note to Tenderers:

Tenderers are to provide information on how the offered items will perform in the above conditions.

5.3 Marine Coast

All items supplied under this Specification may be installed in marine coastal areas with direct and constant salt spray.

Note to Tenderers:

Tenderers are to provide information on how the offered items will perform in marine coastal areas with direct and constant salt spray.

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6. Design and Construction

Design and construction performance parameters are detailed in this section:

6.1 Forgings

The steel for the forgings shall be selected from one of the steels listed in Clause 1.4.6.2 of AS 1154.1, and shall be supplied in the heat treated condition specified.

Note to Tenderers:

Full details of the type of steel to be used shall be submitted in the tender.

6.2 Corrosion Protection

All ferrous items, with the exception of stainless steel, shall be hot dip galvanized in accordance with AS/NZS4680 or AS1214 and relevant drawings after fabrication.

6.3 Workmanship

Forgings shall be one piece drop forged and accurately finished to the dimensions shown on the appropriate ERGON or QESI drawings or AS 1154.1/ AS 4899 as applicable.

6.4 Bolts, Nuts and Washers

All bolts and nuts shall be threaded in accordance with AS 1111 and AS 1112 respectively. The resulting thread form shall have tolerance class of 6H/8g. Internal threads shall be cut and oiled after galvanizing where galvanizing is required.

Flat and spring washers shall be manufactured in accordance with AS 1237 and AS 1968 respectively.

6.5 Welding

Welding shall be in accordance with AS 1554, Parts 1 and 2 or as otherwise indicated on the relevant ERGON or QESI drawing. Weld categories not shown on drawings shall be Category GP.

6.6 Assembly

Where specified, parts shall be assembled before delivery.

6.7 Dimensions and Tolerances

All dimensions and tolerances shall be in accordance with the applicable ERGON or QESI drawing or relevant Australian Standard if not stated thereon.

6.8 Identification Reference

Prior to galvanising, all fittings shall be permanently marked with the appropriate identification reference, batch identification for traceability and the manufacturer's name or trade mark. These should be applied in such a way as to remain legible after galvanising.

Refer to clause 7.5 for additional requirements if items are not manufactured in Australia.

Note to Tenderers:

Tenderers shall submit with the offer, a full size drawing or image of the manufacturer's name or registered trademark that will be permanently marked on each item along with the Tenderer's name or registered trademark that will be permanently marked on each item.

6.9 Mechanical Ratings

Items shall have mechanical ratings as specified on the appropriate drawing.

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7. Performance and Testing

Ratings and performance requirements are to be as specified in AS 1154.1 or on the relevant drawing.

7.1 Type Test Compliance

The fittings shall be type tested in accordance with AS 1154.1 as detailed in Appendix B of this Specification.

Note to Tenderers:

In accordance with AS 1154.1, test certificates giving satisfactory results for the appropriate type tests, made on no fewer than three (3) fittings identical in essential details with those offered shall be regarded as evidence of compliance and shall be submitted with the tender.

Copies of original Type Test certificates/ reports shall be included in full in accordance with AS 1154.1 (including all drawings, revisions and test results as stipulated in the applicable standards as specified in this Specification) with the tender regardless of whether or not the equipment has been supplied previously to Ergon Energy. Where company details have changed with regard to the original Type Testing, and the original Type Testing is submitted, these company details changes shall be detailed in the tender submission, for every company change up to the time of submission of tender. Type Test certificates/reports shall be complete and copies of front pages only shall not be acceptable.

Where items of a similar design to that previously tested is offered, consideration may be given to accepting previous type test reports. Tenderers are requested to substantiate their claims of equivalent type test performance with written engineering evaluation, where full Type Test documentation is not submitted for each of the items offered. Such evaluation must provide all relevant details so that Ergon Energy can establish the validity of existing type tests.

Ergon Energy requires that all Type Tests (for items offered) are certified by a laboratory accredited by an Accreditation Entity. An Accreditation Entity is a signatory to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA), for example; the National Association of Testing Authorities, Australia (NATA). Full accreditation details of the type testing facilities and the accreditation certifying entity and any mutual recognition arrangements with other accreditation entities shall be provided by the Tenderer.

Ergon Energy may request repeat of Type Tests to prove compliance to this technical specification where the materials used in the equipment offered and/ or the manufacturing process and/ or the place of manufacture have changed since the equipment offered was originally type tested.

7.2 Batch and Routine Tests

All items offered shall be fully batch and routine tested in accordance with the applicable standards as detailed in Appendix B of this Specification.

Note to Tenderers:

If tenderers propose to offer items tested to Standards other than those specified in this Specification, full details of these Standards are to be provided at the time of tendering.

With each delivery of the items to Ergon Energy, a "Certificate of Compliance" is to be supplied. This certificate shall include the following:

- The batch number, name of the Manufacturing Company and the location of manufacture.

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- Documented proof that the grade of steel or cast iron used in the manufacture of the items and components of the items meets all of the requirements specified on the relevant drawings, or where the material grade is not specified by Ergon Energy, by the relevant Australian Standards.

Batch Test certificates for mechanical properties, dimensions and galvanising of each item shall be held by the Supplier and provided to Ergon Energy within 24 business hours upon request.

All test certificates must include the Manufacturer's serial number(s). On allocation, Ergon Energy's order number, contract/item number and specification number must be added to the certificate, or as an attachment to the test report.

7.3 Acceptance Tests

Ergon Energy may carry out an acceptance test on an item to prove it conforms to the requirements of this Specification.

7.4 Witnessing of Tests

Ergon Energy reserves the right to witness all testing. The Supplier shall give Ergon Energy reasonable notice of when testing will be carried out.

7.5 Additional Requirements for Overseas-Manufactured Items

Suppliers sourcing components and items from outside of Australia shall submit the following:

With each delivery of the items to Ergon Energy, the Supplier shall state the name of the receiving company responsible for acceptance of the items or components of the items upon arrival to Australia.

With each delivery of the items to Ergon Energy, the Supplier shall provide documentation of the grade of steel used in the manufacture of the items and the location where the steel has been formed or milled.

With each delivery of items and components of the items to the receiving company responsible for the acceptance of the items upon arrival to Australia, the receiving company shall carry out sample mechanical failure testing of items and components of each batch in accordance with AS1199.1 "Sampling Procedures for Inspection by Attributes". A copy of the results of all tests carried out (with corresponding batch numbers) shall be forwarded to Ergon Energy prior to delivery of that batch of items to Ergon Energy. All tests shall be carried out at an Australian National Association of Testing Authorities (NATA) approved test facility. Ergon Energy will not accept a batch if any sampled item or component in that batch fails to meet the test requirements. The Supplier shall be responsible for the costs associated with testing.

Note to Tenderers:

Tenderers shall submit a sampling test plan and types of tests to be carried out with the offer and nominate the NATA test facility.

8. Service Performance

Note to Tenderers:

Tenderers shall complete schedule "L" detailing current and previous experience within Australia.

9. Quality Assurance

Note to Tenderers:

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Tenderers shall complete schedule "MSI" detailing their Management Systems (Quality Assurance Systems).

10. Risk Assessment

There is no requirement for manufacturer provided safety risk assessments for the items covered by this Specification.

11. Samples

Note to Tenderers:

Tenderers must submit, when requested, five (5) production samples of each item tendered to assist in the evaluation of the tender. Samples shall be delivered to the address nominated within ten (10) working days of the request.

The requirement for samples may be waived for the following conditions:

- The tendered item is currently under contract or has previously been supplied to Ergon Energy under contract and there have been no changes to the design or material.
- The tendered items have been supplied to Ergon Energy for approval prior to this tender and there have been no changes to the design or material.

Each sample shall be delivered freight free, suitably packaged and labelled with the following information:

- a) Name of tenderer and this Contract No.
- b) Contract Item Numbers
- c) Any supporting data on features or characteristics

12. Packing and Marking

12.1 Packing

The packing requirements are set out in Schedule 10 of the Contract (Packaging and Transport Requirements).

12.2 Marking

Each packaged lot shall be marked with the following information:

- a) Manufacturers Name
- b) Order Release Authority/Order Number
- c) Contract No.
- d) Ergon Energy Stock Code
- e) Item Description
- f) Pack Size
- g) Pack Weight

13. Reliability

It is expected that the items are designed to have a service life of 35 years under the specified system and environmental conditions.

Note to Tenderers:

Tenderers shall provide evidence in support of the reliability and performance claimed including information of Failure Mode and Effect Analysis with the tender.

14. Training

There is no requirement for training associated with this Specification.

15. Environmental Considerations

Note to Tenderers:

Tenderers shall complete Schedule "R3" Product Environmental Responsibility Questionnaire detailing comments on the environmental soundness of the design/materials, recyclability and disposal at end of service life.

16. Information to be Provided

Note to Tenderers:

Tenderers shall complete and return the following documentation with their tender response:

Attachment "1" - Technical Details

Attachment "2" – Technical Documentation Checklist

Schedule MSI - Management Systems

Schedule L - Details of Current and Previous Experience

Schedule R3 - Product Environmental Responsibility Questionnaire

Appendix A – Drawings

Reference	Revision	Title
01-01-02	B	Pole Step (Concrete)
01-01-03	A	Pole Step (Timber Screw in)
01-03-02	B	Stayrod, M24
01-06-01	C	Insulator Pin, M16
01-06-02	C	Insulator Pin, M20
01-06-03	D	Insulator Pins, M24
01-07-01	C	Bow Shackle, Bolt
875232-01	A	Screw Hook with Neutral Bonding Tab
01-14-01	B	Ordinary Thimble (Open Point)
01-17-01	C	Ball Hook, 70 kN
01-17-02	C	Tongue Hook, 70 kN
01-17-03	C	Twisted Socket Tongue
01-18-01	B	Hook Nut, ABC
875231-01	B	Hook Service Threaded with Neutral Bonding Tab
875225-01	B	Service Eyebolt with Neutral Bonding Tab
878405-01	B	Concrete Foundation Stayrod

Appendix B – Schedule of Required Tests

Item	Category of Test	Criteria for Test	Reference for Test Method
Tension Fittings (Eye Bolts, Stayrods, Screw Anchors)	1. Mechanical Type Test	<input type="checkbox"/> Minimum Failing Loads shall be as specified on the relevant drawings.	AS 1154.1, Clause 2.2
	2. Batch Tests	<input type="checkbox"/> Certificate of Compliance <input type="checkbox"/> Verification of Dimensions <input type="checkbox"/> Galvanising Tests	Eye Bolts - AS 1448 or AS/NZS 3679.1 as relevant; Stayrod – AS/NZS 3679.1; Screw Anchor – AS 4291. AS 1154.1, Clause 1.6 AS 1154.1, Clause 1.4.5

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Item	Category of Test	Criteria for Test	Reference for Test Method
Insulator Fittings (Bow Shackle, Twisted Bow Shackle Clevis pin, Ball Hook, Tongue Hook, Twisted Socket Tongue)	1. Type Tests	<input type="checkbox"/> Mechanical Strength	AS 1154.1, Clause 2.2
		<input type="checkbox"/> Hardness Test	AS 1154.1, Clause 2.3
	2. Batch Tests	<input type="checkbox"/> Certificate of Compliance (Forged Steel Items Only)	AS 1442
		<input type="checkbox"/> Verification of Dimensions	AS 1154.1, Clause 1.6
		<input type="checkbox"/> Mechanical Test (may be terminated at 125% MFL)	AS 1154.1, Clause 2.2
		<input type="checkbox"/> Galvanising Tests	
		<input type="checkbox"/> Hardness Test	AS 1154.1, Clause 1.4.5
	3. Routine Tests	<input type="checkbox"/> Mechanical Strength	AS 1154.1, Clause 2.3
			AS 1154.1, Clause 2.4
	Insulator Pins (Insulator Pin, Fuse Pin, Screw Hook, Fuse Pin & Screw Hook Combination)	1. Type Tests	<input type="checkbox"/> Mechanical Type Test
2. Batch Tests		<input type="checkbox"/> Certificate of Compliance	AS 1442
		<input type="checkbox"/> Verification of Dimensions	AS 4899, Clause 3.1
		<input type="checkbox"/> Galvanising Tests	AS 1214

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Item	Category of Test	Criteria for Test	Reference for Test Method
Pole Step - Timber	1. Batch Tests	<input type="checkbox"/> Certificate of Compliance	AS/NZS 3679.1
Pole Step - Concrete		<input type="checkbox"/> Verification of Dimensions <input type="checkbox"/> Galvanising Tests	AS 1154.1, Clause 1.6 AS 1214
Hook Bolts	2. Batch Tests	<input type="checkbox"/> Verification of Dimensions <input type="checkbox"/> Galvanising Tests	AS 1154.1, Clause 1.6 AS 1214
Flat Washers	1. Batch Tests	<input type="checkbox"/> Verification of Dimensions <input type="checkbox"/> Galvanising Tests	AS 1154.1, Clause 1.6 AS/NZS 4680

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Attachment 1 – Technical Details

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

Item No		Item No.	Item No.	Item No.
	Units			
Ergon Energy IINo				
Manufacturer's Name				
Manufacturer's Address				
Place of Manufacture				
Manufacturer's Product Catalogue Number				
Are Batch Test Certificates able to be supplied?	Yes/No			
Applicable Australian Standard				
Minimum Failing Load	kN			
Galvanising Details:				
Method				
Applicable Australian Standard				
Minimum Coating Thickness	µm			
Details of Oil used on Threads				
Type Test Certificate No.				
Pack Size				
Pack Weight	kg			



Attachment 1 ETS
01-01-01 (5).xlsx

Attachment 2 – Technical Documentation Checklist

Clause Ref.	Particulars	Response
	Have full and comprehensive details been submitted WITH the tender documents associated with each of the following items?	
5.1	Extreme Environmental conditions	Yes/No
6.1	Property class of steel	Yes/No
7.1	Type test reports Accreditation details of the test authority for type testing	Yes/No
7.5	A sampling test plan, types of tests to be carried out and nominated NATA test facility.	Yes/No
8.	Service Performance	Yes/No
9.	Quality systems of BOTH the TENDERER and the MANUFACTURER	Yes/No
13.	Reliability	Yes/No
15.	Environmental Considerations (availability)	Yes/No

SIGNATURE OF TENDERER: _____

NAME OF TENDERER: _____

ADDRESS OF TENDERER: _____

SIGNATURE: _____ FOR AND ON BEHALF OF TENDERER

DATE: _____