Technical Specification for Fuse Panels for Electricity Supply Pillars

ETS14-04-01
Technical Specification for Fuse Panels for Electricity Supply Pillars

Contents

1. Purpose and Scope ........................................................................................................ 1

2. References .................................................................................................................... 1

   2.1 Applicable Standards ........................................................................................ 1

3. Drawings ....................................................................................................................... 1

   3.1 Drawings by the Purchaser ................................................................................. 1

4. Service Conditions ....................................................................................................... 2

5. Design and Construction ............................................................................................ 2

   5.1 General Requirements ....................................................................................... 2

   5.2 Panel Pre-wiring .................................................................................................. 3

6. Performance and Testing ............................................................................................ 3

   6.1 Test Certificates .................................................................................................. 3

7. Risk Assessment ......................................................................................................... 3

8. Quality Assurance ........................................................................................................ 4

   8.1 Purchasers Policy ............................................................................................... 4

   8.2 Documentary Evidence ....................................................................................... 4

9. Samples ........................................................................................................................ 4

   9.1 Production Samples ............................................................................................ 4

   9.2 Sample Delivery .................................................................................................. 4

   9.3 Samples for Tests ............................................................................................... 4

10. Packaging and Marking ............................................................................................... 4

11. Service Performance ................................................................................................... 5

12. Reliability .................................................................................................................... 5

   12.1 Service Life ......................................................................................................... 5

   12.2 Evidence in Support of Reliability ...................................................................... 5

13. Training ...................................................................................................................... 5

14. Environmental Considerations ................................................................................... 5

15. Information to be Provided ......................................................................................... 6

   15.1 Specific Technical Requirements .................................................................... 6

   15.2 Checklist of Supporting Documentation ......................................................... 6
Technical Specification for Fuse Panels for Electricity Supply Pillars

16. Attachment 1 – Technical Details ................................................................. 7
17. Attachment 2 – Technical Details ................................................................. 8
19. Attachment 4 - Drawings ............................................................................ 10
Technical Specification for Fuse Panels for Electricity Supply Pillars

1. Purpose and Scope

This Specification sets out the requirements for pre-wired fuse panels to be mounted in electricity supply pillars used in low voltage Underground Distribution systems in Queensland.

Two panel types are required as follows:
- Fuse Panel Assembly, Cross-Road Pillar, SC 2421204.

2. References

2.1 Applicable Standards

The items shall be designed, 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:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 1275</td>
<td>Metric screw threads for fasteners.</td>
</tr>
<tr>
<td>AS 1567</td>
<td>Copper and copper alloys - Wrought rods, bars and sections.</td>
</tr>
<tr>
<td>AS 1795</td>
<td>SheETSand boards for electrical purposes - Classification and</td>
</tr>
<tr>
<td></td>
<td>(Withdrawn) general requirements.</td>
</tr>
<tr>
<td>AS 1856</td>
<td>Electroplated coatings - Silver</td>
</tr>
<tr>
<td>AS 4169</td>
<td>Electroplated coatings - Tin and tin alloys.</td>
</tr>
<tr>
<td>AS/NZS 4325</td>
<td>Compression and mechanical connectors for power cables with copper</td>
</tr>
<tr>
<td></td>
<td>or aluminium conductors</td>
</tr>
<tr>
<td>AS/NZS 5000.1</td>
<td>Electric Cables - Polynemic Insulated for Working Voltages up to and</td>
</tr>
<tr>
<td></td>
<td>Including 0.6/1kV</td>
</tr>
<tr>
<td>AS/NZS 60269</td>
<td>Low voltage fuses</td>
</tr>
<tr>
<td>AS/NZS 60695.2.13</td>
<td>Fire hazard testing-Glowing hot wire based test methods - Glow-wire ignitability test method for materials</td>
</tr>
<tr>
<td>AS/NZS 9001</td>
<td>Quality management systems – Requirements</td>
</tr>
<tr>
<td>IEC 60893</td>
<td>Insulating materials- Industrial rigid laminated sheet based on</td>
</tr>
<tr>
<td></td>
<td>thermosetting resins for electrical purposes.</td>
</tr>
</tbody>
</table>

3. Drawings

3.1 Drawings by the Purchaser

The following drawings are attached and form part of this Specification.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>QESI 04-03-01</td>
<td>Standard Base Electricity Supply Pillar Critical Dimensions</td>
</tr>
<tr>
<td>QESI 04-03-02</td>
<td>Standard Covers Electricity Supply Pillar Critical Dimensions</td>
</tr>
<tr>
<td>940140-01</td>
<td>Distribution Network Hardware Electricity LV Supply Pillar Fuse Panel</td>
</tr>
<tr>
<td></td>
<td>– Six Fuses Panel Detail</td>
</tr>
<tr>
<td>940140-02</td>
<td>Distribution Network Hardware Electricity LV Supply Pillar Fuse Panel</td>
</tr>
<tr>
<td></td>
<td>– Six Fuses Cabling Details</td>
</tr>
<tr>
<td>QESI 04-04-03</td>
<td>Neutral Bar Electricity Supply Pillars Manufacturing Details</td>
</tr>
</tbody>
</table>
4. Service Conditions

The fuse panels will be installed in pillars which are exposed to the following environmental conditions:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temperature</td>
<td>45°C summer daytime</td>
</tr>
<tr>
<td></td>
<td>-5°C winter night time</td>
</tr>
<tr>
<td>Solar Radiation Level</td>
<td>1,000 Wm(^{-2}) with high ultraviolet content</td>
</tr>
<tr>
<td>Precipitation</td>
<td>Tropical summer storms with gust wind speeds exceeding 160 km/h and an annual rainfall in excess of 1500mm</td>
</tr>
<tr>
<td>Humidity</td>
<td>Extended periods of relative humidity in excess of 90%</td>
</tr>
<tr>
<td>Moisture</td>
<td>Garden sprays and sprinklers set at any height from ground level upwards causing water to be sprayed against or to fall upon the pillar at angles between 40° below and 60° above the horizontal.</td>
</tr>
<tr>
<td>Pollution</td>
<td>Areas of coastal salt spray and/or industrial pollution with equivalent salt deposit densities in the range 2.0 to 3.0 gm(^{-2})</td>
</tr>
</tbody>
</table>

5. Design and Construction

5.1 General Requirements

Panels shall be manufactured in accordance with drawing 940140-01.

The fuse panel shall mount firmly in slots provided in the base of the pillar. The slots will have dimensions as detailed in drawing numbers QESI 04-03-01 and QESI 04-03-02.

Fuse panels shall be manufactured using a polymeric moulded material of high grade non-hygrosopic insulating material and shall be resistant to surface tracking, thermal degradation at 60°C and ageing. They shall comply with IEC 60893 and or other Australian and or International Standards for Fuse panels/insulating panels or materials for electrical purposes, and shall be free of any asbestos reinforcement. Any and all such compliance shall be demonstrated through provision of type test certificates and details.

Fuse panels shall meet the requirements of the water absorption test specified in IEC 60893-2 and shall comply with the relevant sections of AS/NZS 60695.2 for glow-wire or similar tests. All solid insulating materials used will be fire resistant. They will not ignite spontaneously and will cease to smoulder or melt immediately on removal from the heat source.

The Fuse panels shall be inherently fit for electrical insulating purposes and shall have an insulation resistance of not less than 100MΩ when measured using a 500V Megger.

Each fuse holder shall meet the requirements of AS/NZS 60269.3.0 - Low voltage fuses - "Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications)", as applicable to 100 amp 415 volt fuse holders, except that the fuse carrier must accept a fuse-link 22.2 mm dia. x 57 mm long, and shall meet the following requirements.

(a) 100 amp 415 volt rating;
(b) Single hole panel mounting;
(c) Front entry;
(d) Double screw, electro-tinned double terminals up to 50 mm²;
(e) Maximum overall dimensions at 100 mm long x 45 mm wide x 100 mm high;
(f) All metal parts of the fuse holder shall be of non-ferrous metal or stainless steel grade 316 or 304 and all screws shall be brass. Plated ferrous parts are not acceptable;
(g) The fuse as specified above shall be tested in accordance with the requirements of AS?NZS 60269.3.0
(h) The ferrule contacts and carrier contacts shall be electro-tinned to 5 micrometres minimum thickness (the base contacts shall be silver plated to 2 micrometres). That portion of the base contact assembly which mates with the carrier contacts shall be silver plated to a minimum of 2 micrometres. Shell Alvania R3 grease or equivalent shall be used to fill all holes and coat contact surfaces;

The fuse panel shall be provided with a means of ensuring adjacent fuse holders do not rotate to the extent they come into contact with each other. The proposed method of achieving this requirement must be submitted with the Tender.

Fuse panels shall be fitted with a direct-mounted unenclosed all brass neutral bar in accordance with drawing no. QESI 04-04-03. All holes in the neutral bar shall be filled with Shell Alvania R3 grease or equivalent.

5.2 Panel Pre-wiring
Panels shall be pre-wired in accordance with drawing 940140-02.

Cable shall be 16mm² stranded annealed Cu XLPE X-90 insulated in accordance with AS/NZS 5000.1 in the colours shown on the drawing.

Cables from upper to lower fuse holders are required on all fuse panels and shall be arranged in the colours shown, neatly formed into the configurations shown. Insulation shall be completely stripped prior to insertion in to fuse holder tunnels and fixing screws securely tightened. Exposed conductor shall not protrude beyond the fuse holders.

Additional cables for Supply Pillar panels from lower fuse holders and neutral bar shall be installed in accordance with Clause 5.2.3 and a tinned Cu crimp lug 16mm² - M12 fitted to the lower end of each cable. Lugs shall be in accordance with AS/NZS 4325, Class A, fixed to the cable with the correct sized hexagonal or indent crimp. Intended crimping detail, including die/tool size is to be submitted with the Tender. Cables may be neatly wrapped around the fuse panel for packaging & transport.

6. Performance and Testing

6.1 Test Certificates
Suppliers shall provide with the offer full details of the fuse-holder together with test certificates to AS/NZS 60269.3.0 and test certificates for the fuse panel as specified in Clauses 5.1.3, 5.1.4 and 5.1.5. of this specification.

7. Risk Assessment

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

8.1 Purchasers Policy
It is the Purchaser’s policy to procure goods, equipment and services from sources that demonstrate the ability to supply quality products.

8.2 Documentary Evidence
Tenderers are required to submit evidence that the design and manufacture of the products offered are in accordance with AS/NZS ISO 9001 and shall include the Capability Statement associated with the Quality System Certification.

If the Tenderer is a non-manufacturing supplier, the documentary evidence shall include the quality system certifications of both the supplier and the manufacturer.

9. Samples

9.1 Production Samples
Suppliers must submit, at no cost to the Purchaser, a minimum of one (1) production sample of each item offered. Samples MUST be delivered within one (1) week of the closing date of tenders. The requirement for samples may be waived for the following conditions.

(a) The offered item is currently under contract or has previously been supplied to the Purchaser under contract and there have been no changes to the design or material.

(b) The offered items have been supplied to the Purchaser for approval prior to this offer and there have been no changes in design or material.

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

(a) Name of Supplier and this Specification Number
(b) Item numbers
(c) Any supporting data on features or characteristics and test reports.

9.3 Samples for Tests
The Purchaser may at its discretion use samples for tests. Unused Items may be either purchased at the tender price or returned to the respective Supplier after the contract has been awarded.

10. Packaging and Marking
No technical packaging requirements apply. Suppliers shall refer to the annex attached for the delivery packaging requirements.
11. Service Performance

Suppliers shall state:

(a) the period of service for manufacturing and supplying within Australian service conditions, and

(b) Electricity supply authorities within Australia who have a service history of the panels offered.

(c) Contact names and phone numbers of relevant employees of those supply authorities who can verify the service performance claimed.

12. Reliability

12.1 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 50 years under the specified system and environmental conditions.

12.2 Evidence in Support of Reliability

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

13. Training

Training material in the form of drawings, instructions and/or audio visuals shall be provided for the items accepted under this offer.

This material shall include but is not 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. Environmental Considerations

Suppliers are required to comment on the environmental soundness of the design and the materials used in the manufacture of the fuse panels and components. In particular, comments should address such issues as recyclability and disposal at end of service life.
15. Information to be Provided

15.1 Specific Technical Requirements

Attachment 1 of this specification details the required characteristics of the materials to be used in the construction of the fuse panels for use in pillars. Suppliers shall complete Attachment 1, Attachment 2 and Attachment 3 of this specification with details of the equipment offered.

15.2 Checklist of Supporting Documentation

Attachment 3 details a checklist of supporting technical documentation which is required to be submitted with the offer.
16. Attachment 1 – Technical Details

The Supplier shall complete this Schedule and shall guarantee the particulars as set out.

<table>
<thead>
<tr>
<th>FUSE PANEL MATERIAL</th>
<th>Specified Requirement</th>
<th>Guaranteed Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Insulating material to meet the requirements of Clauses 5.1.3 and 5.1.4 and 5.1.5</td>
<td></td>
</tr>
<tr>
<td>Ignitability</td>
<td>AS/NZS 60695.2.13 GWIT 900°C min (preferred) Provide test report</td>
<td></td>
</tr>
<tr>
<td>Material Specification Sheet</td>
<td>Provide a copy.</td>
<td></td>
</tr>
<tr>
<td>Wall Thickness</td>
<td>10 mm nominal at edges and to fit pillar base, 4mm minimum elsewhere</td>
<td></td>
</tr>
<tr>
<td>Yield Tensile Strength (MPa) (Stress)</td>
<td>45 MPa (Minimum) (ASTM D638-77A @ 23°C)</td>
<td></td>
</tr>
<tr>
<td>Compressive Strength (MPa)</td>
<td>20 MPa (Minimum)</td>
<td></td>
</tr>
<tr>
<td>Izod Notched Impact Strength</td>
<td>200 J/m (Minimum) (ASTM D256 @ 23°C)</td>
<td></td>
</tr>
<tr>
<td>Melt Flow Index (MFI)</td>
<td>Maximum 2.0 gm/min. (ASTM 1238 Condition E)</td>
<td></td>
</tr>
<tr>
<td>Vicat Softening Point (VSP)</td>
<td>Minimum 128°C (ASTM D1526)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FUSE PANELS</th>
<th>6 FUSE TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Manufacturer</td>
<td></td>
</tr>
<tr>
<td>Manufacturers Catalogue Number.</td>
<td></td>
</tr>
<tr>
<td>Manufacturers Drawing Number.</td>
<td></td>
</tr>
<tr>
<td>Mass including all Components (kg)</td>
<td></td>
</tr>
<tr>
<td>Is Neutral Bar in accordance with Drawing No QESI 04-04-03</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Name of Fuse Manufacturer and Catalogue Number</td>
<td></td>
</tr>
<tr>
<td>Fuse Holder Rating (A) (V)</td>
<td></td>
</tr>
<tr>
<td>Is the fuse-holder, including terminals to suit 50mm² cable, in accordance with Clause 5.1.6</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Dose the completed fuse panel comply with Clause 5.1.7</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Name of 16mm² cable manufacturer</td>
<td></td>
</tr>
<tr>
<td>Name of 16mm² crimp lug manufacturer Catalogue Number</td>
<td></td>
</tr>
<tr>
<td>Type of crimp and tool/die detail</td>
<td>Indent/Hexagon</td>
</tr>
</tbody>
</table>

SIGNATURE OF TENDERER: _________________________________
17. Attachment 2 – Technical Details

COMMENTS ON RELIABILITY: (Refer Clause 12)

....................................................................................................................................
....................................................................................................................................
....................................................................................................................................
....................................................................................................................................
....................................................................................................................................
....................................................................................................................................
....................................................................................................................................
....................................................................................................................................

COMMENTS ON ENVIRONMENTAL SOUNDNESS: (Refer Clause 14)

1. Is the product recyclable? (Yes/No) .................................................................

2. (a) Can the product be returned to the supplier for recycling? (Yes/No) ..............

   (b) If not, how should the product be disposed of?

....................................................................................................................................
....................................................................................................................................
....................................................................................................................................
....................................................................................................................................
....................................................................................................................................
....................................................................................................................................

3. Is a Safety Data Sheet available for the product? (Yes/No) .......................

SIGNATURE OF TENDERER:  ________________________________________________

<table>
<thead>
<tr>
<th>CLAUSE E REF.</th>
<th>PARTICULARS</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Have full and comprehensive details been submitted WITH the tender documents associated with each of the following items?</td>
<td></td>
</tr>
<tr>
<td>Attachment 1</td>
<td>Ignitability test report of the panel material.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>5.1</td>
<td>Flame retardency additives</td>
<td>Yes/No</td>
</tr>
<tr>
<td>5.1</td>
<td>Water absorption test report of the panel material.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>5.1</td>
<td>Insulation resistance test report of the panel material.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>5.1</td>
<td>Means of ensuring adjacent fuse holders do not touch.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>5.2</td>
<td>Details of lug crimping type and die/tool size</td>
<td>Yes/No</td>
</tr>
<tr>
<td>6.0</td>
<td>Full details of fuse holder</td>
<td>Yes/No</td>
</tr>
<tr>
<td>6.0</td>
<td>Fuse holder test certificates</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Attachment 1</td>
<td>Ignitability test report</td>
<td>Yes/No</td>
</tr>
<tr>
<td>8.0</td>
<td>Quality systems of both the Tenderer and the Manufacturer.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>11.0</td>
<td>Service Performance.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>12.0</td>
<td>Reliability.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>13.0</td>
<td>Training Materials.</td>
<td>Yes/No</td>
</tr>
<tr>
<td>14.0</td>
<td>Environmental Soundness</td>
<td>Yes/No</td>
</tr>
</tbody>
</table>

List below any variations in the items offered to the requirements of this specification:

............................................................................................................................................................
............................................................................................................................................................
.............................................................................................................................................................

NAME OF TENDERER: ____________________________________________________________

ADDRESS OF TENDERER: ________________________________________________________

SIGNATURE: ______________________ FOR AND ON BEHALF OF TENDERER

DATE: ______________________
Technical Specification for Fuse Panels for Electricity Supply Pillars

19. Attachment 4 - Drawings

Queensland Electricity Supply Industry

STANDARD BASE ELECTRICITY SUPPLY PILLAR

CRITICAL DIMENSIONS

NOTE 5

1. A NEAR VERTICAL REAR WALL IS PREFERED BUT NOT ESSENTIAL.
2. ALL CRITICAL DIMENSIONS ARE TOLERANCED.
3. REFER TO QESI DWG No. 04-03-02 FOR COVER DETAILS.
4. MAXIMUM ALLOWABLE WEIGHT OF BASE IS 16 kg.

TYPICAL SLOT DETAIL

SECTIONAL ELEVATION

SECTIONAL SIDE ELEVATION

SIGNATURE PAGE

13/11/95

QESI

COPYRIGHT 1995 QESI

FILE: 04-03-01.DWG

Queensland Electricity Supply Industry

STANDARD BASE ELECTRICITY SUPPLY PILLAR

CRITICAL DIMENSIONS

NOTE 5

1. A NEAR VERTICAL REAR WALL IS PREFERED BUT NOT ESSENTIAL.
2. ALL CRITICAL DIMENSIONS ARE TOLERANCED.
3. REFER TO QESI DWG No. 04-03-02 FOR COVER DETAILS.
4. MAXIMUM ALLOWABLE WEIGHT OF BASE IS 16 kg.
Technical Specification for Fuse Panels for Electricity Supply Pillars

1. All critical dimensions are toleranced.
2. Refer to QESI DWG No. 04-03-01 for base details.

Queensland Electricity Supply Industry

StANDARD COVERS
ELECTRICITY SUPPLY PILLAR
CRITICAL DIMENSIONS

115115
165 (SHORT COVER)
285 MIN. (SHORT COVER)
3 mm
HOLES FOR SCREWS

REFERENCES

FUSED COVER
MOLDED COVER

SECTIONAL ELEVATION
SECTIONAL SIDE ELEVATION

NOTES.

C S E I
© COPYRIGHT 1995
This drawing must not be reproduced in part or whole without written permission from QESI.
Technical Specification for Fuse Panels for Electricity Supply Pillars

**MANUFACTURING DETAILS**

- **Neutral Bar**
  - **Electricity Supply Pillars**

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8 Flat Washer</td>
<td>10 per bar</td>
<td>Steel</td>
</tr>
<tr>
<td>M8 Spring Washer</td>
<td>10 per bar</td>
<td>Steel</td>
</tr>
<tr>
<td>M8 x 20 Set Screw</td>
<td>10 per bar</td>
<td>Steel</td>
</tr>
</tbody>
</table>

**Notes:**
- All holes to be drilled in the neutral bar.
- Do not machine the head.
- All bars to have lug fitted during or point of manufacture. The lug is to be tightened sufficiently to prevent movement of the lug during transport.

**ELEVATION**

- 1 x 7mm Dia. Hole With 0.5mm Chamfer Both Ends.

**PLAN**

- Drill and Tap 10 x M6 Holes
  - Tolerance Class 6H (A.S. 1275)

**END ELEV.**

- 1 x 7mm Dia. Hole With 0.5mm Chamfer Both Ends.

**BRASS SCREW DETAIL**

10 PER BAR

- M6 Thread with Tolerance Class 6H (A.S. 1275)

**DATE:** 13/11/95

---

Ergon Energy Corporation Limited ABN 50 087 646 062

Specified ET8/14-04-01 Ver 2