

Summary

This document provides a Schedule of major High Voltage plant items and associated standards and common requirements.

TransGrid publishes this information under clause 5.2A.5 of the National Electricity Rules.

Document Control

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1. Compliance with Standards

Except as may be herein or otherwise varied, the Connection Applicant¹ shall be responsible for compliance of the Works with the latest edition and amendments of the following documents operative at the base date:

- National Electricity Rules
- Australian Standards, Codes of Practice, and Australian Regulatory Authorities (In the event of there not being any appropriate Australian Standard, the latest appropriate International Standard shall be used)
- The Building Code of Australia
- Principal's Power System Safety Rules, or equivalent for the relevant authority

Should a conflict occur between the requirements of these documents and standards then the following order of priority/precedence will be used to resolve such conflict:

1. Regulatory Requirements
2. Australian Codes of Practice
3. Relevant Australian Standards
4. Relevant IEC Standards

2. List of Primary Standards

Note: This list is not exhaustive.

Number	Part	Title
AS/NZS 3000		Electrical Wiring Rules
AS 1000		The International System of Units (SI) and its Application
AS 1100		Drawing practice
AS/NZS 4680		Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
IEC 60694		Common specifications for high-voltage switchgear and controlgear standards
AS 62271	.1	High-voltage switchgear and Controlgear – Common Specifications
AS 62271	.100	High-voltage alternating-current circuit-breakers
AS 62271	.102	Alternating current disconnectors and earthing switches
AS 62271	.200	A.C metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to 52 kV
AS 62271	.4	Handling procedures for sulphur hexafluoride (SF6) and its mixtures

¹ The 'Connection Applicant' is the person or company responsible for the contestable IUSA

Number	Part	Title
AS 2700		Colour Standards for General Purposes
AS 60044	.1	Current transformers
AS 60044	.2	Inductive voltage transformers
AS 60044	.5	Capacitive voltage transformers
AS 2067		Substations and high voltage installations exceeding 1 kV a.c
AS 1767.1		Insulating Liquids Part 1: Specification for unused mineral insulating oils for transformers and switchgear
IEC 60376		Specification of technical grade sulfur hexafluoride (SF ₆) for use in electrical equipment
IEC 60480		Guidelines for the checking and treatment of sulfur hexafluoride (SF ₆) taken from electrical equipment and specification for its re-use
AS 60529		Degrees of protection provided by enclosures
IEC 61000	4.30	Testing and measurement techniques – Power quality measurement methods
IEC 60099	.4	Surge-arresters – Part 4: Metal-oxide surge arresters without gaps for a.c. systems
AS 4436		Guide for the selection of insulators in respect to polluted conditions
IEC 60507		Artificial pollution tests on high-voltage insulators to be used on a.c. systems
IEC 60273		Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1 000 V
AS 1154.1		Insulator and Conductor Fittings for Overhead Power Lines
AS 4435.1 / IEC 1109		Insulators-Composite for Overhead Lines – Definitions, test methods and acceptance criteria for string insulator units
AS 4435.2		Insulators Composite for Overhead Power Lines - Standard strength classes and end fittings for string insulator units
AS 4435.4		Insulators-Composite for Overhead Power Lines – Definitions, test methods, acceptance criteria for post insulator units
AS IEC 60437		Radio Interference Tests on high-voltage insulators
AS 2947.1		Test methods – Insulator units
AS 60270		High Voltage Test Techniques
IEC 60353		Line traps for a.c. power systems
AS 4398	.1	Insulators - Ceramic or glass - Station post for indoor and outdoor use - Voltages greater than 1000 V a.c
AS 1307	.2	Surge arresters – metal-oxide surge arresters without gaps for a/c systems

3. Common Requirements

External painted surfaces shall be N42 - Stormy Grey colour according to AS 2700 'Colour Standards for general purposes' or similar.

The colour of all insulators and bushings shall be N35 - Light Grey colour to AS 2700 or similar.

The required mechanical dynamic (wind + weight + short circuit) equipment terminal loads are as follows:

- 33 kV up to 40 kA = 6.0 kN in any direction
- 66 kV up to 40 kA = 4.5 kN in any direction
- 132 kV up to 50 kA = 4.0 kN in any direction
- 220 kV up to 50 kA = 3.5 kN in any direction
- 330 kV up to 63 kA = 3.5 kN in any direction
- 500 kV up to 63 kA = 3.5 kN in any direction

4. Schedule of Items – Main HV Plant

- Circuit Breakers Live Head above 145kV
- Circuit Breakers Live Head up to 145kV
- Circuit Breakers Dead Tank
- Current Transformers above 145kV
- Current Transformers up to 145kV
- Capacitive Voltage Transformers
- Inductive Voltage Transformers
- Disconnectors and Earth Switches above 145kV
- Disconnectors and Earth Switches up to 145kV

4.1 Circuit Breakers

1. Circuit Breakers Live Head above 145kV

Item No.	Description
1.1	550 kV, 4000 A, 63 kA, 50Hz, SF ₆ Live Head Outdoor Circuit Breaker
1.2	550 kV, 4000 A, 63 kA, 50Hz, SF ₆ Live Head Outdoor Circuit Breaker with Closing Resistor
1.3	362 kV, 3150 A, 63 kA, 50Hz, SF ₆ Live Head Outdoor Circuit Breaker
1.4	362 kV, 3150 A, 50 kA, 50Hz, SF ₆ Live Head Outdoor Circuit Breaker
1.5	Condition Monitoring for 550 kV Circuit Breaker
1.6	Condition Monitoring for 362 kV Circuit Breaker
1.7	Point-On-Wave Switching for 550 kV Circuit Breaker
1.8	Point-On-Wave Switching for 362 kV Circuit Breaker

2. Circuit Breakers Live Head up to 145kV

Item No.	Description
2.1	145kV, 50kA, 3150A Circuit Breaker
2.2	145kV, 40kA, 3150A Circuit Breaker
2.3	145kV, 40kA, 3150A Circuit Breaker with Independent Pole Operation
2.4	72.5kV, 40kA, 3150A Circuit Breaker
2.5	72.5kV, 25kA, 2000A Circuit Breaker
2.6	72.5kV, 25kA, 2000A Circuit Breaker with Independent Pole Operation
2.7	Condition Monitoring for 145kV Circuit Breaker
2.8	Condition Monitoring for 72.5kV Circuit Breaker
2.9	Point-On-Wave Switching Relay for Items 2.3 & 2.6

3. Circuit Breakers Dead Tank

Item No.	Description
3.1	362 kV, 3150 A, 50 kA, 50Hz, SF ₆ Dead Tank Outdoor Circuit Breaker
3.2	145kV, 50kA, 3150A Dead Tank Circuit Breaker, with Type 6 Current Transformer
3.3	145kV, 40kA, 3150A Dead Tank Circuit Breaker, with Type 1 Current Transformer
3.4	145kV, 40kA, 3150A Dead Tank Circuit Breaker, with Type 2 Current Transformer
3.5	72.5kV, 40kA, 3150A Dead Tank Circuit Breaker, with Type 3 Current Transformer
3.6	72.5kV, 40kA, 3150A Dead Tank Circuit Breaker, with Type 5 Current Transformer
3.7	Condition Monitoring for 362kV Circuit Breaker
3.8	Condition Monitoring for 145kV Circuit Breaker
3.9	Condition Monitoring for 72.5kV Circuit Breaker
3.10	Point-On-Wave Switching Relay for Items 3.1 to 3.6

4.2 Post Type Current Transformers

4. Current Transformers (Post Type) above 145kV

Item No.	Description
4.1	362 kV, 50 kA, 4000 Amp Post Type Current Transformer
4.2	362 kV, 50 kA, 4000 Amp Post Type Current Transformer
4.3	362 kV, 50 kA, 3150 Amp Post Type Current Transformer
4.4	362 kV, 50 kA, 1250 Amp Post Type Current Transformer
4.5	362 kV, 50 kA, 1250 Amp Post Type Current Transformer

5. Current Transformers up to 145kV

Item No.	Description
5.1	145 kV, 50 kA, 3150 Amp Post Type Current Transformer
5.2	145 kV, 50 kA, 3150 Amp Post Type Current Transformer
5.3	145 kV, 50 kA, 3150 Amp Post Type Current Transformer
5.4	72.5 kV, 25 kA, 2500 Amp Post Type Current Transformer
5.5	72.5 kV, 16 kA, 1250 Amp Post Type Current Transformer

4.3 Capacitive Voltage Transformers

6. Capacitive Voltage Transformers

Item No.	Description
6.1	330 kV, 50VA Capacitor Voltage Transformer, accuracy class 0.2M, 3PT1 Mod
6.2	330 kV, 100VA Capacitor Voltage Transformer, accuracy class 0.5M, 3PT1 Mod
6.3	132 kV, 100VA Capacitor Voltage Transformer, accuracy class 0.2M, 3PT1 Mod
6.4	132 kV, 200VA Capacitor Voltage Transformer, accuracy class 0.5M, 3PT1 Mod
6.5	Option to supply and install a PQSensor™ with Items 6.1 & 6.3, including associated testing

4.4 Inductive Voltage Transformers

7. Inductive Voltage Transformers

Item No.	Description
7.1	132kV, 200VA Inductive Voltage Transformer, Accuracy Class 0.2M, 3P
7.2	132kV, 100VA Inductive Voltage Transformer, Accuracy Class 0.2M, 3P
7.3	132kV, 2 x 50VA Inductive Voltage Transformer, Accuracy Class 0.2M, 3P
7.4	66kV, 200VA Inductive Voltage Transformer, Accuracy Class 0.2M, 3P
7.5	66kV, 100VA Inductive Voltage Transformer, Accuracy Class 0.2M, 3P
7.6	66kV, 2 x 50VA Inductive Voltage Transformer, Accuracy Class 0.2M, 3P

4.5 Disconnectors and Earthing Switches

8. Disconnectors and Earth Switches above 145kV

Item No.	Description
8.1	362kV, 50kA/1s, 3150A 3-phase Ganged Motor Operated HDB Disconnector
8.2	362kV, 50kA/1s 3-phase Ganged Manual Associated SVB Earthing Switch
8.3	362kV, 50kA/1s 3-phase Ganged Manual Independent SVB Earthing Switch
8.4	Motor Drive Unit for Items 8.2 and 8.3

9. Disconnectors and Earth Switches up to 145kV

Item No.	Description
9.1	145kV, 50kA/1s 3-phase 3150A Horizontal Double Break (HDB) Disconnector
9.2	145kV, 50kA/1s 3-phase 1250A HDB Disconnector
9.3	145kV, 50kA/1s 3-phase Associated Single Vertical Break (SVB) Earthing Switch
9.4	145kV, 50kA/1s 3-phase Independent SVB Earthing Switch
9.5	Motor Drive Unit for Items 9.1 to 9.4
9.6	72.5kV, 25kA/1s, 1600A, 3-phase Horizontal Double Break (HDB) manually operated Disconnector
9.7	72.5kV, 25kA/1s, 3-phase Associated Single Vertical Break (SVB) manually operated Earthing Switch
9.8	72.5kV, 25kA/1s, 3-phase Independent Single Vertical Break (SVB) manually operated Earthing

Switch

5. Schedule of Items – Miscellaneous HV Plant

5.1 Post Insulators

10. Post Insulators

Item No.	Description
10.1	362kV, 6kN, Upright Station Post Insulator
10.2	362kV, 6kN, Underhung Station Post Insulator
10.3	362kV, 10kN, Upright Station Post Insulator
10.4	145kV, 6kN, Upright Station Post Insulator
10.5	145kV, 6kN, Underhung Station Post Insulator
10.6	145kV, 12.5kN, Upright Station Post Insulator
10.7	72.5kV, 6kN, Upright Station Post Insulator
10.8	36kV, 6kN, Upright Station Post Insulator

5.2 Composite Insulators

11. Composite Insulators

Item No.	Description
11.1	550kV, 210kN SML Composite Longrod Insulator for Light Pollution
11.2	362kV, Pivotal Horizontal Vee Composite Longrod Insulator for Light Pollution
11.3	362kV, 2kN MDCL Composite Post Insulator for Light Pollution (Two Hole 'Tear Drop' Blade End)
11.4	362kV, 160kN SML Composite Longrod Insulator for Heavy Pollution
11.5	362kV, 160kN SML Composite Longrod Insulator for Light Pollution
11.6	300kV, 160kN SML Composite Longrod Insulator for Light Pollution
11.7	145kV, 2kN MDCL Composite Post Insulator for Light Pollution (Clamp Top End)
11.8	145kV, 6kN MDCL Composite Post Insulator for Light Pollution (Clamp Top End)
11.9	145kV, 6kN MDCL Composite Post Insulator for Heavy Pollution (Two Hole 'Tear Drop' Blade End)
11.10	145kV, 6kN MDCL Composite Post Insulator for Light Pollution (Two Hole 'Tear Drop' Blade End)

11. Composite Insulators

11.11	145kV, 160kN SML Composite Longrod Insulator for Light Pollution
11.12	145kV, 120kN SML Composite Longrod Insulator for Heavy Pollution
11.13	145kV, 120kN SML Composite Longrod Insulator for Light Pollution

5.3 Surge Arresters

12. Surge Arresters

Item No.	Description
12.1	420kV, 20kA Upright Arrester
12.2	288kV, 10kA Upright Arrester
12.3	288kV, 20kA Upright Arrester
12.4	120kV, 10kA Upright Arrester
12.5	60kV, 10kA Upright Arrester

5.4 Line Traps

13. Line Traps

Item No.	Description
13.1	362kV, 3150A, 50kA, 150-480kHz Line Trap
13.2	145kV, 1250A, 25kA, 150-480kHz Line Trap