MV Load Break Switch

Standard Number: HPC-8DJ-07-0011-2026

Original Issue Date: 22nd January 2026
Document Number:

Print Date: 22/01/2026

Document Control			
Author	**Name:** Paul Savig **Position:** Senior Standards & Plant Engineer		Digitally signed by Paul Savig Date: 2026.01.22 11:03:21 +08'00'
Reviewed By	**Name:** Kai Chong Jee **Position:** Senior Standards & Plant Engineer		Digitally signed by Kai Chong Jee Date: 2026.01.22 13:12:18 +08'00'
Endorsed By	**Name:** Johnathan Choi **Position:** Standards and Plant Manager		Digitally signed by Johnathan Choi Date: 2026.01.22 13:26:21 +08'00'
Approved By *	**Name:** Victor Cheng **Position:** Senior Manager Engineering and Project Services		Digitally signed by Victor Cheng Date: 2026.01.27 09:01:39 +08'00'
Date Created/Last Updated	22 January 2026		
Review Frequency **	3 yearly		
Next Review Date **	22 January 2029		

** Shall be the Process Owner and is the person assigned authority and responsibility for managing the whole process, end-to-end, which may extend across more than one division and/or functions, in order to deliver agreed business results.*

*** Frequency period is dependent upon circumstances– maximum is 5 years from last issue, review, or revision whichever is the latest. If left blank, the default shall be 1 year unless otherwise specified.*

Revision Control		
Revision	**Date**	**Description**
0	22/01/2026	Initial Document

STAKEHOLDERS *The following positions shall be consulted if an update or review is required:*	
Senior Manager – Engineering & Project Services	Senior Manager – Asset Services
Senior Manager – Energy Planning	Senior Manager – System Operations
Head of People and Safety	Senior Manager – Project Delivery

Table of Contents

1. Scope

This Specification sets out the technical (electrical and mechanical) requirements for the design, manufacturing, testing and supply of medium voltage, pole mounted Load Break Switches for the 11 kV, 22 kV and 33 kV distribution system only.

The *Equipment* must consist of:

- Tank – housing the primary device (switch disconnector)
- Control unit – automation and remote switching. The control cubicle will contain the secondary devices (SCADA and communication device)

Approval in terms of this specification shall be obtained by one or a combination of the following:

a) Successful completion of the appropriate tests required by this specification by an independent and accredited test authority.

b) Provision of test certificates from an independent and accredited test authority based upon an alternative specification, with test requirements at least equivalent to this specification.

NOTE: Verification of accreditation of the test authority shall be provided by NATA (National Association of Testing Authorities) accredited test house or by a test house possessing accreditation from a NATA MRA (Mutual Recognition Agreement) partner.

Tenderers must state any non-compliance with the specification in any tender submission and any alternative offers must be submitted in full and separately from any main offer.

2. Normative References

2.1 Standards

2.1.1 Horizon Power Standards

[1]. *Horizon Power Environmental Conditions*, standard number HPC-9EJ-01-0001-2013, available at http://horizonpower.com.au/contractors-suppliers/contractors/manuals-and-standards/ under the 'Standards' heading.

[2]. *Technical Rules HPC-9DJ-01-0001-2012, available at* http://horizonpower.com.au/contractors-suppliers/contractors/manuals-and-standards/*under the 'Technical Rules' heading.*

2.1.2 Australian Standards

The following standards are available at http://www.interlekinform.com.

[3]. *AS/NZS 1125: 2001 (Amd 1: 2017), Conductors in insulated electric cables and flexible cords*

[4]. *AS 1580: XXXX, Paints and related materials—Methods of test*

[5]. *AS/NZS 2312.1: 2014 (Amd 1: 2017), Guide to the protection of structural steel against atmospheric corrosion by use of protective coatings – Paint coatings*

[6]. *AS 3100: 2022 (Amd 2:2024), Approval and test specification – General requirements for electrical equipment*

[7]. *AS/NZS 4680: 2025, Hot dip galvanised (zinc) coatings on fabricated ferrous articles*

[8]. *AS/NZS 60137: 2020, Insulated bushings for alternating voltages above 1000 V*

[9]. *AS/NZS 60529: 2025, Degrees of protection provided by enclosures (IP Code)*

[10]. *AS/NZS IEC 60812: 2020, Failure modes and effects analysis (FMEA and FMECA)*

[11]. *AS 62271.1: 2019, High voltage switchgear and controlgear – Common specifications*

[12]. *AS 62271.200: 2019, High Voltage switchgear and controlgear—Part 200: A.C. metal enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

[13]. *AS 62271.301: 2022, High voltage switchgear and control gear – Dimensional standardisation of terminals*

[14]. *SA TS 60815.1: 2020, Selection and dimensioning of high-voltage insulators intended for use in polluted conditions*

2.1.3 International Standards

The following standards are available at http://www.interlekinform.com/.

[15]. *IEC 62271.103: 2021, High voltage switchgear and control gear – Part 103: Switches for rated voltages above 1 kV up to and including 52 kV*

[16]. *IEC 62271.111: 2019, High voltage switchgear and control gear – Part 111: Automatic circuit reclosers for alternating current systems up to and including 38 kV*

2.1.4 Compliance With Standards

Various Standards are referenced in this Specification. The Standards have reference to the year they were published. If over the life of the Tender the Standards change, the Vendor is required to conform to the new edition of the Standard.

Unless otherwise specified herein, the Equipment shall be designed, manufactured and type and routine tested in accordance with the referenced Australian Standards, including all amendments. Where there is no Australian Standard equivalent, International Standards or Codes as defined in this specification shall be used. The specified documents contain provisions that, through reference in the text, constitute requirements of this Specification. At the time of publication of this Specification, the editions indicated were valid. Information on currently valid national and international standards may be obtained from the Australian Standards website – http://www.interlekinform.com/.

2.2 Definitions and Abbreviations

For the purposes of this specification, definitions shall apply as in the relevant Australian Standards (AS 62271.1 [11]) with the addition of a few general definitions listed below in alphabetical order.

***Equipment*:** must collectively refer to various components (tank, control cabinet and control cable) that form the pole load break switch unit

3. *Equipment* Requirements

3.1 General

The *Equipment* specified in this instruction must be suitable for continuous connection, capable of breaking and making load and provide suitable disconnection and isolation of the power system in a distribution network.

The *Equipment* offered that is found on inspection not to conform to this Specification shall be replaced by the Vendor at no cost to Horizon Power.

3.2 Environmental Conditions

The performance of the *Equipment* must meet the requirements set out in Section 4.1 of the *Horizon Power Environmental Conditions [1].*

3.3 Technical Requirements

Horizon Power shall only make use of **22 kV and 33 kV *Equipment*** on its **distribution networks**. Mounted to power poles either:

1) Directly by means of two vertically spaced pole bolts, or
2) Indirectly by means of a supplied bracket and two vertically spaced pole bolts.

The technical performance of the *Equipment* must as a minimum meet IEC 62271.103 [15] . Refer to Schedules A in Appendix B for full requirements.

3.3.1 Electrical Requirements

The *Equipment* must be suitable for operation under the defined operating conditions and must meet the performance requirements as set out in the table below:

Table 1 – Electrical Requirements

Description		22 kV	33 kV
Maximum system voltage (U_m)	kV	24	36
Power frequency withstand ($_{60\ sec.}$)	$kV_{r.m.s.}$	50	70

Description		22 kV	33 kV
Power frequency withstand ($_{60\ sec.}$) across isolation	$kV_{r.m.s.}$	60	80
Lightning impulse withstand	kV_{Peak}	125	170
Lightning impulse withstand ($_{60\ sec.}$) across isolation	kV_{Peak}	145	195
Rated frequency	Hz	50	
Rated current	A	630	630
Breaking capacity	A	630	630
Fault making current	kA_{Peak}	40	40
Rated short-time withstand current	$kA_{r.m.s.}$	25	25
Rated short-time withstand time	s	3	3
Rated control supply AC (@50Hz)	V_{AC}	240	
Rated control supply DC	V_{DC}	12	

3.3.2 Mechanical Requirements

The design and manufacturing process must confirm, that the performance characteristics of the *Equipment* is not affected by changes in the ambient conditions, such as temperature or humidity, and meet forces presented during fault and environmental conditions (see Section 3.2 Environmental Conditions paying particular attention to the wind region category). The Vendor shall submit the detailed design, materials used and manufacturing process of the *Equipment*.

The *Equipment* shall be suitable for use under the following conditions as set out in the table below:

Table 2 – Mechanical Requirements

Description		22 kV	33 kV
Bushing type		Epoxy Resin/Silicon	
Creepage (≥31 mm/kV)	mm	≥744	≥1116
Terminal material		Tinned Copper	

3.4 Load Break Switch Tank

3.4.1 Tank Design

The tank must be made of stainless steel or hot dip galvanised steel to AS/NZS 4680 [7], be robust, metal clad design in accordance with IEC 62271.103 [15]. All exposed internal and external surfaces to be cleaned, prepared and treated with a coating system suitable for severe marine environments corrosion category E-M (very high, marine), in accordance with AS/NZS 2312.1 [5]. It is not expected that the tank will require re-coating during its anticipated lifespan.

The tank must be perfectly sealed as described in clause 5.101 of IEC 62271.111 [[16], with all fittings in place to operate under all operating conditions.

All surfaces will be designed to prevent the accumulation of water. All seams must be electrically welded. Welding in all cases will be continuous. On the external areas of the tank, welding of horizontal and vertical joints must be on both sides of the joint. All metal work must be electrically bonded to the tank. If a part cannot be adequately bonded it will be constructed from a suitable insulating material instead of metal.

The Vendor must state in its Proposal:

- the intended surface protection methods of the tank including base material selection and surface preparation (e.g. galvanising, painting, greasing, etc.),
- the estimated life of the protective coating must also be specified, and
- the details of all tests (accelerated aging, salt spray, fog, impact, etc.) that prove the effectiveness of the proposed protective coating. All testing must be carried out in accordance with AS 1580 [4] or equivalent international standards.

3.4.2 Internal Arc Classification

Where phase conductors or switching components share a common metallic enclosure, in which there is risk of overpressure due to phase to phase internal arcing, the design must be internal fault tested in accordance with AS 62271.200 [12].

Internal fault testing must allow for Accessibility Type C (pole mount gear) as defined by AS 62271.200 [12] Annex A2 and state the minimum admissible installation height with reference to the base of the switch, in accordance with that standard. The tank must satisfy an Internal Arc Classification C for the specified test current and duration.

The prospective three phase test current must be equal to the rated short time withstand current.

3.4.3 Interrupting Medium

The interrupting medium must be vacuum for the *Equipment*. The vacuum bottles must be sealed for life. The tightness of the sealed bottles must meet the requirements of IEC 62271.103 [15].

Vendors must outline the precautions and tests carried out during manufacture to ensure the long-term maintenance of the vacuum and long-term integrity of the vacuum bottles. The Vendor must specify the lifetime performance of these systems and if they have to be replaced within the operating life of the *Equipment*.

Vendors must guarantee the number of switch operations at rated short circuit current before replacement of the vacuum bottle is necessary.

The contacts for the interrupter must be positively driven in both the open and closed directions, and in no way be dependent on the interrupter vacuum.

The level of x-rays emitted must meet requirements of AS 62271.1 [11]. Vendors must state if it is possible for Horizon Power to carry out in-situ tests on the integrity of vacuum in the bottles.

If the switching action of the contactor cannot be completed when activated by a pulse contact of 200 milli-seconds. Vendor must provide a time delayed action to ensure that the started action is completed.

The Vendor must maintain the same make and type of vacuum bottle for all switches of the same rating throughout the Standing Offer period. The make and type of vacuum bottles must not be changed without the prior approval of Horizon Power.

Tenders must state the consequences of loss of vacuum on:

- the voltage withstand capability of an open circuit switch,
- the ability of the *Equipment* to switch load current, and
- the ability of the *Equipment* to switch fault current.

3.4.4 Insulation Medium

The Vendor shall state the insulation medium in their Proposal.

Horizon Power supports minimising the greenhouse gas emissions in all its operations, and encourages Vendors to provide an option that does not use SF_6 gas as an insulation medium.

The SF_6 gas used must comply with the requirements of IEC 62271.103 [15] and AS 62271.200 [12].

Each enclosure containing SF_6 / "SF_6-free medium" must be provided with a minimum pressure switch that directly operates a lockout relay with a flag indicator, allowing the unit to perform one open operation before preventing further operation of the switch and activating the external alarm indication, as well as a non-return valve.

The Vendor must state in Technical Schedule if a gas non-return valve is NOT provided.

3.4.5 Tank Pressure Relief

Pressure relief facilities must be provided to enable the tank unit to withstand safely the effects of excessive pressure rise due to an internal fault. Details of how the pressure relief is achieved shall be proven in the IAC Type test.

3.4.6 Operating Mechanism

This *Equipment* must be suitable for three-phase opening and closing. The switch disconnector shall be capable of mechanical endurance M2 i.e. 10,000 operations in accordance with IEC 62271.103 [15].

Further, the operating mechanism must be capable of:

- Holding the switch in closed position, by toggles or latches until the opening signal is received.
- Performing the related functions such as, indication, control, alarm, and lock- out on low pressure.
- Opening and closing the three phases of the *Equipment* simultaneously.

3.4.7 Manual Operation and Operation Counter

The *Equipment* must make provision for independent manual operation using a manual operating lever. The lever shall operate as per clause 6.8 of AS 62271.1 [11]. It must be possible to operate the lever from ground level using a standard hot line stick as described in IEC 62271.103 [15].

Further the lever must be able to be locked with the switch in the open position as per clause 6.12 of AS 62271.1 [11].

Clear indication must be provided to an operator standing on the ground as to the status of the load break main contacts. This must be by an indicator mechanically linked to the switching mechanism and must be clearly visible to the personnel standing on the ground.

The colours of the indicator must remain vivid for the *Equipment's* working life. Painted symbols are unacceptable.

An operation counter must be provided. It must be readable locally and at remote end. The operating counter must be well protected against moisture ingress. The number of operations must also be readable through the control unit.

3.4.8 Bushings and Primary Terminals

All bushings must comply with AS/NZS 60137 [8] and the operating conditions stated in this technical specification. The bushings must be of a high-quality epoxy resin bushings, or silicon bushing.

Notwithstanding the nominal system's Basic Insulation Level (BIL) at each distribution level (see Section 3.2), the minimum system design level for insulation creepage length is 31 mm/kV as specified in SA TS 60815.1 [14] for Very Heavy pollution areas. A dimensioned drawing of the bushing (and boot if applicable) must be supplied with the tender.

The *Equipment* shall be provided with suitable terminals to connect to the line in concordance with AS 62271.301 [13]. The terminals shall be (tin-plated) copper.

Precautions must be taken to prevent the long-term erosion of the MV bushing gasket by leakage currents. This may be done so by providing a path for leakage currents by the application of conductive paint around the perimeter of the gasket, by a metal shorting strip between the bushing side of the gasket and the tank side of the gasket, or by another approved method.

3.4.9 Covered Conductor Tails

Vendor shall supply the covered cable tails for Horizon Power to make connection to the overhead 3 phase bare conductor.

The covered cable tails shall be 4 metres with one end lugged and the other end for Horizon Power to make off the cable.

3.4.10 Wildlife Covers

The Vendor shall supply boots or wildlife caps to prevent accidental flashover due to wildlife. The Vendor shall provide the design for approval by Horizon Power.

3.4.11 Surge Arrester Bracket

Mounting brackets for surge arresters must be provided on the source side and load side of the *Equipment* unit's tank. Brackets must be attached to the tank adjacent to each MV bushing, to enable mounting of surge arresters. The brackets must have a corrosion-resistant, bare metal connecting zone which has the capability to conduct fault current through the surge arrester.

The brackets must be constructed to accommodate the mounting of polymeric surge arresters, fitted with a M12 (min 14 mm dia. hole) earthing stud with a minimum exposed stud length of 36 mm. The arresters must preferably be mounted onto the bracket directly. Clearances between the *Equipment* tank/metalwork and surge arresters must be such that phase to ground clearances are achieved. The arresters must be mounted parallel to and in the same plane as the associated phase bushing. The surge arrester brackets must be used as the connection point for the arrester earth. Bolts and nuts associated with the support structures must be hot-dip galvanised as per AS/NZS 4680 [7].

3.4.12 Pole Mounting Frame

The tank must be supplied with a steel mounting frame suitable for mounting on a single pole:

1) steel:
    a) 12-sided tapered (current standard)

b) round tapered

c) rectangular cross-section (pole constructed from two rails, universal column, or parallel flange channel)

2) timber

3) concrete

The mounting brackets must have minimum two slotted mounting holes sufficient for M20 bolts in order to mount the *Equipment* to the pole. The spacing between the two bolts must be between 260 and 400 mm.

In addition, the Vendor must detail in its proposal whether appropriate clamping is available for the *Equipment* to secure the unit to a pole without using bolts through the poles. Such clamping should suit poles of circular and rectangular cross- section.

The bracket and tank wall are to be of adequate strength to limit distortion, when mounted. Both the top and bottom bracket must be suitable to carry the total weight of the tank. Adequately rated lifting lugs must be provided and placed such that the *Equipment* can be lifted in a safe manner, (i.e. as a balanced load) using a single hook without damage.

The minimum clearances to the structure must be as indicated on the drawing.

All brackets must be suitable for the environmental conditions stated in Section 3.2 including adequate strength for the wind load in cyclonic areas.

3.4.13 Lifting Facilities

The *Equipment* shall be provided with suitable lifting lugs. Lifting instructions shall be fitted to the outside of the tank showing slinging method and centre of gravity. The label shall be etched on stainless-steel.

3.5 Control Cabinet

3.5.1 Cabinet Design and Construction

The control cabinet must be manufactured from 316-grade stainless steel. The construction must be vandal proof such that it must not be easy to force the door open when it is locked and padlocked.

Cabinets must be protected from dust and water ingress to achieve an IP rating of IP 54 or better as per AS 60529 [9]. Cabinets must be designed and internally treated to prevent moisture condensation. The cabinet must be fitted with an external M12 earthing stud with a nut, lock-nut and a serrated washer for earthing purposes.

All metal components of the control cabinet must be electrically bonded.

3.5.2 Cabinet Door

The cabinet must have a hinged door. The door must be fitted with a robust fastening arrangement which can be locked with a padlock that has a shackle of 9 mm diameter (Lockwood 334 series). Means must be provided to either secure the door in a fully open position (90˚ or more), or to easily remove (without the use of tools) the door completely during maintenance or similar activities.

Good electrical contact must be maintained between the door and the rest of the cabinet at all times (excluding the condition when the door is completely removed).

A document pocket must be provided on the inside of the door for the storage of documentation.

3.5.3 Mounting Bracket

The cabinet must be supplied with a mounting bracket made of stainless steel, or as a minimum, hot-dip galvanised steel in accordance with AS/NZS 4680 [7].

The mounting bracket must be suitable to be installed on Horizon Power's standard steel poles and existing A frame steel poles. The holes must be designed such that it will be possible to slide the cabinet into position without having to remove the pole mounting bolts.

The mounting bracket must have at least two sets of vertically spaced slots in addition to mounting bolt slots for mounting by means of straps.

The control cabinet must be mounted below the switchgear tank and must be easily removable for maintenance purposes.

3.5.4 Internal Construction

The Vendor must ensure that the equipment housed in the control cabinet can withstand the internal heating effect at the higher temperature ranges given in Section 3.2. The Vendor must supply documentation in support of this.

Provision must be made for:

1) a facility to terminate a 240 V_{AC} mains auxiliary power supply (normal operation of the control for the device and the communications media).
2) two surge arrestors (auxiliary power supply and antenna)
3) (in the top of the cabinet) an equipment compartment whereby Horizon Power can mount remote control communication equipment in accordance with the SCADA requirements (Analogue, Digital or CDMA for Next-G). Provision must be included for power supply to the communication equipment.

3.5.4.1 Power Supplies

The main power supply to the control unit must be from an external power source (auxiliary supply), and in addition to this, there must also be a backup battery.

The capacity of the power supply must be rated to power all the electronic modules, operate the Equipment (opening and closing), and power the data communication equipment.

Details of the *Equipment's* control's power consumption must be provided in the tender documentation. The maximum current drain (considering the inputs to be in a "worst case" configuration regarding power consumption) and any inrush current parameters must be stated.

Details of the power requirements for a close operation must be provided in the tender documentation.

3.5.4.2 Main Power Supply Requirements

The output voltage of the external power source must be 240 V_{AC} at a frequency of 50 Hz and meet the requirements of Class II equipment in accordance with AS 3100 [6].

The device must provide a visual indication, on the control panel and in the event log, of the status of the mains supply. A supply fail function must be provided; it must operate an alarm output for the user.

The control unit must be able to withstand loss or restoration of the supply voltage and under voltage conditions.

3.5.4.3 Voltage/Current Excursions

The power supply must include the necessary over-current protection to protect the supply from current excursions.

The use of fuses for over-current protection on the auxiliary input circuit(s) is not acceptable.

Information on the methods used to protect against transient over-current conditions must be provided in the tender documentation.

The power supply must include the necessary surge arresters and/or voltage limiting devices to inhibit damage due to voltage surges. The surge arrestor must be rated to withstand voltage spikes across it due to a short circuit on the Low Voltage (LV) supply. Surge arrestors must have a designed visual indication of failure.

3.5.4.4 Battery Backup Supply

A 12 V_{DC} backup power supply suitable for a minimum period of 48 hours must be provided, in order that the *Equipment* must operate from the battery supply during failure of auxiliary supply for high reliability (this includes communications).

The battery must be rated to operate and provide backup supply for the specified period under the temperature conditions in Section 3.2. The chargeable battery must have a life span of not less than five years at 25°C.

The auxiliary supply shall be able to provide a 12 V_{DC} supply capable of providing continuous 3 A to the Horizon Power supplied communications/radio equipment through suitable spring-loaded terminals.

3.5.4.5 Control Unit Features

The control unit must include the following technical features:

1) Self-diagnostic features
2) LCD with high degree of resolution and legibility, valid for life span of
3) Event logging facilities
4) RS232/ USB ports for remote communication supporting Modbus and DNP3 protocols.

3.5.4.6 Control Functions

The following control features must be provided:

1) Open/Close
2) Local/Off/Remote control

3.5.5 Cable Entry

The cabinet must make provision for bottom entry of the control cables and at least three additional cables (one being the external antenna cable). The cabinet must be pre-punched with at least one 21 mm diameter hole and one 32 mm diameter hole. The holes must be suitably blanked off.

3.6 Control Cable

An ultraviolet resistant cable as per AS/NZS 1125 [3], of minimum length 7 m, must be provided to connect the tank to the control cabinet. It must be adequately screened against electrostatic and electromagnetic interference, which can cause malfunctioning of the control equipment. This cable must connect into both the tank and the control cabinet by means of plug and socket arrangements. Robust, multi-pin, weatherproof connectors must be provided on both ends of the control cable.

It must be possible to disconnect the control cable at the control cabinet while the tank is energised, without causing damage or mal-operation.

3.7 Painting and Galvanising

All painting and galvanising shall conform to AS/NZS 2312.1 [5] and AS/NZS 4680 [7] respectively. The galvanising coating shall be smooth, clean and of uniform thickness, free from defects.

3.8 Earthing

All metal components of the *Equipment* must be electrically bonded. The bonding method must have a current carrying capability equivalent to that of 50 mm^2, stranded, copper conductor.

The tank must be fitted with an external M12 earth stud, complete with a nut, lock nut and serrated washer. It must include a clamping arrangement that can accommodate a 70 mm^2 earth copper conductor.

The control (umbilical) cable must be adequately earthed to shield the control equipment against electrical interference. The cabinet should be suitably shielded so that an externally mounted 4G / Omni / Yagi antenna will not interfere with the normal operation of the *Equipment*. Where minimum distance requirements for the mounting of an antenna apply, these should be stated.

3.9 Rating Plate

Equipment shall be provided with a rating plate incorporating details in accordance with table 2 of IEC 62271.103 [15] and as described in AS 62271.1 [11]. It must be fitted such that it is clear of live parts in a position that is clearly visible. Bushing terminals must be clearly marked on the source and load side. The true rating of each of the component parts must be marked by etching or stamping on the plate. The serial number must also be etched or stamped on this plate. The rating plate must be made of stainless steel and must be permanently fitted by means of rivets or firmly bolted down using stainless steel bolts.

Stick-on, glued-on or painted-on rating plate labels are NOT acceptable.

The following minimum information shall be provided:

1) Manufacturer's name or trademark, type, and identification;
2) Type designation and arrangement;
3) Serial number and year of manufacture;
4) Rated voltage;
5) Rated short-duration power-frequency withstand voltage;
6) Rated lighting impulse withstand voltage;
7) Rated switching impulse withstand voltage;
8) Rated frequency;
9) Rated continuous current;
10) Rated short-time withstand current and duration;

11) Creepage distance (optional);
12) Mass of switchgear and controlgear; and
13) Year of manufacture.

4. Shipping Requirements

The Equipment shall be delivered in open wood crates that it is "fit for use" at any location in Horizon Power's operational area and specifically include all accessories needed. Packaging shall be capable of preventing damage whilst in storage and during transit to remote locations. The Vendor is required to nominate standard pack quantities and standard packs shall be clearly marked with the following information:

1) Manufacturer's name;
2) Manufacturer's part reference number;
3) Batch Number;
4) Horizon Power Order Number;
5) *Equipment* description (voltage rating); and
6) Package weight.

The combined height of the pallet and *Equipment* of a standard pack shall not exceed 1,050 mm.

Each shipment shall be provided with box labels stating the part, stock, and contract number as well as the routine test reports.

5. Storage

The *Equipment, if kept as system spares, will be stored undercover and* shall be capable of being stored without deterioration within the temperature range of -0 °C to +50 °C for no less than 24 months.

6. Reliability

Vendors shall provide information on the reliability of the *Equipment* and the performance of the materials offered over an operational life of 50 years under the specified field of application and conditions of service.

Information provided shall evidence the claimed reliability and performance for the *Equipment* offered, including details on Failure Mode and Effect Analysis, carried out in accordance with AS/NZS IEC 60812 [10]. Failure modes should be described; taking cantilever mechanical failure as an example, the failure may be excessive deflection, or brittle fracture. Electrical failure may be material damage such as puncture, polymer degradation, carbonisation, loss of hydrophobicity, etc.

Vendors may offer their standard *Equipment* but any variation to the foregoing standards must be clearly stated in writing at the time of the proposal. The products offered in the standing offer should be equal to or better in quality and performance than the existing items as listed under this Specification.

7. Safety

Material Safety Data Sheets (MSDS) applicable for each different *Equipment* or chemical ingredient in the *Equipment* which is considered harmful to personnel or environment in any manner, shall be supplied with the Proposal.

8. Environmental Considerations

Vendors are required to provide information on the environmental soundness of the design and the materials used in the manufacture of the items offered. In addition, provide a detailed outline of the steps that have been put in place to fulfil any obligations that may be required pursuant to the *Waste Avoidance and Resource Recovery Act 2007* and any amendments. In particular:

a) Management of waste reduction;

b) The use of re-usable packing; and

c) Extended producer responsibility for the safe disposal of materials at the end of their life.

9. Tests

9.1 Test Requirements

The Vendor shall prior to first delivery, complete the design, type, routine, sample and special tests and inspections as required by the relevant Australian or IEC standard.

The passing of such tests does not prejudice the right of Horizon Power to reject the *Equipment* or fitting if it does not comply with this Specification when installed.

Note: A condition of acceptance on imported products shall be completed to perform landing routine and sample tests completed in Australia on each batch imported. In these cases, each batch must obtain a passed landing test in order that the batch acceptance will be reflected on an acceptance list.

9.2 Test Certificates

At the time of submitting the offer on the tender, single copies of test certificates, in English, shall be provided and shall be clearly marked and contain a reference number. If all the required test certificates are not submitted the tender will be rated incomplete and may not be considered.

Electronic copies of type test certificates shall be arranged in the order set out in this Specification and shall be marked clearly with the identifier and description in the contents Section. Any extra test certificates shall be marked with "extra tests" and kept separate from the required test certificates.

All tests required by the relevant Australian or International standards shall be carried out. Test certificates shall be submitted in electronic format and shall be in Adobe Acrobat (.pdf) format.

9.3 Type Test

The tests are intended to verify the main characteristics and suitability of the design, dimensions, materials, and method of manufacture (technology).

Certified type test results shall be submitted with the Proposal, these type tests shall include those outlined in AS 62271.1 [11] and IEC 62271.103 [15]. The Vendor shall, in their evaluation submission, state which tests the *Equipment* have passed.

Table 3 – Type Tests

Description	Standard
	AS 62271.1 & IEC 62271-103 (Clause/s)
Dielectric tests	-1 (7.2)
Power-frequency voltage tests	-1 (7.2.7.2)
Lightning impulse voltage tests	-1 (7.2.7.3)
Radio interference voltage tests	-1 (7.3)
Measurement of circuit resistance	-1 (7.4)
Continuous current tests	-1 (7.5)
Short-time withstand current and peak withstand current tests	-1 (7.6)
Verification of the degree of protection by enclosure	-1 (7.7)

Description	Standard
Enclosure tightness test at ambient temperature	-1 (7.8)
Pressure test for enclosure	-1 (7.8.4)
Auxiliary Contact	-1 (7.10.2)

9.4 Routine Test

Routine tests are intended to eliminate defective units and shall be carried out during the manufacturing process. Routine tests shall be carried out on every *Equipment* and should not consist of visual examination only, these routine tests shall include those outlined in AS 62271.1 [11] and IEC 62271.103 [15].

The Vendor shall supply duly certified copies of the routine tests performed on the *Equipment* to Horizon Power, either prior to or upon delivery.

Table 4 – Routine Tests

Description	Standard
	AS 62271-1 & IEC 62271-103 (Clause/s)
Dielectric tests	-1 (8.2)
Auxiliary Contact	-1 (8.3)
Measurement of circuit resistance	-1 (8.4)
Tightness test	-1 (8.5)
Design and visual tests	-1 (8.6)
Visual Inspection	“Manufacturer’s Standard”

10. Documentation and Samples

10.1 Documentation to be provided with Proposals

Submitted proposals shall provide all documentation and information as requested in this specification, including any further relevant information on the *Equipment* offered. The proposal must be complete in all respects. Failure to comply may cause the proposal to be considered incomplete and hence informal.

The Vendor shall provide an electronic version of all documents in Adobe Acrobat (.pdf) format containing the information detailed below with their offer:

- Any non-compliance of the Specification shall be detailed in the Technical Deviation schedule;
- All information provided in Technical Requirements shall be in English and measurement units shall be in metric units;
- Material Safety Data Sheets;
- CAD drawings (Micro station preferred DGN format) of all Equipment showing all critical dimensions;
- Equipment data sheets showing the weight, material type, protective coatings, mechanical & electrical properties (Combined Load Charts shall be included);
- Installation instructions included in the packaging; and
- A copy of the Vendor's current Quality Assurance accreditation and category.

Should the preferred Vendor submit drawings for approval by Horizon Power, this will in no way exonerate it from being responsible for the correct and proper function of the *Equipment*.

10.2 Service History

Vendors shall state:

- Other Australian electricity supply authorities who have a service history of the items offered; nd
- Contact details of those supply authorities who can verify the service performance claimed.

10.3 Training Materials

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

Vendors shall state the availability of training materials which could include but is not limited to the following topics:

- Handling and storage;
- Application (particularly in areas of heavy coastal pollution);
- Installation;

- Maintenance;
- Environmental performance;
- Electrical performance;
- Mechanical performance;
- Disposal at the end of service life; and
- Production process and testing.

APPENDIX A. REVISION INFORMATION

(Informative) Horizon Power has endeavoured to provide standards of the highest quality and would appreciate notification of errors or queries.

Each Standard makes use of its own comment sheet which is maintained throughout the life of the standard, which lists all comments made by stakeholders regarding the standard.

A comment sheet found in **DM# 49111643**, can be used to record any errors or queries found in or pertaining to this standard. This comment sheet will be referred to each time the standard is updated.

Date	Rev No.	Notes
22/01/2026	0	Initial Document

APPENDIX B. SCHEDULES A & B ENQUIRY DOCUMENT

B.1. TECHNICAL SCHEDULES

Completion of the listed schedules below by the Vendor shall indicate the product offered is fully compliant with the nominated Clauses in this specification. All information provided shall be in English and measurement units shall be in metric units.

Any deviation from the specification shall be listed on the "Technical Deviation Schedule C", provided in Appendix D with motivation to Horizon Power for consideration and written approval.

B.2. TECHNICAL REQUIREMENTS

Schedule A: Purchaser's specific requirements.

Schedule B: Particulars of *Equipment* to be supplied.

B.2.1. TECHNICAL SCHEDULES A & B FOR 22 KV LOAD BREAK SWITCH

	SPECIFICATION ENQUIRY	**HPC-8DJ-07-0011-2025**
	VENDOR'S NAME	
	DATE	

TECHNICAL SCHEDULES A & B

SCHEDULE A: Horizon Power's specific requirements
SCHEDULE B: Particulars of *Equipment* to be supplied (to be completed by Vendor)

Item	Sub-clause	Description	Schedule A	Schedule B
1.		Manufacturer/ Vendor of Load Break Switch	xxxxxx	
2.		Manufacturer's/ Vendor's catalogue number	xxxxxx	
3.		Manufacturer's/ Vendor's drawing number	xxxxxx	
4.	3.3.1	Electrical Requirements		
4.1		Max. system voltage (U_m) kV	24	
4.2		Power frequency withstand ($_{60\ sec.}$) $kV_{r.m.s.}$	50	
4.3		Power frequency withstand ($_{60\ sec.}$) across isolation $kV_{r.m.s.}$	60	
4.4		Lightning impulse withstand kV_{Peak}	125	
4.5		Lightning impulse withstand ($_{60\ sec.}$) across isolation kV_{Peak}	145	
4.6		System frequency Hz	50	
4.7		Rated current A	630	

Item	Sub-clause	Description		Schedule A	Schedule B
4.8		Breaking capacity	A	630	
4.9		Fault making current	kA_{Peak}	40	
4.10		Rated short time withstand current (I_{th})	$kA_{r.m.s.}$	25	
4.11		Rated short time withstand time	s	3	
5.	3.3.2	Mechanical Requirements			
5.1		Insulator type		/CAER/Silicon	
5.2		Minimum creepage distance	mm	≥744	
5.3		Primary terminals		Tinned Copper	
6.	3.5	Control Cabinet			
6.1		IP Rating		IP54	
6.2		Door lockable		Yes	
6.3		AC Supplies	V_{AC}	240	
6.4		Battery	V_{DC}	12	
6.5		Switch/es “Open / Close” control		Yes	
6.6		Switch “Local / Off / Remote” control		Yes	
6.7		Control Unit		Yes	

B.2.2. TECHNICAL SCHEDULES A & B FOR 33 KV LOAD BREAK SWITCH

	SPECIFICATION ENQUIRY	**HPC-8DJ-07-0011-2025**
	VENDOR'S NAME	
	DATE	

TECHNICAL SCHEDULES A & B

SCHEDULE A: Horizon Power's specific requirements
SCHEDULE B: Particulars of *Equipment* to be supplied (to be completed by Vendor)

Item	Sub-clause	Description	Schedule A	Schedule B
1.		Manufacturer/ Vendor of Load Break Switch	xxxxxx	
2.		Manufacturer's/ Vendor's catalogue number	xxxxxx	
3.		Manufacturer's/ Vendor's drawing number	xxxxxx	
4.	3.3.1	Electrical Requirements		
4.1		Max. system voltage (U_m) kV	36	
4.2		Power frequency withstand (60 sec.) $kV_{r.m.s.}$	70	
4.3		Power frequency withstand (60 sec.) across isolation $kV_{r.m.s.}$	80	
4.4		Lightning impulse withstand kV_{Peak}	170	
4.5		Lightning impulse withstand ($_{60\ sec.}$) across isolation kV_{Peak}	195	
4.6		System frequency Hz	50	
4.7		Rated current A	630	
4.8		Breaking capacity A	630	
4.9		Fault making current kA_{Peak}	40	
4.10		Rated short time withstand current (I_{th}) $kA_{r.m.s.}$	25	
4.11		Rated short time withstand time s	3	
5.	3.3.2	Mechanical Requirements		
5.1		Insulator type	CAER/Silicon	
5.2		Minimum creepage distance mm	≥1116	
5.3		Primary terminals	Tinned Copper	

Item	Sub-clause	Description	Schedule A	Schedule B
6.	3.5	Control Cabinet		
6.1		IP Rating	IP54	
6.2		Door lockable	Yes	
6.3		AC Supplies V_{AC}	240	
6.4		Battery V_{DC}	12	
6.5		Switch/es “Open / Close” control	Yes	
6.6		Switch “Local / Off / Remote” control	Yes	
6.7		Control Unit	Yes	

APPENDIX C. TECHNICAL SCHEDULE C: COMPLIANCE DOCUMENT

The Vendor shall indicate below whether this offer is fully compliant with the nominated clause in this Specification. A YES shall ONLY be indicated if the offer is 100% compliant with the relevant Clause. If NO is indicated and supporting documents are submitted, then mark the ATT box with the attachment number. Details of departure shall be provided in Schedule D Appendix D.

CLAUSE NUMBER		YES	NO	ATT.
3	Requirements			
3.1	General	☐	☐	
3.2	Environmental Conditions	☐	☐	
3.3	Technical Requirements			
3.3.1	*Electrical Requirements*	☐	☐	
3.3.2	*Mechanical Requirements*	☐	☐	
3.4	Load Break Switch Tank	☐		
3.4.1	*Tank Design*	☐	☐	
3.4.2	*Internal Arc Classification*	☐	☐	
3.4.3	*Interrupting Medium*	☐	☐	
3.4.4	*Insulation Medium*	☐	☐	
3.4.5	*Tank Pressure Relief*	☐	☐	
3.4.6	*Operating Mechanism*	☐	☐	
3.4.7	*Manual Operation and Operation Counter*	☐	☐	
3.4.8	*Bushings and Primary Terminals*	☐	☐	
3.4.9	*Covered Conductor Tails*	☐	☐	
3.4.10	*Wildlife Covers*	☐	☐	
3.4.11	*Surge Arrester Bracket*	☐	☐	
3.4.12	*Pole Mounting Frame*	☐	☐	
3.4.13	*Lifting Facilities*	☐	☐	
3.5	Control Cabinet			
3.5.1	*Cabinet Design and Construction*	☐	☐	
3.5.2	*Cabinet Door*	☐	☐	
3.5.3	*Mounting Bracket*	☐	☐	
3.5.4	*Internal Construction*			
3.5.4.1	*Power Supplies*	☐	☐	

CLAUSE NUMBER		YES	NO	ATT.
3.5.4.2	*Main Power Supply Requirements*	☐	☐	
3.5.4.3	*Voltage/Current Excursions*	☐	☐	
3.5.4.4	*Battery Backup Supply*	☐	☐	
3.5.4.5	*Control Unit Features*	☐	☐	
3.5.4.6	*Control Functions*	☐	☐	
3.5.5	*Cable Entry*	☐	☐	
3.6	Control Cable	☐	☐	
3.7	Painting and Galvanising	☐	☐	
3.8	Earthing	☐	☐	
3.9	Rating Plate	☐	☐	
4	Shipping Requirements	☐	☐	
5	Storage	☐	☐	
6	Reliability	☐	☐	
7	Safety	☐	☐	
8	Environmental Considerations	☐	☐	
9	Tests			
9.1	Test Requirements	☐	☐	
9.2	Test Certificates	☐	☐	
9.3	Type Tests	☐	☐	
9.4	Routine Tests	☐	☐	
10	Documentation and Samples			
10.1	Documentation to be provided with Proposals	☐	☐	
10.2	Service History	☐	☐	
10.3	Training Materials	☐	☐	

APPENDIX D. SCHEDULE D: DEPARTURES FROM TECHNICAL SPECIFICATION

The Vendor shall nominate the Clause and describe the departure:

CLAUSE NO.	DEPARTURE