



Standard

Surge Arrester Standard

R522696

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Authorisations

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Responsibilities

This document is the responsibility of the Asset Strategy Team, Tasmanian Networks Pty Ltd, ABN 24 167 357 299 (hereafter referred to as "TasNetworks").

Please contact the Asset Strategy Leader with any queries or suggestions.

- Implementation All TasNetworks staff and contractors.
- Compliance All group managers.

Minimum Requirements

The requirements set out in TasNetworks' documents are minimum requirements that must be complied with by all TasNetworks team members, contractors, and other consultants.

The end user is expected to implement any practices which may not be stated but which can be reasonably regarded as good practices relevant to the objective of this document.

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Record of revisions

Section number	Details
Entire doc	Copied over verbatim from superseded Transend to TasNetworks template. Updated Transend to TasNetworks document reference numbers where known including Australian Standards.

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1 General

1.1 Purpose

This specification covers the requirements for surge arresters and associated accessories for use by Tasmanian Networks Pty Ltd (hereafter referred to as "TasNetworks").

1.2 Scope

This standard applies to all surge arresters to be procured by TasNetworks.

This standard contains requirements for design, engineering, manufacture and construction, testing at manufacturer's works, secured packaging, supply, transportation and delivery to site with complete documentation of surge arresters and associated accessories.

1.3 Objective

TasNetworks requires a design standard for surge arresters to ensure:

- (a) all assets are protected from over voltages that may arise in the power system;
- (b) that relevant Australian legal requirements are met;
- (c) that the requirements of the Tasmanian Electricity Code and National Electricity Code are met;
- (d) personnel and public safety;
- (e) ease in operation and maintenance;
- (f) reliability and continuity of the power supply;
- (g) minimum disruptions to the power supply following a fault;
- (h) that the requirements of TasNetworks business plan are met; and
- (i) that the exposure of TasNetworks' business to risk is minimised.

1.1 Certificate of conformance

- (a) Before any surge arrester is accepted by TasNetworks, certificate of conformance with this standard must be submitted to TasNetworks. The certificate of conformance must be duly supported with documents, drawings, test results, test reports, test certificates, completed check lists and other documents as applicable. Where TasNetworks has approved deviation to specific requirements of this standard, all such approvals must be included with the certificate of conformance.
- (b) TasNetworks will supply blank proforma for certificate of conformance, to be completed by the Contractor.
- (c) Surge arresters will be accepted only after TasNetworks has received the certificate of conformance.

1.1 Precedence

Any conflict between the requirements of the codes, specifications, drawings, rules, regulations and statutory requirements or various sections of this standard and other associated documents must be brought to the attention of TasNetworks for resolution.

1.2 Deviation

Special approval for a deviation to this standard may only be accorded if it does not reduce the quality of workmanship and does not deviate from the intent of the standard. A request for deviation must follow a designated procedure that involves approval from TasNetworks. Deviations if any, must be specifically requested, and approved in writing by TasNetworks prior to award of Contract.

1.3 References

As a component of the complete specification for a system, this standard is to be read in conjunction with other standards and documents as applicable. In particular this includes the following:

1.3.1 TasNetworks standard

R579294	Surge Arrester Schedule
R579293	Surge Arrester Deliverables

1.3.2 Other standards

Surge arresters Part 2: Metal-oxide surge arresters without gaps for a.c. systems	AS 1307.2 - 1996
Insulation Coordination Part 2 - Application Guide	AS 1824.2 – 1985
	IEC 60071-2
Terminals for switchgear assemblies for alternating voltages above 1 kV	AS 62271.301

2 Service Conditions

2.1 System conditions

Particulars of TasNetworks' transmission system are shown in Table 1.

Table 1 Particulars of the system

Sr No.	Description	Unit	Requirement	
			Type One	Type Two
1	Nominal voltage	kV	220	110
2	Highest voltage	kV	245	123
3	Frequency	Hz	50	50
4	Number of phases	-	3	3
5	Rated Withstand Voltages			
5.1	Lightning impulse	kV peak	1050	550

Sr No.	Description	Unit	Requirement	
5.2	Power frequency	kV rms	460	230
6	Earth fault factor	-	1.4	1.4

2.2 Environmental conditions

Surge arresters will be installed at various locations around the state of Tasmania, Australia. Surge arresters must be designed:

- (a) to meet normal service conditions outlined in Clause 4.4, AS 1307.2 - 1996.
- (b) for a pollution severity of "extreme" as outlined Clause 5.2, AS 1824.2 - 1985.

3 General design requirements

3.1 Surge Arrester

Surge Arrester are required to limit the effect of over-voltages on power system assets. They will be mounted on pedestal support structures, to be provided by TasNetworks unless otherwise specified in the project specifications. The surge arresters are intended to be installed as close as practicable to the power transformer bushing terminals.

Surge arresters must comply with the requirements outlined in this specification and with the latest issues of the relevant applicable Australian Standards, in particular AS 1307.2 - 1996.

Surge arresters must:

- (a) be gapless metal oxide type;
- (b) be of a hermetically sealed type, self supporting construction suitable for mounting on concrete or steel structures;
- (c) be manufactured with silicone or composite material, grey in colour;
- (d) be equipped with a pressure relief device for relieving excessive internal pressure in the surge arrester and preventing violent shattering of the housing following prolonged passage of fault current or internal flashover of the arrester;
- (e) include a rating plate, with information as specified in Clause 3.1, AS 1307.2 – 1996, and bear the company name, "TasNetworks Networks"; and
- (f) allow a Palm No.5 connection of conductor, as per AS 62271.301.

3.1 Surge Counter

Where a surge counter is provided it must, as a minimum have the following features:

- (a) One surge counter must be provided for each set of three phase surge arresters; and
- (b) The surge counter must:
 - (i) include a clearly visible cyclometer dial; and
 - (ii) have an enclosure to IP56;

3.1 Surge Monitor

Where a surge monitoring device is provided it must comply with the requirements as below:

- (a) One surge monitoring device must be provided for each set of three phase surge arresters.
- (b) The surge monitor must as a minimum have the following features:
 - (i) record the number of surges absorbed by the surge arrester locally and/or remotely;
 - (ii) measure and display the leakage current locally and/or remotely;
 - (iii) have an enclosure to IP56;
 - (iv) have all necessary terminations for remote connections as required for remote monitoring;
- (c) The surge monitors must be capable of either direct connection to TasNetworks' substation RTU for remote monitoring OR have downloading facility local to the surge monitor;
- (d) Where it is possible to connect the output of the surge monitor to remote using connections to remote terminal unit (RTU), all such outputs will comply with the following:
 - (v) Where digital outputs are provided, they must be potential free clean outputs capable of operating on 125Vdc; and
 - (vi) Where analog outputs are provided, they must be in the range of 4-20mA.
- (e) All necessary software and tools for downloading the information from the surge monitors must be provided.

4 Specific design requirements

Surge arresters must be designed to meet the requirements outlined in Table 2.

Table 2 Specific Technical Parameters for Surge Arresters

Sr No.	Description	Unit	Requirement	
			Type One	Type Two
1	Rated voltage	kV rms	245	123
2	Nominal discharge current	kA		10
3	Line discharge class	-		2
4	Pressure relief class (AS 1307.2)	-	S	S
5	Maximum earth fault current	kA	25	25
6	Minimum creepage distance	mm	6080	3810
7	Type of duty	-	Heavy	Heavy
8	Service location	-	Outdoor	Outdoor

5 Testing

All components of surge arresters must be duly tested in accordance with relevant applicable Australian and International standards. Where tests are stated as optional in the standards, it will be considered that these tests are required by TasNetworks, unless otherwise requested by Contractor and agreed in writing prior to order.

5.1 Type tests

- (a) Type tests are intended to prove the soundness of design of the surge arresters and their suitability for operation under the conditions detailed in the specifications. Type tests must be carried out before the delivery of the surge arresters. A certified test report, detailing the results of such tests along with the procedures followed, must be supplied to TasNetworks. These tests must be made upon a surge arrester of identical design with that offered, or on a surge arrester of a design which does not differ from that offered in any way which might influence the properties to be checked by the type test.
- (b) Where such tests have already been performed, a copy of type test reports that qualifies for the exemption from conducting these tests must be provided with the tender.

5.1 Routine tests

The routine tests must be conducted on the surge arresters to prove quality of manufacture and compliance with the relevant performance requirements of the applicable standards. Routine testing must be performed at the manufacturer's works prior to delivery. The results must be approved and accepted by TasNetworks prior to dispatch of equipment to site.

5.2 Acceptance tests

Acceptance tests in accordance with AS 1307.2-1996 must be performed. The acceptance tests must include special thermal stability test and seal leakage test.

5.3 Batch tests

Batch tests in accordance with AS 1307.2-1996 must be performed.

5.4 Test certificates

Certified test certificates for all routine, acceptance and batch tests must be submitted with the claim for payment for the equipment.

6 Data for asset management information system

TasNetworks maintains a comprehensive "Asset Management Information System" (AMIS) that contains all design information, test results and condition of TasNetworks assets. The AMIS also contains maintenance regimes for all assets.

The contractor must provide information required to maintain the currency of AMIS for each surge arrester in a standard proforma provided by TasNetworks. The proforma must be filled in and submitted to TasNetworks as below:

- (a) Design information and maintenance regime information must be supplied on delivery.

- (b) Test results must be submitted on delivery.

7 Documentation requirements

7.1 General Documentation requirements

- (a) All documents and drawings must be clear, legible and free from errors or omissions;
- (b) All documents and drawings must be in the English language ONLY;
- (c) Only SI system of units must be used. Units must be stated for all values;
- (d) Scales wherever used must be as per the applicable Australian Standards;
- (e) All drawings that are made to the scale must have a scale block; and
- (f) Only information relevant to the particular type of surge arrester supplied will be shown in the documentation and drawings.

7.1 Drawings and information

The contractor must submit for approval all drawings and information before manufacture commences. Sufficient time to allow modifications to be made without delaying the work must be provided. Where drawings and information are not approved, the contractor must modify and resubmit them for approval. This process will continue until all drawings and information are approved.

Design information, consisting of fully dimensioned assembly/arrangement drawings, must be submitted before manufacture commences.

7.2 Installation and commissioning information

Copies of comprehensive installation and commissioning instructions must be supplied no later than two (2) weeks before shipping of the equipment from the manufacturer's works.

8 Information to be provided with the tender

Requirements for information to be submitted as part of the tender are outlined in document R579294.

9 Deliverables

Requirements for deliverables are outlined in document R579293.

10 Hold points

The hold points for supply of surge arresters are:

- (a) TasNetworks approval of design documentation, as detailed in R579293.
- (b) Acceptance testing, as per clause 5.3 of this standard.