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| Asset Planning and Delivery Group  Engineering |

DESIGN STANDARD DS 26-37

Type Specifications – Electrical

Type Specification for

HV Distribution Switchgear with Kiosk Enclosure

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| version 1  revision 3 |
| June 2022 |

**FOREWORD**

The intent of Design Standards is to specify requirements that assure effective design and delivery of fit for purpose Water Corporation infrastructure assets for best whole-of-life value with least risk to Corporation service standards and safety. Design standards are also intended to promote uniformity of approach by asset designers, drafters and constructors to the design, construction, commissioning and delivery of water infrastructure and to the compatibility of new infrastructure with existing like infrastructure.

Design Standards draw on the asset design, management and field operational experience gained and documented by the Corporation and by the water industry generally over time. They are intended for application by Corporation staff, designers, constructors and land developers to the planning, design, construction and commissioning of Corporation infrastructure including water services provided by land developers for takeover by the Corporation.

Nothing in this Design Standard diminishes the responsibility of designers and constructors for applying the requirements of the Western Australia's Work Health and Safety (General) Regulations 2022 to the delivery of Corporation assets. Information on these statutory requirements may be viewed at the following web site location:

[Overview of Western Australia’s Work Health and Safety (General) Regulations 2022 (dmirs.wa.gov.au)](https://www.dmirs.wa.gov.au/sites/default/files/atoms/files/overview_general_regulations.pdf)

Enquiries relating to the technical content of a Design Standard should be directed to the Senior Principal Engineer - Electrical, Engineering. Future Design Standard changes, if any, will be issued to registered Design Standard users as and when published.

Head of Engineering

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REVISION STATUS

The revision status of this standard is shown section by section below

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Type Specifications – Electrical

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HV Distribution Switchgear with Kiosk Enclosure

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# GENERAL

This Specification covers the requirements for the design, manufacture, assembly, inspection, factory testing, packaging, transport to site, on site assembly, on site mechanical installation, on site testing and commissioning of High Voltage distribution switchgear with a kiosk enclosure all as further detailed herein.

The High Voltage distribution switchgear together with its kiosk enclosure shall constitute a prefabricated substation in accordance with Clause 1.1 of AS 62271.202 and shall be described as such herein.

The specification for the High Voltage distribution switchgear kiosk enclosure is covered by DS 26-42 ‘Type Specification for Kiosk Enclosure for HV Switchgear and/or Transformer’ and forms part of this Specification.

# SITE

The location of and access to the site for the installation of the substation shall be as described in the Annexure.

# OPERATING MODE

The mode under which the substation will be operated shall be as described in the Annexure.

# WORK BY THE PRINCIPAL

The work to be performed by the Principal shall be as detailed in the Annexure.

# INFORMATION FROM THE CONTRACTOR

The Contractor shall provide the following documentation in respect of the substation within the listed number of calendar days after receipt of the Principal’s order.

* + 1. General Arrangement Drawings 28 days
    2. Electrical Wiring and Schematic Drawings 28 days
    3. Manufacturing and Delivery Schedule 14 days
    4. Specification Data Sheets 35 days
    5. Inspection and Test Plan 35 days
    6. Test Certificates On delivery
    7. Operating and Maintenance Manual On delivery

# CONTRACTOR’S DRAWINGS

The Contractor shall submit two A3 copies of the Contractor’s Drawings for approval. The Contractor’s Drawings shall show the general arrangement, circuit diagrams and equipment specifications.

All drawings submitted by the Contractor shall be in accordance with the latest issue of the relevant Australian Standards.

Adequate contrast shall be maintained between drawing detail and background, and the clarity and quality of the drawings shall enable the Principal to microfilm the prints and to reproduce by photographic processes clear and legible A3 copies for record purposes.

The drawings shall provide, in the title block, the number and title of the Contract, as well as details to identify the drawing, its contents, revision status and date of issue.

All drawings shall be prepared using AutoCAD Release 2000 or later software. Drawings shall be prepared on A1 metric size drawing sheets, incorporating the Principal’s border and title block.

# STANDARDS

In particular the prefabricated substation shall comply with the requirements of AS 62271.202 as further detailed in this Specification. Specific reference is made in this Specification to the following Australian and International Standards:

AS 1627.4 Metal finishing - Preparation and pre-treatment of surfaces - Abrasive blast cleaning

AS 2700 Colour standard for general purposes

AS 60529 Degree of protection provided by enclosures for electrical equipment (IP code)

AS 62271.1 High voltage switchgear and controlgear - Common specifications

AS 62271.100 High voltage switchgear and controlgear - Alternating current circuit-breakers

AS 62271.102 High voltage switchgear and controlgear - Alternating current disconnectors and earthing switches

AS 62271.105 High voltage switchgear and controlgear- Alternating current switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV

AS 62271.200 High voltage switchgear and controlgear - AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV AS 62271.202 High voltage switchgear and controlgear - High voltage/low voltage prefabricated substations

AS/NZS 2312 Guide to the protection of iron and steel against exterior atmospheric corrosion

AS/NZS 3000 Electrical installations - (Wiring Rules)

AS/NZS 3750 Paints for steel structures

AS/NZS 60265.1 High voltage switches- Switches for voltages above 1 kV and less than 52 kV

AS 2067 Substations and High Voltage installations exceeding 1 kV AC

AS/NZS ISO 9001 Quality Management Systems – Requirements  
  
IEC 60815 Selection and dimensioning of HV insulators intended for use in polluted conditions

# QUALITY ASSURANCE

The prefabricated substation shall be manufactured under a Quality System certified by an Accredited Authority in accordance with AS/NZS ISO 9001 or an approved equivalent.

# POWER SUPPLY

The electrical supply to the substation shall be 22,000 Volts +/- 10%, 50 Hz, 3 phase, 3 wire.

# AMBIENT CONDITIONS

The substation shall be suitable for both continuous and cyclic full load operation under the following site ambient conditions:

* 1. Ambient temperature range of -5oC to 50oC,
  2. Maximum relative humidity of 90% with periods of heavy condensation.
  3. Pollution level in accordance with IEC 60815 as specified in the Annexure

# HIGH VOLTAGE SWITCHGEAR

## General

The High Voltage Switchgear shall consist of fully enclosed High Voltage Ring Main Unit type of switchgear (RMU), mounted within the kiosk and switching external High Voltage circuit(s) as detailed in the Annexure.

### Standards

The RMU shall be in accordance with the requirements of the following standards:

1. AS 62271.100
2. AS 62271.102
3. AS 62271.200
4. AS/NZS 60265.1
5. AS 62271.1
6. AS 62271.105

### Equipment

The RMU shall consist of:

1. one or two incoming line load break switch(es), as specified in the Annexure, which shall be complete with line side earthing switch(es), the latter being padlockable in both the on and off positions
2. if so specified in the Annexure, either SF6 gas or vacuum circuit breakers switching the supply to outgoing High Voltage circuits
3. a load side isolator on each vacuum circuit breaker
4. a load side earthing switch on each SF6 circuit breaker, interlocked with the circuit breaker and with the earthing switch being padlockable in both the on and off positions
5. an earthing switch on the load side of each vacuum circuit breaker isolator with the earthing switch being interlocked with the isolator and being padlockable in both the on and off positions
6. if so specified in the Annexure, switchfuses switching the supply to outgoing High Voltage circuits each complete with an earthing switch interlocked with the isolating switch and earthing both sides of the fuse, and with the earthing switch being padlockable in both the on and off positions
7. a single SF6 gas filled chamber, complete with a gas pressure indicator, housing the isolating and earthing switch contacts, the circuit breaker(s) and the associated interconnecting bus bar system
8. separate compartments for each incoming and outgoing cable connection compartment

### Voltage and Frequency Ratings

The RMU voltage and frequency ratings shall be as follows:

1. Rated voltage: 24 kV,
2. Rated frequency: 50 Hz,
3. Power frequency withstand voltage: not less than 50 kV,
4. Impulse withstand voltage: not less than 125 kVp,

### Current Ratings

The RMU current ratings shall have current ratings as detailed hereunder.

1. Incoming line isolating switches shall have:

(i) a nominal full load rating of not less than 400 Amps,

(ii) a one second short time current rating of not less than 16 kA,

(iii) a making capacity of not less than 40 kA

1. Earthing switches shall have:

(i) a one second short time current rating of not less than 16 kA,

(ii) a making capacity of not less than 40 kA

1. Circuit breaker(s), if supplied, shall have:

(i) a nominal full load rating of not less than 200 Amps.

(ii) a one second short time current rating of not less than 16 kA,

(iii) a short circuit breaking capacity of 16 kA,

(iv) a making capacity of not less than 40 kA.

1. Switchfuse(s), if supplied shall have:

(i) a nominal full load rating of not less than 200 Amps,

(ii) an off load transformer breaking capacity of not less than 16 Amp,

(iii) a short circuit breaking capacity of 16 kA,

(iv) a making capacity of not less than 40 kA,

(v) a fuse rating as specified in the Annexure (in the range 10 Amps to 100 Amps)

1. Vacuum circuit breaker disconnector(s) shall have:

(i) a one second short time current rating of not less than 16 kA,

(ii) a making capacity of not less than 40 kA.

1. The bus bar system shall have:

(i) a nominal full load rating of not less than 400 Amps,

(ii) a one second short time current rating of not less than 16 kA

1. Incoming HV line cable bushings shall have a one second short time current rating of not less than 16 kA,
2. Outgoing HV cable bushings shall have a short time one second current rating of not less than 5 kA,

### Switchgear Categories

The RMU shall:

1. be metal enclosed switchgear category LSC1 incorporating class PM partitioning, such that separate compartments are provided for incoming cable connections, switchgear and outgoing cable connections, and
2. incorporate a degree of protection of not less than IP3X in accordance with AS 60529 externally and between compartments

### Cable Connections

The RMU cable connections to the RMU shall be suitable for use with dead break elbows and shall be EN50181 standard profile bushings of the following types:

1. Incoming line HV cable connections bushings shall be Type C profile,
2. Outgoing HV cable connections shall be either Type A profile or Type C profile, preferably Type C profile.

### Interlocking

The RMU shall be provided with interlocking so as to prevent:

1. earthing switches being closed unless the associated isolating switch or circuit breaker is open, and
2. access to the cable connection compartments unless the associated earthing switch is closed.

### Protection Equipment

Each RMU circuit breaker shall be provided with fault over current protection by way of an inverse time over current relay and a circuit breaker release both powered by the associated current transformers and not requiring an external power source.

Also, it shall be possible to trip each circuit breaker by the closure of an external pair of contacts, either via a connection to the associated overcurrent relay or via a separate shunt trip release on the circuit breaker, (preferably the former). If a separate shunt trip release is required it shall be suitable for operation from a 24Volt DC supply.

If the circuit breaker is controlling a High Voltage to Low Voltage step down transformer, over load protection for the transformer Low Voltage winding and Low Voltage feeder cable will be provided at the associated Low Voltage switchboard by others.

If transformer Low Voltage neutral over current and earth fault protection is specified in the Annexure as being required, a definite minimum time single phase over current protection relay shall be provided which is suitable for operation from a current transformer having a rated one Amp secondary current.

### Labelling

The RMU shall be labelled appropriately and shall be provided with appropriate operating and maintenance handbooks. All labelling and handbooks shall be in the English language.

## Arcing Fault Protection

1. The RMU cable connection compartments shall be of a design which has been arcing fault type tested at not less than 16 kA for one second in accordance with AS 62271.200 classification IAC AFL, unless specified otherwise in the Annexure. Such type testing shall have been carried out in accordance with AS 62271.200 Annex A.
2. Additional arcing fault protection shall be provided either by successful arcing fault type testing of the HV switchgear within the kiosk, or an arc suppression system installed within the SF6 gas filled switchgear chamber, all as described further hereunder.

(i) If the HV switchgear within the kiosk is being provided as an arcing fault type tested design, an internal arc classification of IAC-A shall be sufficient. The arcing fault type test current shall have been not less than 16 kA for one second.

(ii) If fitted, the arcing suppression system shall consist of a mechanical pressure detector arranged to detect the over pressure caused by an arcing fault and to trip a very quick make short circuit device connected on the line side of the incoming supply isolator, thus providing a solid short circuit, extinguishing the arc and leaving the fault to be cleared quickly by the incoming supply upstream circuit breaker.

The arcing suppressor system shall be insensitive to variations due to changes in atmospheric pressure, changes in ambient temperature, vibrations or external shocks.

The arcing suppressor shall operate in the arcing fault current range 1 kA to 20 kA and shall reduce the generated arcing fault energy by a factor of more than 20 compared to the energy released during an arcing time of one second.

The arcing suppressor system shall be fitted with a normally open auxiliary contact to signal its operation.

# HIGH VOLTAGE CABLING

## Incoming Line HV Cables

The incoming line High Voltage cables will be three single core, 95 mm2 copper conductor XLPE insulated, heavy duty copper screened, PVC sheathed cables rated as follows:

1. Operating Voltage: 22/12.7 kV
2. Power Frequency Withstand Voltage: 30 kV for 15 minutes
3. Impulse Withstand Voltage: 150 kVp
4. Earth Fault Current Rating:  **>** 13 kA for one second

## Incoming Line HV Cable Terminations

The prefabricated substation shall be supplied with fully screened cold applied dead break elbows suitable for terminating the incoming line High Voltage cables onto the RMU bushings specified in clause 11.1.6 above. These dead break elbows shall be rated as follows:

1. Operating Voltage: 22/12.7 kV +10%
2. Power Frequency Withstand Voltage: 42 kV for 15 minutes
3. Impulse Withstand Voltage: 125 kVp
4. Continuous Current Rating: > 400 Amps
5. Earth Fault Current Rating:  **>** 13 kA for one second

## Outgoing Line HV Cables

Outgoing line High Voltage cables will be either three core cables or will be three by single core cables as specified in the Annexure.

Outgoing line High Voltage cables will be XLPE insulated, heavy duty copper screened, PVC sheathed cables having copper conductors as specified in the Annexure and rated as follows:

1. Operating Voltage: 22/12.7 kV
2. Power Frequency Withstand Voltage: 30 kV for 15 minutes
3. Impulse Withstand Voltage: 150 kVp
4. Earth Fault Current Rating:  **>** 13 kA for one second

## Outgoing Line HV Cable Terminations

The prefabricated substation shall be supplied with fully screened cold applied dead break elbows suitable for terminating the outgoing line High Voltage cables onto the RMU bushings specified in clause 11.1.6 above. These dead break elbows shall be rated as follows:

1. Operating Voltage: 22/12.7 kV +10%
2. Power Frequency Withstand Voltage: 42 kV for 15 minutes
3. Impulse Withstand Voltage: 125 kVp
4. Continuous Current Rating: > 200 Amps
5. Earth Fault Current Rating:  **>** 13 kA for one second

# ENCLOSURE REQUIREMENTS

A kiosk enclosure shall be provided by the Contractor as part of the Contract. The kiosk enclosure shall comply with requirements of Type Specification DS26.42

The Contractor shall ensure that the HV switchgear is designed and built so as to meet the requirements of this Specification when operating in that enclosure.

# TESTING

## Testing of Substation

1. Type Tests

Evidence shall be submitted on delivery indicating that all relevant type tests required by AS 62271.202 have been carried out on the substation or on a substation of an identical design.

1. Routine Tests

Prior to delivery, the substation shall undergo routine tests in accordance with AS 62271.202. The Contractor shall supply one copy of the routine test certificate for the substation on delivery.

In addition to the above, evidence shall be submitted on delivery indicating that the HV switchgear provided in a kiosk enclosure passed successfully the routine tests and verifications stated in section 7 ‘Routine Tests’ of AS 62271.202 on the HV switchgear/enclosure arrangement.

## Testing of Switchgear

1. Type Tests

Evidence shall be submitted on delivery indicating that all type tests required by AS 62271.200 have been carried out on the switchgear or on a switchgear of an identical design.

1. Routine Tests at Manufacturer’s Works

Prior to installation into the substation enclosure, the switchgear shall undergo routine tests in accordance with AS 62271.200. The Contractor shall supply one copy of the routine test certificate for the switchgear on delivery of the substation.

1. Special Routine Tests at Manufacturer’s Works

In addition to the standard routine tests specified clause 7.3 of this Specification, the Contractor shall carry out routine tests to verify:

(i) the accuracy of all instrumentation and instrument transformers , and

(ii) the correct operation of the current operated protection devices at the proposed operational settings specified on the Principal’s drawings.

Tests on current operated protection devices shall be carried out by secondary injection and shall test each protective device at not less than six points spread evenly over the complete operating range of the device at the specified device setting. In addition, each protective device shall be tested at one point by primary injection.

## Test Certificates

All test certificates shall describe the tests carried out and the test results obtained.

# INSTALLATION AT SITE

The Contractor shall deliver the HV switchgear with kiosk to the site.

The Contractor shall uncrate and assemble the equipment if necessary.

The Contractor shall place the HV switchgear with kiosk on the prepared surface and shall align it appropriately with the High Voltage and Low Voltage cable pits, if these exist.

# POST INSTALLATION REQUIREMENTS

## Final Inspection

Before final testing and commissioning of the HV switchgear with kiosk takes place, the Contractor shall undertake an inspection to verify that the HV switchgear with kiosk has been installed correctly and is undamaged.

## Final Testing and Commissioning

The Contractor shall carry out the following tests after Final Inspection has been completed:

1. Insulation Resistance Check
2. Protection Setting

Once Final Inspection and Final Testing has been completed, the Contractor shall commission the HV switchgear with kiosk in conjunction with the Principal’s electrical staff.

## As-Constructed Drawing

The Contractor shall provide As-Constructed information on all drawings.

As-Constructed drawings shall be supplied electronically with A3 size hard copies.

## Manuals

The Contractor shall supply three copies of comprehensive instruction manuals, written in English and covering the complete operation and maintenance requirements of all equipment supplied under the Contract. The manuals shall be printed on high grade A4 size paper and shall be bound in a high grade A4 size loose leaf binder.

Information included in the manuals shall include:

1. operating instructions;
2. safety instructions and warnings;
3. maintenance instructions and schedules;
4. recommended spare parts and special tool list;
5. as-constructed drawings;
6. detailed equipment performance specifications and;
7. test reports and test certificates.

**Annexure to Specification**

**for**

**HV Distribution Switchgear with Kiosk Enclosure**

**Project:**

**Site Location:**

**Work to be done by the Principal**:

**Special Service Conditions**:

Pollution Level in accordance with IEC 60815

Earth fault factor

**HV Switchgear:**

**Incoming HV switches**

Number required *(one or two)*

**Outgoing HV circuit breakers**

Number required

**Outgoing HV switchfuses**

Number required

**No. 1 outgoing HV circuit**

Type of Protection *(circuit breaker or switchfuse)*

Rating of CT primary or fuse, Amps

Transformer LV earth fault protection (required or not)

**No. 2 outgoing HV circuit**

Type of Protection *(circuit breaker or switchfuse)*

Rating of CT primary or fuse, Amps

Transformer LV earth fault protection (required or not)

**No. 3 outgoing H.V. circuit**

Type of Protection *(circuit breaker or switchfuse)*

Rating of CT primary or fuse, Amps

Transformer L.V. earth fault protection (required or not)

**Outgoing High Voltage Cables**

No. 1 outgoing HV Cable Conductor Size ………………………………………. mm2

No. 1 outgoing HV. Cable single core or three core……………………………………

No. 2 outgoing HV Cable Conductor Size ………………………………………. mm2

No. 2 outgoing HV Cable single core or three core…………………………………….

No. 3 outgoing HV Cable Conductor Size ……………………………………….. mm2

No. 3 outgoing HV Cable single core or three core…………………………………….

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Specification for H.V. Distribution Switchgear with Kiosk Enclosure Tender Response Schedule** | | | | | |
| **Clause No.** |  |  | **Yes** | **No** |  |
| **1.** | **General** |  |  |  |  |
| **2.** | **Site** |  |  |  |  |
| **3.** | **Operating Mode** |  |  |  |  |
| **4.** | **Work by Principal** |  |  |  |  |
| **5.** | **Information from Contractor** |  |  |  |  |
| **6.** | **Contractor’s Drawings** |  |  |  |  |
| **7.** | **Standards** |  |  |  |  |
| **8.** | **Quality Assurance** |  |  |  |  |
| **9.** | **Power Supply** |  |  |  |  |
| **10.** | **Ambient Conditions** |  |  |  |  |
| **11.** | **High Voltage Switchgear** |  |  |  |  |
| 11.1 | General |  |  |  |  |
| 11.1.1 | Standards |  |  |  |  |
| 11.1.2 | Equipment |  |  |  | Vacuum or SF6 circuit breakers? |
| 11.1.3 | Voltage and Frequency Ratings |  |  |  |  |
| 11.1.4 | Current Ratings |  |  |  |  |
|  | (a) Incoming line isolating switches |  |  |  |  |
|  | (b) Earthing switches |  |  |  |  |
|  | (c) Circuit breakers |  |  |  |  |
|  | (d) Switchfuses |  |  |  |  |
|  | (e) Vacuum C.B. disconnectors |  |  |  |  |
|  | (f) Busbar system |  |  |  |  |
|  | (g) Incoming line cable bushings |  |  |  |  |
|  | (h) Outgoing line cable bushings |  |  |  |  |
| 11.1.5 | Switchgear Categories |  |  |  |  |
|  | (a) Loss of service category |  |  |  |  |
|  | Partitioning class |  |  |  |  |
|  | (b) Degree of protection |  |  |  |  |
| 11.1.6 | Cable Connections |  |  |  |  |
|  | (a) Incoming line connections |  |  |  |  |
|  | (b) Outgoing line connections |  |  |  |  |
| 11.1.7 | Interlocking |  |  |  |  |
|  | (a) Earthing switches |  |  |  |  |
|  | (b) Cable connections |  |  |  |  |
| 11.1.8 | Protection Equipment |  |  |  | Separate shunt trip release required for trip by external contacts? Yes/No |
| 11.1.9 | Labelling |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Specification for H.V. Distribution Switchgear with Kiosk Enclosure Tender Response Schedule** | | | | | |
| **Clause No.** |  |  | **Yes** | **No** |  |
| **11.2** | **Arcing Fault Protection** |  |  |  |  |
|  | (a) RMU connections IAC |  |  |  |  |
|  | (b) Additional protection |  |  |  |  |
|  | (i) by substation IAC, or |  |  |  | Substation IAC classification = |
|  | (ii) by RMU arc suppression |  |  |  |  |
| **12.** | **High Voltage Cabling** |  |  |  |  |
| **12.1** | **Incoming Line Cable** |  |  |  |  |
|  | (a) Operating voltage |  |  |  |  |
|  | (b) 50 Hz withstand voltage |  |  |  |  |
|  | (c) Impulse withstand voltage |  |  |  |  |
|  | (d) Earth fault current |  |  |  |  |
| **12.2** | **Incoming Line Cable Terminations** |  |  |  |  |
|  | (a) Operating voltage |  |  |  |  |
|  | (b) 50 Hz withstand voltage |  |  |  |  |
|  | (c) Impulse withstand voltage |  |  |  |  |
|  | (d) Continuous current |  |  |  |  |
|  | (e) Earth fault current |  |  |  |  |
| **12.3** | **Outgoing Line Cable** |  |  |  |  |
|  | (a) Operating voltage |  |  |  |  |
|  | (b) 50 Hz withstand voltage |  |  |  |  |
|  | (c) Impulse withstand voltage |  |  |  |  |
|  | (d) Earth fault current |  |  |  |  |
| **12.4** | **Outgoing Line Cable Terminations** |  |  |  |  |
|  | (a) Operating voltage |  |  |  |  |
|  | (b) 50 Hz withstand voltage |  |  |  |  |
|  | (c) Impulse withstand voltage |  |  |  |  |
|  | (d) Continuous current |  |  |  |  |
|  | (e) Earth fault current |  |  |  |  |
| **13.** | **Enclosure Requirements** |  |  |  |  |
| **14.** | **Testing** |  |  |  |  |
| **14.1** | **Testing of Substation** |  |  |  |  |
|  | (a) Type tests |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Specification for H.V. Distribution Switchgear with Kiosk Enclosure Tender Response Schedule** | | | | | |
| **Clause No.** |  |  | **Yes** | **No** |  |
| **14.2** | **Testing of Switchgear** |  |  |  |  |
|  | (a) Type tests |  |  |  |  |
|  | (b) Routine tests |  |  |  |  |
|  | (c) Special tests at Manufacturer’s works |  |  |  |  |
| **14.3** | **Test Certificates** |  |  |  |  |
| **15.** | **Installation at Site** |  |  |  |  |
| **16.** | **Post Installation Requirements** |  |  |  |  |
| **16.1** | **Final Inspection** |  |  |  |  |
| **16.2** | **Final Inspection and Commissioning** |  |  |  |  |
| **16.3** | **As Constructed Drawings** |  |  |  |  |
| **16.4** | **Manuals** |  |  |  |  |
|  | **Other Required Information** |  |  |  |  |
|  | Enclosure height |  |  |  | Enclosure height m = |
|  | Enclosure width |  |  |  | Enclosure width m = |
|  | Enclosure depth |  |  |  | Enclosure depth m = |
|  | Enclosure weight without base |  |  |  | Enclosure weight without base kg = |
|  | Switchgear weight |  |  |  | Switchgear weight kg = |
|  | Substation complete overall weight |  |  |  | Substation complete overall weight kg = |
|  | Substation general arrangement |  |  |  | ***To be attached*** |

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