



Ergon Energy Corporation Limited

**Technical Specification for 12kV
and 24kV Powder Filled Current
Limiting Fuse Links for Use in
Switchgear (In Air)**

ETS12-01-02



Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

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	1
5. Design and Construction	2
5.1 Requirements.....	2
5.2 Ratings.....	2
5.3 Fuse-link Applications	2
5.4 Fuse-Link Dimension	3
5.5 Striker	3
6. Performance and Testing	3
6.1 Testing	3
7. Risk Assessment	3
8. Quality Assurance	4
9. Samples	4
9.1 Production Samples.....	4
10. Packaging and Marking	4
10.1 General	4
10.2 Marking.....	4
11. Service Performance	4
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	5



Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

15.1	Specific Technical Requirements.....	5
15.2	Checklist of Supporting Documentation	5
15.3	Documentation to be Supplied During the Course of the Contract.....	5
16.	Appendix A.1 – Items List	6
17.	Appendix A.1 – Items List (cont).....	7
18.	Attachment 1 – Technical Details	8
19.	Attachment 2 – Technical Document Checklist	9

Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

1. Purpose and Scope

This specification sets out the technical requirements for 12kV and 24kV powder filled fuses suitable for use in switchgear in air. The fuses are primarily used for the protection of distribution transformers.

A list of items covered by this specification is given in the **Appendix A.1**.

2. References

2.1 Applicable Standards

The fuses 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.

Should inconsistencies be identified between standards and/or this specification, the Supplier shall immediately refer such inconsistencies to the Corporation for resolution.

STANDARD	TITLE
AS1033.2	High voltage fuses (for rated voltages exceeding 1000V) Part 2 – Current-limiting (Powder-filled) type
IEC 60282-1	High-voltage fuses- Part 1: Current-limiting fuses
AS/NZS ISO: 9001	Quality Management Systems – model for quality assurance in design, development, production, installation and servicing

3. Drawings

3.1 Drawings by the Purchaser

No drawings are included in this specification

4. Service Conditions

The switchgear using the fuses to be purchased under this specification will be exposed to the following environmental conditions:

Ambient Temperatures	45° summer day time -5° winter night time
Solar Radiation Level	1100 watts per square metre with high ultraviolet content
Precipitation	Tropical summer storms with gust wind speeds above 160km/h, and an annual rainfall in excess of 1500 mm
Humidity	Extended periods of relative humidity in excess of 90% R.H.

Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

Atmospheric Classifications	Areas of coastal salt spray and/or industrial pollution with equivalent salt deposit densities in the range 2.0 - 3.0 g/m ² .
------------------------------------	--

The fuses will be used in sealed epoxy resin fuse enclosures, having varying degrees of external ventilation depending on the switchgear type. .

5. Design and Construction

Design and construction performance parameters are detailed in this section.

5.1 Requirements

The fuse-links shall have the following ratings and comply with the Australian Standard AS1033.2 or an equivalent international standard. The fuse-links shall be used primarily for protection of delta connected three phase distribution transformer.

5.2 Ratings

Rated voltage	12kV	24kV
Rated Current	Refer Table Below	
Rated breaking current	40kA(minimum)	20KA (minimum)
Rated frequency	50Hz	
Fuse classification	Full Range	
Rated insulation level of fuse-holder	95kV BIL	125kV BIL

Full range fuses are specified above but fuses of other classification will be considered.

5.3 Fuse-link Applications

The HV fuse sizes currently used by the Purchaser for the protection of distribution transformers are listed below.

Transformer three phase kVA	Fuse Rating(A) for 12kV Transformers	Fuse Rating(A) for 24kV Transformers	Typical Fuse Rating for LV.
100	10		125
200	20		200 per circuit
315	25	16	200 per circuit
500	40	20	200 per circuit
750	50 & 63		200 per circuit
1000	80	40	

The fuse links offered shall be capable of withstanding magnetising inrush currents up to 12 times the transformer rated full load current for 0.1 seconds and 25 times the transformer rated full load current for 0.01 seconds and discriminate with the secondary fuse links specified.

Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

The fuse links shall be capable of withstanding 125% of the transformer rated full load current continuously and periodic over-loads up to 150% of the transformer rated full load current.

The fuse links shall be able to clear a phase to neutral fault on the secondary terminals of the transformer in less than 1.5 seconds, in order to limit damage to the transformer in the event of such fault. (The impedance voltage of the transformer at the rated current may be assumed as 4%)

The current- time characteristics of the fuses offered shall be included in the tender.

Fuse links shall be suitable for mounting in any orientation.

5.4 Fuse-Link Dimension

Fuse-links shall have dimensions in accordance with Reference I1 and I2 of Figure D1, Appendix D of AS1033.2 respectively for rated voltages 12kV and 24kV.

Drawings showing the critical dimensions of the fuse links offered shall be submitted with the tender.

5.5 Striker

The fuse-links shall be fitted with a striker for indication purposes and to initiate three phase tripping of the circuit being protected. The mechanical characteristics of the striker shall be in accordance with the medium duty type in Table 6.3 of AS1003.2. The energy rating of the striker shall be $1J \pm 0.5J$.

6. Performance and Testing

6.1 Testing

Test certificates of the type tests specified in the Section 4 of AS1033.2 shall be provided with the tender. The routine and batch test certificates shall be submitted with each delivery.

The test certificate for the time current characteristics provided with the tender shall include the minimum melting time characteristics and the total clearing time characteristics. A table of (current -time) data defining the above curves shall also be included with the tender in (MS Office) Excel format.

Current limiting data showing the extent of current limiting should be included.

The testing shall have been carried out by a nationally accredited testing authority.

7. Risk Assessment

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

Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

8. Quality Assurance

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

Tenderers are required to submit documentary evidence that the design and manufacture of the fuses offered is in accordance with AS/NZS/ISO 9001.

This documentation shall include the Capability Statement associated with the Quality System Certification

9. Samples

9.1 Production Samples

When requested, production samples of each item shall be submitted with the offer.

10. Packaging and Marking

10.1 General

Tenderer's attention is specifically drawn to the requirements of the Logistic Specification with regard to the packaging, marking and delivery of palletised goods.

10.2 Marking

Markings shall be provided on the fuse-links in accordance with Clause 6.9.3 of AS 1033.2

The following information shall be legibly and indelibly marked on BOTH sides of the carton:

- a) Manufacturer's name and sequential unit identification number
- b) Ergon Energy's Purchase Order number
- c) Ergon Energy's Item Identification Number
- d) Rated voltage and current of fuse links
- e) Gross mass of carton and contents
- f) Handling or lifting instructions where applicable

11. Service Performance

Potential first time Suppliers to the Purchaser shall state:

1. The period of service achieved by items offered within Australian service conditions;
2. Australian electricity supply authorities who have a service history of the items offered;
3. Contact names and phone numbers of relevant employees of those supply authorities who can verify the service performance claimed.

Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

12. Reliability

12.1 Service Life

Comments on the reliability and performance of the items offered, for a service life of 35 years under the specified system and environmental conditions, shall be submitted with the offer.

12.2 Evidence in Support of Reliability

Such comments shall include evidence in support of the reliability and performance claimed including information of 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 the offer. This material shall include but is not limited to the following topics:

- Handling
- Storage
- Application guide
- 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 items offered. In particular, comments should address such issues as recyclability and disposal at end of service life and also disposal of packaging material.

15. Information to be Provided

15.1 Specific Technical Requirements

Attachment 1 is a schedule of the technical details that suppliers are required to complete and return with their offer.

15.2 Checklist of Supporting Documentation

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

15.3 Documentation to be Supplied During the Course of the Contract

Test certificates as required in **Clause 6**.

Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

16. Appendix A.1 – Items List

Item No	IINo	Description
1	0620613	FUSE LINK, 12 kV, HRC, Air Insulated, 10 Amp, Barrel 292mm Lg 50.8mm Dia plus End Caps 34mm Lg 45mm Dia, with Striker Pin, to DIN Standard 43625, Full Range Fuse. For Use in Hazemayer MD4, ABB Safelink and Areva SBX Ring Main Units
2	0620648	FUSE LINK, 12 kV, HRC, Air Insulated, 20 Amp, Barrel 292mm Lg 50.8mm Dia plus End Caps 34mm Lg 45mm Dia, with Striker Pin, to DIN Standard 43625, Full Range Fuse. For Use in Hazemayer MD4, ABB Safelink and Areva SBX Ring Main Units
3	2404922	FUSE LINK, 12 kV, HRC, Air Insulated, 25 Amp, Barrel 292mm Lg 50.8mm Dia to DIN Standard 43625, Full Range Fuse. For Use in Hazemayer MD4, ABB Safelink, Krone Kesio and Areva SBX Ring Main Units
4	0621008	FUSE LINK, 12 kV, HRC, Air Insulated, 40 amp, Barrel 292mm Lg 76.2mm Dia plus End Caps 34mm Lg 45mm Dia, with Striker Pin, to DIN Standard 43625, Full Range Fuse. For Use in Hazemayer MD4, ABB Safelink and Areva SBX Ring Main Units
5	0621016	FUSE LINK, 12 kV, HRC, Air Insulated, 80 Amp, Barrel 292mm Lg 76.2mm Dia plus End Caps 34mm Lg 45mm Dia, with Striker Pin, to DIN Standard 43625, Full Range Fuse. For Use in Hazemayer MD4, ABB Safelink and Areva SBX Ring Main Units
6	2400616	FUSE LINK, 12 kV, HRC, Air Insulated, 31.5 Amp, Barrel 292mm Lg 50.8mm Dia to DIN Standard 43625, Full Range Fuse. For Use in Hazemayer MD4, ABB Safelink, Krone Kesio and Areva SBX Ring Main Units
7	2404926	FUSE LINK, 12 kV, HRC, Air Insulated, 50 Amp, Barrel 292mm Lg 76.2mm Dia plus End Caps 34mm Lg 45mm Dia, with Striker Pin, to DIN Standard 43625, Full Range Fuse. For Use in Hazemayer MD4, ABB Safelink and Areva SBX Ring Main Units
8	2406261	FUSE LINK, 12 kV, HRC, Air Insulated, 63 Amp, Barrel 292mm Lg 50.8mm Dia to DIN Standard 43625, Full Range Fuse. For Use in Hazemayer MD4, ABB Safelink, Krone Kesio and Areva SBX Ring Main Units
9	2400629	FUSE LINK, 12kv HRC, Air Insulated 125 Amp Ring Main Unit DIN Type Air Insulated Barrel 359mm Lg 76.2mm Dia with End Caps 44mm Lg 76.2mm Dia with Striker Pin to DIN Standard 43625 Full Range Fuse.

Table continued on next page.

Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)



17. Appendix A.1 – Items List (cont)

Item No	IINo	Description
10	2404923	FUSE LINK, 12kv HRC, Air Insulated 40 Amp Ring Main Unit DIN Type Air Insulated Barrel 565mm Lg 76.2mm Dia including End Caps 44mm Lg 76.2mm Dia with Striker Pin to DIN Standard 43625 Full Range Fuse.
11	2424919	FUSE LINK, 24 kV, HRC, Air Insulated 16 Amp, Barrel 442mm Lg 50.8mm Dia plus End Caps 34mm Lg 45mm Dia, with Striker Pin to DIN Standard 43625. Full Range Fuse For use in F&G, Schneider RM6 and Ormazabal
12	0621113	FUSE LINK, 24 kV, HRC, Air Insulated 20 Amp, Barrel 442mm Lg 50.8mm Dia plus End Caps 34mm Lg 45mm Dia, with Striker Pin to DIN Standard 43625. Full Range Fuse For use in F&G, Schneider RM6 and Ormazabal
13	2404138	FUSE LINK, 24 kV, HRC, Air Insulated, 63 Amp, Barrel 442mm Lg 50.8mm Dia, plus End Caps 33mm Lg 45mm Dia, with Striker Pin to DIN Standard 43625, Full Range Fuse. For use in F&G, Schneider RM6 and Ormazabal
14	2404139	FUSE LINK, 24 kv HRC, Air Insulated 40 Amp Ring Main Unit DIN Type Air Insulated Barrel 442mm Lg 50.8mm Dia plus End Caps 33mm Lg 45mm Dia with Striker Pin to DIN Standard 43625 Full Range Fuse, For use in F&G, Schneider RM6 and Ormazabal.



Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

18. Attachment 1 – Technical Details

The supplier shall complete this schedule for each item offered and shall guarantee the particulars as set out:

Tender Item Number		IINo	
Name of Manufacturer			
Address of Manufacturer			
Place of Manufacturer			
Manufacturer's Catalogue Number and Drawing Numbers			
Material of Fuse			
Weight of Each Fuse		(kg)	
Weight per Crate		(kg)	
Time-Current Characteristics of Fuse Attached?			YES/NO
Cut-off current Characteristics of Fuse Attached?			YES/NO
I ² t Characteristics Attached?			YES/NO
Dimensional details of the fuse Attached?			YES/NO
Prospective Breaking Current		(kA)	
Breaking Capacity		(kA)	
Minimum Breaking Current		(A)	
Power dissipation at rated current		(W)	
Energy rating of the striker pin		(J)	
Details of Fuse End caps:			
End cap Material			
Type of Plating			
Thickness of plating		(micron)	

SIGNATURE OF TENDERER: _____

DATE _____

Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

19. Attachment 2 – Technical Document Checklist

CLAUSE	PARTICULAR	RESPONSE
Clause 5.3	Fuse-link Applications	Response
1	The current-time characteristics of the fuse-links offered shall be submitted with the tender.	
Clause 5.4	Fuse-link Dimensions	Response
1	Drawings showing the critical dimensions of the fuse links offered shall be submitted with the tender.	
Clause 6.0	Performance and Testing	Response
6.1	Test certificates of the type tests specified in the Section 4 of AS1033.2 shall be provided with the tender.	
Clause 8.0	Quality Assurance	Response
8	Tenderers are required to submit documentary evidence that the design and manufacture of the fuses offered is in accordance with AS/NZS/ISO 9001.	
Clause 9.0	Samples	Response
9.1	When will samples be available, if required?	
Clause 11.	Service History	Response
1	The period of service achieved by items offered within Australian service conditions	
2	Australian electricity supply authorities who have a service history of the items offered	
3	Contact names and phone numbers of relevant employees of those supply authorities who can verify the service performance claimed	
Clause 12	Reliability	Response
12.1	Comments on the reliability and performance of the items offered, for a service life of 35 years under the specified system and environmental conditions, shall be submitted with the offer.	
12.2	Evidence in support of the reliability and performance claimed including information of Failure Mode and Effect Analysis.	
Clause 13	Training	Response



Technical Specification for 12kV and 24kV Powder Filled Current Limiting Fuse Links for Use in Switchgear (In Air)

CLAUSE	PARTICULAR	RESPONSE
1	Comment on the availability of training materials	
Clause 14	Environmental Considerations	Response
1	Suppliers are required to comment on the environmental soundness of the design and the materials used in the manufacture of the items offered. In particular, comments should address such issues as recyclability and disposal at end of service life and also disposal of packaging material.	

Note: All requested supporting documentation is to be attached to this Attachment 2.

NAME OF TENDERER:

ADDRESS OF TENDERER: _____

SIGNATURE: _____ FOR AND ON BEHALF OF TENDERER

DATE: _____