

Equipment Technical Specification

Padmount substation cubicles

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Substation Design Instruction

ASSET STANDARDS & DESIGN

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ETS 0077 Padmount substation cubicle

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1.0 PURPOSE

To define the technical requirements for selection and application of distribution substation padmount cubicles.

2.0 SCOPE

This Specification covers the design, engineering, manufacture, testing, supply and delivery of 11kV and 22kV padmount cubicles suitable to house distribution equipment and transformers with ratings up to and including 1500kVA. It is not the intention to specify all design, manufacturing and constructional details, however, the equipment supplied must meet the highest standards of design, engineering and manufacturing practices.

All supplied cubicles and associated equipment must be manufactured and tested to the standards with the year of publication listed in section 3.0 below. In some circumstances based on local network conditions and experience, this specification is more stringent or is inclusive of requirement not covered in Australian and International Standards; in this circumstance the requirements of this specification must take precedence.

MCI 0006 – Underground distribution construction standards manual and MDI 0028 – Underground distribution network design manual set-out the design and on-site and constructional requirements for the padmount substation, such as installation and easement requirements.

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. Any proposed variations from this specification must be referred to Substation Assets Manager for approval prior to acceptance.

3.0 REFERENCES

External

Company Policy (Network) 9.2.5 – Network Asset Design
Company Policy (Network) 9.7.1 – Network Asset Construction
Company Policy (Network) 9.8.3 – Network Operations
Company Policy (Network) 9.9.1 – Network Asset Maintenance
Branch Procedure (Asset Standard and Design) PAE 1004 – Product approval process
Branch Form (Asset Standard and Design) FAE 3014 – Padmount substation cubicle product approval form
Earthing Design Instruction EDI 100 – Distribution earthing design, construction and test
Equipment Technical Specification ETS 0068 – Distribution indoor and padmount substation 12-24kV switchgear
Equipment Technical Specification ETS 0069 – Distribution indoor and padmount substation low voltage switchgear
Equipment Technical Specification ETS 0070 – 11kV and 22kV padmount and indoor distribution transformers
Equipment Technical Specification ETS 0072 – Padmount substation plinth and culvert
Mains Construction Instruction MCI 0006 – Underground distribution: Construction standards manual
Mains Design Instruction MDI 0028 – Underground distribution network design manual
Company Network Management Plan December - 2013 Review

Internal

Work Health and Safety Act 2011 (NSW)
Work Health and Safety Regulation 2011

ENA National Electricity Network Safety Code (Doc. 01-2008)
 Australian Standards AS ISO 1000:1998 - The international system of units (SI) and its application
 AS 1580:2004 - Paints and related materials - Methods of test
 AS 1627:1997 - Metal finishing - Preparation and Pre-treatment of Surfaces
 AS 2067:2016 - Substations and high voltage installations exceeding 1kV ac
 AS 2700:2011 - Colour standards for general purposes
 AS/NZS 3000:2007 Electrical Installations
 AS/NZS 2312:2014 - Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings – Paint coatings
 AS/NZS 3750.6:2009 - Paints for steel structures Part 6: Full gloss polyurethane (two- pack)
 AS/NZS 4673:2001 - Cold-formed stainless steel structures
 AS/NZS 4680:2006 - Hot Dipped Galvanised (zinc) Coatings on fabricated ferrous articles
 AS/NZS 60076.10:2009 - Power transformers Part 10: Determination of sound levels
 AS 60529:2004 - Degrees of protection provided by enclosures (IP Code)
 AS62271.1:2012 - High voltage switchgear and controlgear-Common specifications
 AS 62271.202—2008 High-voltage switchgear and controlgear Part 202: High-voltage/low-voltage prefabricated substation

4.0 DEFINITIONS AND ABBREVIATIONS

AC	alternating current
company	Endeavour Energy
distribution network	The collection of assets (distribution lines, cables, substations and associated equipment) whose purpose is to distribute power from a zone substation to distribution substations, which feed the LV network
Drawings	Drawings must also include any drawings referenced to by that drawing or any drawing referenced to by a referenced drawing
ELLIPSE	The company's asset database
FRL	Fire resistance level - the grading period in minutes. The three (3) figures represent structural adequacy/integrity/insulation.
HV	High voltage
LV	Low voltage
MCI	Mains Construction Instruction
MSDS	Material Safety Data Sheet
NATA	National Association of Testing Authorities
RMU	Ring main unit
padmount substation	An electrical substation housed in an outdoor enclosure that is designed to prevent the ingress of moisture from rain and storms but is subject to water rise at ground level and high levels of humidity. The enclosure can be made from fibreglass or stainless steel.
SDI	Substation Design Instruction
SMI	Substation Maintenance Instruction

5.0 ACTIONS

5.1 Service conditions

5.1.1 General

Distribution padmount cubicles are used throughout the company's network to manage the protection of transformers and switching from vandalism and the elements to maintain a reliable network.

Generally fibreglass cubicles are used for residential areas, secure industrial commercial areas and where there may be issues with touch potentials from HV earth faults. Stainless steel cubicles are used where there is a possible fire risk to or from adjoining buildings and structures or there is an increased risk of vandalism.

The padmount cubicles supplied must conform to all the current requirements of the relevant Australian and IEC Standards and this specification.

The equipment supplied must meet the highest standards of engineering, design and manufacturing practices.

The supplier must provide everything necessary, including any special tools, usually supplied for the safe operation of the equipment, whether directly specified or not.

The design and construction must be in accordance with the technical requirements stated.

All ferrous parts of the cubicle must be treated to provide acceptable surface finish and protection. The manufacturer must provide full details of the surface finish provided on the cubicle parts. Where required, equipment may need extra treatment to minimise corrosion on all metal components, particularly those in contact with the plinth.

All materials must be of a type and quality that will give a normal life expectancy of 45 years without deterioration. All equipment must be enclosed to the extent that there is no safety hazard to operating employee. The equipment must provide full shrouding to prevent accidental shorts by human error, flying objects or by rodents.

The manufacturer must provide details of the recommended maintenance procedures for the equipment.

Note: All values submitted to tender and in Product Approval Forms must be guaranteed values and will be treated as such in the evaluation, and when assessing whether the delivered equipment meets the specification.

5.1.2 Service conditions

The equipment must be designed for operation in the ambient temperature range of –10 deg. C to 45 deg. C. The air temperature inside the cubicle may reach 110 deg C due to transformer losses, the effects of solar radiation and additional heat from the switchgear. The padmount substation can be potentially subjected to a dusty, moist and coastal environment. All ratings and equipment must be suitable for this environment.

Table 1 - Service conditions

Description	Criteria
Normal service condition	Outdoor to AS62271.1
Altitude	<1000m *
Maximum ambient temperature	45 deg. C
Minimum ambient temperature	-10 deg. C
Average index of mean relative humidity: 9:00am	95%
Seismic acceleration coefficient (maximum)	0.09
Pollution level	Level IV in accordance with AS4436

Note * - Max altitude is 1200m in a small portion of the network which will be evaluated in accordance with the conditions in AS62271.1

5.2 Health, safety and environment (HSE) requirements

5.2.1 Special environmental requirements - toxicology safety

The supplier must provide with any offer, full details, including composition and toxicological information, regarding the health and safety aspects of all the materials offered in their offer or supplied equipment regardless of content.

Recommended procedures must be provided for the safe handling, safe operation and maintenance of products supplied. The means of disposal of the materials must be clearly stated. Material safety data sheets (MSDS) must be provided for materials that are supplied and subject to safety considerations in handling and use.

All equipment, packaging and all other accessories provided must be asbestos free.

The above information is required as part of the offer and will be reviewed as part of any tender process.

5.2.2 Noise levels and radio interference voltage (RIV)

Although the padmount cubicle itself is not expected to emit any noise it will be housing equipment that can or it can be affected by environmental conditions such as wind and rain. The cubicle must be constructed to prevent or minimise the effects of any noise being transmitted under these conditions. It is necessary that noise levels comply with AS1055.2 Level R1.

5.2.3 Fire and blast hazards

The cubicle will house equipment that may produce high temperatures during fault venting. The cubicle and its components must be designed in a manner to reduce the risk of subsequent fire risk.

5.3 Technical requirements

Table 2 - Technical requirements

Description	All cubicles
Applicable standards	AS62271.202 in part
Applicable fabrication drawings	Refer to clause 5.9
Material (complete main body of cubicle)	Fibreglass reinforced polyester resin or 2.0mm thick 304 stainless steel
Mass	
• Total (Fibreglass)	≤ 200kg*
• Total (Stainless steel)	≤ 450kg*
• Any lift off door	≤ 20kg
Maximum deflection of doors and panels	5mm
Water and wire proofing rating to HV & LV (min)	IP34D
Doors	Lift off (for hinged doors - at min 30 deg. opening)
Hardware such as locks and hinges	Fire resistant, stainless steel, brass (not plastic or aluminium)
Colour (external)	Avocado green (colour G34)
Metal cubicle earthing (all doors and sections)	70mm ² copper cable

* Cubicles with a higher mass may be considered if it is evaluated as a cost efficient offer.

5.4 Construction requirements

5.4.1 Cubicle common requirements

5.4.1.1 Sizes

Cubicle sizes have varied over the years but the following are the standard sizes of cubicles currently still being used:

Size 5 – Old design for 0-500kVA

Size 5 Sw/Stn – Old switching station for 11kV switchgear

Size 10 – Old design for 750-1000kVA

Size 14 – New design for 0-500kVA

Size 16 – New design for greater than 500kVA up to 1500kVA

Size 16 Sw/Stn – New switching station for 11kV and 22kV switchgear.

All internal dimensions shown in the table below are approximate only and do not include door latch mechanisms, stays, hinges and the like that may protrude into the area at different locations. These dimensions are only given to assist in switchgear dimensioning, refer to the drawings in the drawing section for actual manufacturing dimensions.

Table 3 – Cubicle dimensions (All internal dimensions are approximate)

Cubicle descr.	Height		Width		Length				
	Ext.	Int.	Ext.	Int.	Total	HV end		LV end	
						Ext.	Int.	Ext.	Int.
Size 5	1520	1500	1070	960	2810	650	600	900	850
Size 5 Sw/Stn	1520	1500	1070	960	904	650	550	-	-
Size 10	1850	1800	1220	1120	2900	685	630	840	790
Size 14	1450	1415	1320	1220	3140	900	850	770	720
Size 16	1600	1550	1320	1220	3140	900	850	770	720
Size16 Sw/Stn	1600	1550	1320	1220	904	900	800	-	-

Note: Depending on construction and internal equipment fit the overall dimensions of the cubicle may be modified if approved by the Substation Assets Manager but all interface measurements to other sections, transformer and the plinth must remain exactly as shown on the drawings.

5.4.1.2 Materials

The cubicle can be constructed of either fibreglass reinforced polyester resin or 2.0mm thick 304 stainless steel. The total weight of the cubicle must not exceed that specified in Table 2 and any lift off door must not exceed 20kg. Resistance to corrosion and vandalism are the other main considerations.

Other materials will be considered upon application to Asset Standards & Design. A detailed MSDS will be provided for all materials used in manufacturing a cubicle, refer to clause 5.2.

5.4.1.3 Moulds and patterns

For fibreglass cubicles, to guarantee that a consistent product is created, patterns must be made to allow moulds to be created. From these moulds the sections and doors must be manufactured. If the mould/pattern manufacturing technique is not used (vacuum formed parts etc) then similar items must be constructed. All patterns, moulds, vacuum templates and the like must be at the tenderers expense.

5.4.1.4 Durability

The cubicle must be constructed in three (3) separate sections and in accordance with the requirements of Drawing no. 264887. The cubicles will be installed in public places without further mechanical protection and therefore, a robust construction is required. Cubicle and door panels are to be suitably reinforced to limit maximum deflection to less than 5mm.

5.4.1.5 Water- and wire-proofing of interfaces

The cubicle requires a minimum rating of IP34D. Intrusion of all components from outside the cubicle must be kept to a minimum. Interfaces with the transformer end flanges are critical for safety, to prevent wire or other materials being inserted into the cubicle end compartments from the middle vented section. Interfaces between doors and end panels are also safety critical for the same reasons.

The cubicle **must** be designed **so** that all doors and joins channel water away. Particular care is required on the joins between cubicle sections **so** that water cannot drip onto equipment located inside the cubicle.

The above mentioned details are not necessarily shown in Drawing no. 264887; however the detail is provided in associated drawings to achieve the wire-proofing and water-proofing.

5.4.1.6 Ventilation

The cubicle will require ventilation to be installed in the centre section, as shown in Drawing no. 264887. In the centre section, each vent **must** be a minimum size of 0.35m². Two (2) vents on the top and one (1) on the bottom of either side is the minimum. Natural ventilation to the LV end is also desirable and will be considered on submission of drawings.

5.4.1.7 Doors

The cubicle **must** be fitted with flush type doors, each having a flush, non-through grip handle. The handle is to enable the security of the door to be checked. To prevent rattle, fibreglass doors **must** be cast with a slight bow so that they have to be pushed during locking. Metal doors **must** be fitted with rubber edging or stops to enable the locking device to holding the door firmly against the pull of the door.

Doors may be either lift-off or hinged, however, hinged doors **must** not inhibit access to the cubicle. Hinged doors **must** be 180 degree opening and able to be lifted off **after opening a min of 30 deg**. Hinged doors **must** be fitted with door stays. The size of the door is critical as they need to open in a limited space. Easement size is 5.5m x 2.75m. Doors are to be constructed so that they cannot be easily forced or sprung open.

End doors manufactured from metal **must** be made as two (2) doors on each end with three (3) point locking, top bottom and centre, operated from the one (1) handle.

5.4.1.8 Door hinges

All door hinges are to be stainless steel or brass/bronze to prevent melting in a fire situation. Aluminium or plastic hinges are not allowed.

5.4.1.9 Door locks

The end doors **must** be provided with fittings to accept Lockwood 6-pin lock cylinders. A Lockwood 100 back set case, or suitable equivalent **must** be provided. Only one (1) type of back set **must** be supplied on all cubicles and **must** be fitted by the supplier. The back set cases are modified for the company's application. The thumb turns are to be removed and the mechanism made to drive the bolt directly. The bolt **must** be a dead bolt.

The side doors (**excluding size 5 LV end**) do not require the above locking facilities if they can be opened from the end door with the equipment in position and alive.

The supplier **must** submit details fully illustrating the arrangement of the **side** door latching design. These **must** illustrate the design in sufficient detail to enable a judgement to be made on:

- The strength of the latches against vandalism.
- The ability of the latches to be operated many times without defects.
- The ease, with which the door can be fitted, locked, unlocked and removed.
- The materials to determine if rust and corrosion will be a problem.

5.4.1.10 Cubicle surface finish

Fibreglass cubicles must be painted using either polyurethane or 100% acrylic water borne paint. The minimum paint thickness must be 37 micrometres (polyurethane) or 50 micrometres (acrylic). The supplier must provide details of the equipment and procedure proposed to be used in painting and touching up of fibreglass cubicles.

The manufacturer must nominate the type of external and internal paint finish that is proposed for metallic cubicles.

The external surfaces of all cubicles must have a finish colour of Avocado Green (colour G34) or Light Olive Green (colour G25) to AS 2700S:1996. The internal surfaces of all types of cubicles must also be painted.

For fibreglass cubicles the internal surface must be flow coated with 100% water borne acrylic satin paint. A PVA mould release agent must be used so that paint may be applied to the exterior surface. The internal surfaces must be white.

The internal surface of the fibreglass cubicle must be treated to prevent fibreglass piercing the skin or flaking.

5.4.1.11 Labelling

All cubicle doors must be fitted with danger high voltage signs and substation numbering. The substation numbering must consist of 50mm high black numbers on white background and must be reflective. The danger high voltage sign must be 110mm x 72mm. Where this labelling varies from that currently used by the company, approval will be required.

5.4.1.12 Cubicle serial numbers

Each cubicle must be fitted with a nameplate fastened to the inside in an accessible position. The nameplate must be engraved with the manufacturer's name, serial number and date of manufacture and cubicle size ie. Size 16 etc.

5.4.1.13 Removable keyway

The HV cubicle end section must be fitted with a removable keyway to assist in the installation of power cables. The keyway must provide a clear opening as shown in the cubicle detail drawings, must be not less than 800mm, and must be installed in the centre of the cubicle.

5.4.2 Metallic cubicle

Metallic cubicles will not be permitted in separately earthed areas due to the possibility of undesirable touch potentials (refer to clause 5.5 for special requirements).

Metallic cubicles must be fitted with stainless steel or electrolytically compatible, corrosive resistant fittings.

5.4.3 Fibreglass cubicle - construction detail

The cubicle walls must have a minimum laminate of 1.80 kilograms of glass for each sq.m, and the doors and roof a minimum of 2.40 kg/m². The minimum weight of resin/glass must be 6.75 kg/m² for hand lay up for the walls, and 9.0 kg/m² for the doors and roof (no minus tolerance), excluding any reinforcing ribs and any fittings, such as latches and vents. The use of low-density polyurethane foam may vary these requirements.

The minimum thickness of fibreglass, including gelcoat thickness, on any part of the cubicle and doors must be 3.6mm and 5.2mm respectively (no minus tolerance allowable).

Returns, such as gutters and corners, must be formed from 225gm for each sq.m split strand glass.

The gelcoat must be applied by the spray gun method to a thickness of not less than 400 micrometres. It must be allowed to cure for a minimum of three (3) hours and a maximum of 24 hours before laminating. A minimum of 40 barcol hardness is to be obtained after 14 days. The gelcoat must be of a premium grade, orthallac or isothallac type. The resin must be general purpose polyester. The resin/glass ratio must be 2.75 to 3.0 maximum of resin to 1.0.

The laminate must consist of polyester resin and chopped straw mat glass reinforcement without fillers or additives, other than necessary to meet the given requirements. Chopped strand mat glass must be used.

The above are minimum standards and, depending on the supplier's plant and techniques, it may be necessary for materials to be applied in excess of the stated minimums in order to meet the requirements. The standard does not specify the need for strengthening of the cubicle. Variation of this method must be considered on application.

All metal inserts must be suitably fastened to the cubicle. Any metalwork exposed externally and which can contact equipment housed inside the enclosure must be suitably insulated from such equipment. All ferrous metal inserts must be hot dipped galvanised.

The component must remain in the mould until it has attained a sufficient degree of cure to resist distortion after removal. No trimming will be carried out until the cubicle has attained a sufficient degree of cure to resist delamination at the edge of the laminate.

5.5 Earthing

Padmount substation earth grids can be either common or separate earthing. Provision needs to be made in the cubicle design for either of these arrangements.

5.5.1 Common earthing

Where metallic cubicles are to be used, the following requirements are also to be met:

- All doors and adjacent door jambs to have an earth stud fitted and earth braid of sufficient length to allow doors to be removed and placed against the outside of the cubicle.
- All bolted sections of the cubicle are to be electrically connected to each other using earth braids or equivalent.
- Earth braids to be a minimum size equivalent to 70mm² copper cable.
- A separate M12 earth stud is to be provided at each end of the cubicle near ground level for connection of the earth grid.

5.5.2 Separate earthing

Fibreglass cubicles and concrete bases are to be used. Metallic cubicles or plinths are not permitted in separately earthed areas.

Refer to EDI 100 for full details of distribution substation earthing.

5.6 Installation details

The cubicle will be fixed to the substation plinth by M10 bolts through the holes supplied as detailed in the construction drawings.

Each cubicle and section of a cubicle must be self-supporting and suitable for lifting without distortion.

Metal cubicles must be fitted with removable lifting eyes. Lifting eye holes must be sealed.

5.7 Tests

5.7.1 General

The following clauses detail the testing requirements for the cubicles. The tests must confirm the ability of the cubicle to meet the technical requirements as laid down in clause 5.3.

The manufacturer **must** provide two copies of certified test reports for type, routine and special tests.

At any time during the supply of the equipment, the Manager Asset Standards & Design may consider it necessary to confirm performance of the cubicle by conducting any tests.

These tests will initially be carried out at the company's expense, however, where it can be demonstrated that the equipment does not meet with the approved test results, the tests **must** be repeated in the presence of an the company representative.

This and subsequent tests will be at the manufacturer's expense.

Depending on the extent of these non-conformances, the company may remove or rectify equipment already in service. In these cases, all costs will be at the manufacturer's expense.

5.7.2 Accreditation and acceptability of testing authorities

All tests **must** be carried out by a testing authority holding appropriate accreditation:

- by NATA Australia; or,
- by an accreditation authority recognised by NATA Australia.

Tests from other testing authorities, such as KEMA, may be accepted at the discretion of Substation Assets Manager.

However, routine tests carried out at the manufacturer's testing facilities may be accepted provided the facilities are pre-qualified by the Manager Asset Standards & Design to perform the tests.

The Manager Asset Standards & Design may accept test results of previously conducted type tests, provided the offered cubicle is exactly the same as the type tested cubicle, and type tested cubicle is in accordance with this specification.

Where the offered cubicle has not been successfully type tested, or the test results do not meet the technical requirements of this specification, fresh type tests must be conducted at the manufacturer's expense.

Two (2) copies of type test reports must be submitted for the Manager Asset Standards & Design's approval.

Test reports must not be more than five (5) years old from the closing date of the tender.

Test records (on identical equipment) in the form of validated copies of test certificates must be submitted for approval/information.

Copies of the test reports must be provided to the company. Reports written in any language other than English must not be accepted by the company unless such reports are translated into the English language by a sworn translator.

The company reserves the right to witness type tests for which a minimum of four (4) weeks notice must be given.

5.7.3 Type tests

The cubicle **must** be of a type-tested design in accordance with the requirements as listed below.

The following type tests are required on the complete assembled unit:

Table 4 - Type tests – all equipment

Type test	Test method	Acceptance criteria
Tests for protection against solid foreign objects and water	AS 60529, clause 13 + 14	IP34D
Mechanical test	-	The assembled cubicle panels and doors must be designed using stringers and additional reinforcement so that the application of 900 Newton (92kg) force over any 120mm square of the cubicle causes a deflection of not more than 5mm. The transformer is not to support the cubicle during the mechanical test
Mechanical impact test	AS 60529 clause 6.7.3	The degree of protection of the enclosure must be maintained. Operation of control means, handles, etc. must not be impaired. Deterioration of the enclosure or deformations must neither impair the further use of the equipment or decrease its dielectric withstand (or clearance or creepage distances) according to the specified values. Superficial deterioration, for example, removal of paint and small depressions are admissible.
Thickness test (fibreglass cubicle)	-	A cubicle must be weighed, thickness checked and tested for glass content. The manufacturer must estimate and agree to a minimum total weight for each component of the assembled cubicle. For the purpose of testing overall thickness, the gel coat thickness must be assumed to be 400 micrometres. The total weight must not exceed the value given in clause 5.3.
Thickness test (Stainless steel cubicle)	-	The total cubicle, individual doors, end sections and transformer section must be weighed and documented. The thickness of the main sheet components (doors, panels) must be listed. The total weight must not exceed the value given in clause 5.3.

5.7.4 Routine tests and inspections

The routine test must be conducted on each unit prior to delivery.

Table 5 - Routine tests – all equipment

Routine test	Test method	Acceptance criteria
Intrusion test	-	It must not be possible to lever the door to allow intrusion of wire or foreign materials into the cubicle
Vandalism test	-	The cubicle must be suitably resistant to vandalism. It must not be easy to damage any fittings
Weather	-	Water does not drip inside the HV and LV ends from joins or door returns during severe storms
Door fit	-	Doors open/close and lock easily
Door interchangeability	-	Doors of same size fit all openings of same size
Locks (key and spring pull type)	-	Door stops adjusted so doors lock tight without movement
Earthing	-	All sections and doors are fitted with 70mm ² earth bonds

5.8 Product approval

5.8.1 Product approval and audit forms

Complete information of the cubicle must be provided on Branch Form FAE 3014.

5.8.2 Product approval process

The company must approve the equipment/components for use on the network. The cubicle must be evaluated under the product approval process set out in PAE 1004.

Approval will only be given after a successful installation of the padmount cubicle with a suitable standard company transformer and switchgear fitted.

5.9 Drawings

The following drawings form part of this instruction:

Table 6 - Current design - Size 14 and 16 – 11/22kV new design (300/500/1000/1500kVA)

Fibreglass drawing no.	Amnd no.	Steel drawing no.	Amnd no.	Title
245887	F	360393	A	Size 14 & 16 padmount & indoor transformer typical requirements
264786	A	-	-	Size 14 & 16 padmount substation exploded view
264887	B	360393	A	General arrangement
264888	B	360394	A	Transformer compartment
264889	B	-	-	Steelwork
264890	B	360395	A	Door
264891	C	360395	A	HV & LV compartment
282540	A	-	-	HV switching station

Table 7 - Superseded design - Size 5 – 11kV (300/500kVA)

Fibreglass drawing no.	Amnd no.	Steel drawing no.	Amnd no.	Title
044266	A	360387	A	General arrangement
044267	A	360388	A	Transformer compartment
044268	A	360389	A	HV compartment
044269	A	360389	A	LV compartment
044270	A	360389	A	Door
044271	A	-	-	Steelwork
044338	A	-	-	Removable bottom mullion
053654	E	-	-	11kV 300,500 & 1000kVA padmount transformer typical requirements
044311	H	-	-	HV switching station

Table 8 - Superseded design - Size 10 – 11kV (750/1000kVA)

Fibreglass drawing no.	Amnd no.	Steel drawing no.	Amnd no.	Title
044361	A	360390	A	General arrangement
044362	A	360391	A	Transformer compartment
044363	A	360392	A	HV compartment
044364	A	360392	A	LV compartment
044359	A	360392	A	Door
044373	A	-	-	Steelwork
044338	A	-	-	Removable bottom mullion
053654	E	-	-	11kV 300,500 & 1000kVA padmount transformer typical requirements

Table 9 - Superseded design - Size 22 – 22kV (300/500kVA)

Fibreglass drawing no.	Amnd no.	Steel drawing no.	Amnd no.	Title
076838	A			General arrangement
076839	A			Transformer compartment
076840	A			HV compartment
076841	A			LV compartment
076842	A			Door
240447	-	-	-	Steelwork
240467	-	-	-	Removable bottom mullion
076844	C	-	-	22kV 300 & 500VA padmount transformer typical requirements

6.0 AUTHORITIES AND RESPONSIBILITIES

General Manager Asset Management has the authority and responsibility for:

- approving this specification, including any variations;
- making all decisions concerning compliance in respect to this specification;
- nominating the company's representative(s) for either the manufacturing facility inspection and/or witness testing; and
- delegating any of these authorities and responsibilities to the Manager Asset Standards & Design.

Manager Asset Standards & Design has the authority and responsibility for:

- reviewing this specification and making recommendations to the **General Manager Asset Management**; and
- making recommendations concerning compliance in respect of this specification; and
- making nominations of the company's representatives.

Substation Assets Manager has authority and responsibility for:

- reviewing all type and routine test reports and alternative proposals submitted for evaluation, and making recommendations to the Manager Asset Standards & Design;
- clarifying all the technical aspects of this specification to the stakeholders; and
- approving the relevant actions required and outlined in this specification.

Contractor Operations Manager has the authority and responsibility for confirming all equipment installed by Level 1 Accredited Service Providers comply with the requirements of this specification.

Commercial Manager has the authority and responsibility to certify that the equipment purchased through the tender process complies with the requirements of this specification.

Manufacturers/suppliers have the authority and responsibility for:

- establishing awareness of their responsibilities under this specification;
- determining the contractor/s under their control have provided suitable training for their employees;
- implementing an effective safety, environmental and quality auditing system is in place; and

- Implementing this specification and keeping the company or other responsible equivalent officers informed of any factors that may prevent them from accepting responsibility for its full implementation.

7.0 DOCUMENT CONTROL

Documentation content coordinator : Substation Assets Manager
Documentation process coordinator : Standard & Process Administrator