

 Eskom	Standard	Technology
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Title: **OUTDOOR CERAMIC STATION
POST INSULATORS FOR
SYSTEMS WITH NOMINAL
VOLTAGES UP TO 765KV
SPECIFICATION**

Unique Identifier: **240-56030435**

Alternative Reference Number: **34-2202**

Area of Applicability: **Engineering**

Documentation Type: **Standard**

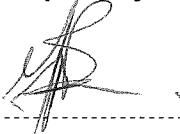
Revision: **5**

Total Pages: **106**

Next Review Date: **April 2025**

Disclosure Classification: **Controlled
Disclosure**

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1. Introduction

It is intended that the insulators specified in this document be used for the construction of all new or refurbished substations. Certain electrical and mechanical characteristics are rationalised in order to achieve standardization. For those parameters, which can be varied, the preferred values are specified.

Insulators for maintenance may not have standard connecting lengths or standard end fittings as specified in this specification. In these cases this specification must be used as a basis for the majority of the requirements, whilst specifying the particular connecting lengths or end fittings for the application in the technical schedule A of an enquiry document.

2. Supporting clauses

2.1 Scope

This specification covers the Eskom specific technical requirements for station post insulators for use in substations with nominal system voltages up to 765kV. The insulator ratings have been rationalised for application at the following nominal system voltages: 22kV, 33kV, 66kV, 132kV, 220kV, 275kV, 400kV and 765kV (See Table 1).

2.1.1 Purpose

To document, have on record and refer to as required, Eskom's specific technical requirements for station post insulators for use in substations with nominal system voltages up to 765kV.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001 Quality Management Systems.
- [2] IEC/SANS 60815, Selection and dimensioning of high voltage insulators for use in polluted conditions, Part 1: Definitions, information and general principles & Part 2: Ceramic and glass insulators for a.c. systems.
- [3] IEC/SANS 60273, Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1000V.
- [4] IEC/SANS 60168, Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 1000V.
- [5] IEC/SANS 60060-1, High-voltage test techniques – Part 1: General definitions and test requirements
- [6] SANS 121 [Equivalent to ISO 1461], Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods.
- [7] ISO/IEC 17011, Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies

2.2.2 Informative

None

2.3 Definitions

2.3.1 General

Definition	Description
Cantilever load	A load applied perpendicular to the longitudinal axis of the insulator.
Certified test report	A certificate of tests performed as specified within the specification, and carried out by an accredited authority or by the manufacturer and witnessed by an accredited authority that has been accredited in accordance with ISO/IEC 17011.
Chips, pits or blisters	Surface marks of insulator shed material usually caused during the manufacturing process.
Connection zone	The interface between the core of the insulating part and the metal fixing devices
Crack	A surface fracture greater than 0,1 mm deep
Total creepage distance	The shortest distance or sum of the shortest distances measured along the contours of the external surfaces of the insulating parts, between the metallic end fittings, that normally have the operating voltage between them.
Flashover	A disruptive external discharge across the surface of the insulating part between the metallic end fittings across which, the operating voltage is normally imposed.
Specific creepage distance (SCD)	Total creepage distance divided by the phase-to-phase system highest voltage.
Unified specific creepage distance (USCD)	Total creepage distance divided by the r.m.s. value of the highest continuous operating voltage (U_m).
Insulator length	The external dimension measured from bottom flange of earth end fitting to top flange of live end fitting.
Minimum cantilever failing load (MCFL)	Minimum bending load that the insulator has to withstand.
Metal fittings of an insulator	Devices that form part of an insulator and intended to connect it to a supporting structure or to a conductor. The two fittings referred to in this specification are the earth end and a line or live end.
Shed	A projection from the core of the insulating part of an insulator intended to increase the creepage distance. The creepage can further be increased by means of ribs in the lower surface of the shed.
Standard reference atmospheric conditions	The standard reference atmosphere is defined as reference temperature ($t_0 = 20\text{ }^{\circ}\text{C}$), absolute pressure ($p_0 = 1\,013\text{ hPa}$ or $1\,013\text{ mbar}$) and absolute humidity ($h_0 = 11\text{ g/m}^3$).

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
AMSL	Above Mean Sea Level
g	Acceleration due to gravity
MCFL	Minimum Cantilever Failing Load
PCD	Pitch Circle Diameter
r.m.s	Root mean square

2.5 Roles and responsibilities

None.

2.6 Process for monitoring

None

2.7 Related/supporting documents

Not applicable

3. Specification for Outdoor Ceramic Station Post Insulators for Systems with Nominal Voltages up to 765kV

3.1 Requirements

3.1.1 General

No conditions in this specification shall lessen the obligations of the supplier as detailed in any other documents forming part of a contract. The insulators shall be designed, manufactured and tested as specified herein, and in schedule A of an enquiry document.

All evaluation submissions shall be supplied electronically as well as in printed format. All information must be supplied in English. Details of the format and structure of the submission shall be made available at the time of issuing the enquiry document.

3.1.2 Manufacturer/supplier Credentials

The manufacturer/supplier shall have access to the engineering facilities necessary to provide technical service and information, advice and after-sales service related to the products under consideration. The manufacturer/supplier must have adequate local technical competency to deal with technical and quality issues related to their products.

The manufacturer/supplier is requested to provide a list of references indicating the country, name of the customer, system voltage, quantity and year of delivery for substantial previous orders. Eskom will perform a comparison of these details with the type of insulator being offered against the enquiry.

3.1.3 Product Acceptance

Only insulators that have been evaluated and accepted by Eskom will be procured for use on the Eskom system.

The manufacturer/supplier shall be fully responsible for his designs and their satisfactory performance in service. Acceptance by Eskom shall not absolve the supplier of the responsibility for the adequacy of the design, dimensions and other details.

Manufacturers'/supplier's catalogues shall not refer to any product as "Eskom approved" or "Eskom accepted". Eskom may only be mentioned as a reference.

3.1.4 Quality System Assessment

Quality assessment will be done in conjunction with the technical acceptance. This assessment shall not override any quality requirements that are specified in a contract document.

3.1.5 Samples

Samples of insulators may be requested as part of the technical evaluation process.

3.1.6 Drawings and Manuals

Each acceptance package shall include one copy of the general arrangement drawings of the insulator and components offered. In addition it should contain detailed assembly, handling and transport instructions

The drawings shall clearly show the following information:

- a) Eskom drawing number and applicable revision (Eskom will allocate the number after the drawing has been approved.
- b) All dimensions and associated tolerances of the insulator housing and top and bottom end fittings (mounting hole details, PCD etc.)
- c) Minimum nominal total creepage distance and specific creepage distance
- d) Detailed dimensioned profile of shed pair.
- e) Material description and fabrication details (e.g. "dry" or "wet" method)
- f) Electrical properties: The lightning impulse withstand level (basic insulation level), switching impulse withstand level, power frequency withstand level, etc.
- g) Mechanical properties: The minimum cantilever and torsion failing loads.
- h) Detail of end fitting flange mounting holes, corona rings, material and corrosion treatment if applicable.
- i) Mass of complete insulator assembly.
- j) Colour of the glaze.
- k) Supplier's product code numbers.
- l) Location and description of identification markings on the insulator body.
- m) All dimensions and associated tolerances of all fasteners and associated fittings

Notes:

- All parameters shall be in metric units and dimensions in millimetres.
- Drawings must be supplied in both scale PDF and acceptable CAD format.
- Indicate on drawings whether SCD or USCD is utilized.
- Maintenance and operating manuals shall be supplied with a tender.
- All information submitted must be in English.

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3.1.7 Insulator Type and Material

Post insulators and post insulator units shall be of the cylindrical, solid-core type with cemented external metal fittings. The insulating material shall be of glazed porcelain. The colour of the glaze shall be dark brown in colour, unless otherwise approved. The use of alternative material may be offered as an option, but shall be subject to Eskom approval.

The ceramic body shall be sound, thoroughly vitrified and free of defects and blemishes that could adversely affect the performance or durability of the post insulator. The insulators shall be capable of withstanding seismic events of up to 0,3g. The exposed parts of the ceramic body shall be smoothly glazed and free of surface defects, inclusions etc. that could detrimentally affect the performance of the post insulator.

3.1.8 Electrical Insulation Withstand Levels

The rated insulation withstand levels for lightning and switching impulse, as well as short time power frequency withstand are specified in table 1 below, and are in accordance with standard values in IEC/SANS 60273. The service conditions for South Africa are rationalised for altitudes up to 1800m. Although the insulation levels in table 1 below are specified at an altitude of 0 - 1000m, the values have been selected for appropriate insulation coordination for altitudes up to 1800m and need not be corrected for altitude. The insulators should be supplied with standard values as per Table 1. Test values must however be corrected for deviations from the standard reference atmospheric conditions in accordance with IEC/SANS 60060-1.

Table 1: Insulation Withstand Levels at 1000m AMSL

1	2	3	4	5
Nominal system voltage	Maximum system voltage	Rated lightning impulse withstand voltage	Rated switching impulse withstand (wet) voltage	Rated short duration wet power frequency withstand voltage
kV r.m.s.	kV r.m.s.	kV (peak)	kV (peak)	kV r.m.s.
22	24	150	-	50
33	36	200	-	70
66	72,5	350	-	140
132	145	550	-	230
220	245	1050 ¹	750	460
275	300	1175 ²	850	-
400	420	1425 ³	950	-
		1550 ⁴	1050	-
765	800	2100	1300	-

Notes:

- 1) 1050 kV rated insulators may be required for extensions at existing 220kV substations
- 2) 1175kV rated insulators is the standard for all new build 220 and 275kV substations
- 3) 1425kV rated insulators may be required for extensions at existing 400kV substations
- 4) 1550kV rated insulators is the standard for all new build 400kV substations

3.1.9 Dimensional characteristics**3.1.9.1 Insulation Creepage**

Eskom has rationalised on three site pollution severity classes as defined in IEC/SANS 60815 Part 1, as follows:

- a) For all nominal voltages >132 kV, class “d - Heavy” and “e - Very heavy” are specified.
- b) For all nominal voltages ≤132 kV, class “c-Medium”, class “d - Heavy” and “e - Very heavy” is specified.

The minimum specific and unified specific creepage distances at the maximum continuous system voltage (Um) for these site pollution severity classes are as follows:

1	2	3	4
Pollution zone	Voltage application range	SCD	USCD
		mm/kV	mm/kV
c- Medium (M)	≤ 132 kV	20	34,7
d - Heavy (H)	All voltages	25	43,3
e - Very heavy (VH)	All voltages	31	53,7

Notes: Depending on the insulator design, the specific creepage distance required to successfully complete the KIPTS test requirement (see **Error! Reference source not found.**), might be higher than that listed in the table above. Item 14C, 15C, 16C & 17C require a minimum SCD of 38 mm/kV.

3.1.9.2 Insulator shed profile

Insulator shed profiles shall be designed in accordance with IEC/SANS 60815. Alternating sheds with an “open” or “aerodynamic” profile are preferred. Designs utilising “Under-ribs”, in order to increase the creepage distance, shall not be accepted. The following parameters apply to the shed profile and are the recommended minimum values in IEC/SANS 60815 for full compliance:

- The shed spacing-projection (s/p) ratio shall be at least 0,65.
- The minimum distance between sheds:
 - For insulator lengths greater than 550mm shall be 30mm
 - For insulator lengths less than or equal to 550mm shall be 25mm
- The creepage to clearance ratio (l/d) shall not exceed 5.
- The shed angle shall be between 5° and 22,5°
- The creepage factor shall not exceed:
 - 3,75 for SPS Class “c” (“Medium” pollution class)
 - 3,875 for SPS Class “d” (“Heavy” pollution class)
 - 4,0 for SPS Class “e” (“Extra heavy” pollution class)

Above the dimensional constraints of the shed profile, the sheds shall be sufficiently robust to withstand reasonable handling and transportation stresses.

3.1.9.3 Overall dimensions

The height of the post insulator is a critical dimension from the electrical performance and mechanical design perspectives, and cannot be deviated from. Two heights are specified in some cases for a given voltage, as there are different specifications for some existing installations, and for new installations. The height of the insulator is specified in Table 2.

The diameter of the insulating part is also stated in Table 3 below.

3.1.10 Mechanical characteristics

3.1.10.1 Cantilever strength

Post insulators shall be standardised in mechanical strength classes based on the values of the specified minimum cantilever failing load in the bending test according to the classification in IEC/SANS 60273. The minimum values of MCFL are tabulated in Table 3.

3.1.10.2 Torsional strength

Torsional failing load is critical for application in disconnector switches. The minimum values are as per IEC/SANS 60273 and are tabulated in Table 3.

Table 2: Post Insulator Dimensions and Mechanical Characteristics

1	2	3	4	5	6
Item	IEC classification	Height	Max nominal diameter of insulating part	Cantilever failing load	Torsion failing load
		mm	mm	N	Nm
1	C4-150	355 ± 1	195	4000	1000
2	C4-200	475 ± 1	210	4000	1200
3	C4-325 ¹	770 ± 1	225	4000	2000
4	C4-550	1220 ± 1	300	4000	3000
5	C6-550		300	6000	4000
6	C10-550		350	10000	4000
7	C12.5-550		350	12500	6000
8	C10-1050	2300±3,5	450	10000	4000
9	C4-1175	2650±4,5		4000	3000
10	C6-1175			6000	3000
11	C10-1175			10000	4000
12	C12.5-1175			12500	6000
13	C10-1425	3150±4,5		10000	4000
14	C6-1550	3350±4,5		6000	3000
15	C10-1550			10000	4000
16	C12.5-1550			12500	6000
17	C16-1550			16000	6000
18	C8-2100	4700±5,5			8000

Notes:

- 1) As per Table 1, the required **Rated lightning impulse withstand voltage** is 350 kV (peak)

3.1.11 Fixing Arrangements

The end fittings shall comply with the dimensional characteristics stated in IEC/SANS 60273. The end fittings shall be manufactured from cast iron. The mechanical strength of the end fittings shall be demonstrated with the appropriate mechanical tests. Portland and alumina cements are preferred for metal end fitting attachment. The use of sulphur cement is not acceptable.

Corona rings shall be supplied with the insulators as part of the supply contract, to meet the RIV limits. The dimensions of the corona ring shall be such that adequate dry arcing distance is maintained to meet impulse withstand levels. If corona rings are required, these must be supplied with each unit and details on dimensions, mounting and finish must be provided in the submission.

Galvanised fasteners shall be supplied to assemble a complete post insulator unit.

In addition, fasteners that are required for mounting the post insulator base flange to the supporting structure must be provided and packaged appropriately with each supplied post insulator, meeting the following minimum criteria:

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- Bolt length: The bolt length shall be equivalent to the sum of the width of the post insulator base flange, supplied nut, supplied washers and an additional 15mm.
- Bolt Type: Grade 8.8 or superior shall be supplied.
- Bolt Size: This is to be determined by the manufacturer. The integrity of the fastening arrangement supplied shall be able to withstand all forces placed on the post insulator up to and including the maximum failing load ratings. Detailed confirmation or suitable calculation showing that this requirement is met must be supplied.
- All ferrous fasteners and associated fittings shall be hot dip galvanised in accordance with SANS 121 to a minimum coating thickness of 100 µm.
- Detailed drawings, specification and ratings of the supplied fasteners, associated components and fastening arrangement must be submitted and shall be subject to Eskom acceptance.
- Fasteners and its associated fittings must be individually packaged for each post insulator supplied i.e. fasteners and associated fittings for more than one post insulators cannot be supplied in the same package.

The top and bottom flanges of the end fittings shall have PCDs, holes and thread sizes as listed in Table 4 below. "Plain" indicates that the holes are not tapped.

Table 3: Post Insulator PCD Requirements

1	2	3	4	5	6
Item	IEC classification	Top fitting PCD	Hole detail	Bottom fitting PCD	Hole detail
		mm		mm	
1	C4-150	76	4 X M12 (Tapped)	76	4 X M12 (Tapped)
2	C4-200	76	4 X M12 (Tapped)	76	4 X M12 (Tapped)
3	C4-325	127	4 X M16 (Tapped)	127	4 X M16 (Tapped)
4	C4-550	127	4 X M16 (Tapped)	127	4 X M16 (Tapped)
5	C6-550	127	4 X M16 (Tapped)	127	4 X M16 (Tapped)
6	C10-550	127	4 X M16 (Tapped)	225	4 X 18mm (Plain)
7	C12.5-550	127	4 X M16 (Tapped)	254	8 X 18mm (Plain)
8	C10-1050	225	4 X 18mm (Plain)	275	8 X 18mm (Plain)
9	C4-1175	127	4 X M16 (Tapped)	225	4 X 18mm (Plain)
10	C6-1175	127	4 X M16 (Tapped)	254	8 X 18mm (Plain)
11	C10-1175	225	4 X 18mm (Plain)	275	8 X 18mm (Plain)
12	C12.5-1175	225	4 X 18mm (Plain)	300	8 X 18mm (Plain)
13	C10-1425	225	4 X 18mm (Plain)	300	8 X 18mm (Plain)
14	C6-1550	127	4 X M16 (Tapped)	254	8 X 18mm (Plain)
15	C10-1550	225	4 X 18mm (Plain)	300	8 X 18mm (Plain)
16	C12.5-1550	225	4 X 18mm (Plain)	325	8 X 18mm (Plain)
17	C16-1550	225	4 X 18mm (Plain)	356	8 X 18mm (Plain)
18	C8-2100	225	4 X 18mm (Plain)	325	8 X 18mm (Plain)

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3.1.12 Metal Finish

All ferrous fittings shall be hot dip galvanised in accordance with SANS 121 to a minimum coating thickness of 100 µm. Threaded holes shall be suitable for standard metric sized bolts, after the galvanising process. The thread of tapped holes shall not be re-tapped after galvanising.

3.1.13 Insulator Identification

The insulator shall be indelibly marked with the following information:

- a) "IEC classification" according to IEC/SANS 60273
- b) Minimum nominal total creepage distance in mm
- c) Manufacturer's name or trademark;
- d) Manufacturer's type or model number, batch number and year of manufacture

The markings shall be clearly legible and in English. Markings on the insulating unit shall remain legible during the lifetime of the insulator.

For porcelain insulators, the markings shall be a transfer that is fired into the glaze of the top shed.

3.1.14 Packaging

Details of the proposed packaging method shall accompany a tender offer, and shall be subject to Eskom acceptance.

The insulators shall be packaged in robust wooden crates, individually protected and suitably supported in order to protect the insulators from the stresses of normal handling that can be expected from the point of despatch to the point of construction. The crates must be designed such that inspection can be affected without opening or damaging the crate. The crate must be able to be lifted by slings with lifting points clearly marked. Any special handling requirements shall be clearly specified to purchaser before delivery and shall be clearly specified on packaging.

The packaging shall not disintegrate due to exposure to rain and direct sunlight during outdoor storage and the construction period of 18 months in total. The manufacturer/supplier shall notify the purchaser of any special methods recommended for storage prior to delivery, and on packaging materials.

If insulators are packed in boxes or crates on pallets, the gross weight of the pallets shall not exceed 1800kg. Pallets shall be suitable for handling by forklift trucks, capable of entry from both sides. Each pallet shall be fitted with a shock indicator to indicate if the pallet was subjected to high impacts during transit. All boxes, pallets or containers shall be clearly marked in accordance with the following template or similar approved:

Eskom Order No.:

Eskom SAP No.:

Project Name:

Project Number:

Delivery Address:

Suppliers Name:

Supplier's Serial No.:

Description of Material:

Gross Weight:

3.1.15 Delivery

Eskom shall only accept delivery to the destination specified in the contract. Arrangements for acceptance, off-loading and trans-shipping including off-loading at the final destination shall be pre-arranged and will be the responsibility of the supplier.

3.2 Testing and inspection

- a) Single copies of type test reports, in English, shall be submitted with a tender to prove that the station post insulators offered comply fully with the provisions of IEC standards stipulated as well as for any further requirements as stipulated in this specification and in the relevant Technical Schedule A. If all the required type test reports are not submitted, the tender will be rated incomplete and shall not be considered.
- b) All type tests shall be conducted at an accredited testing laboratory. An accredited testing laboratory is defined as that which is ISO 17025 accredited and/or that which holds valid certification issued by ILAC (International Laboratory Accreditation Corporation) or one of its members.
- c) Eskom reserves the right to appoint a representative to inspect the products offered at any stage of manufacture and to witness and sanction any tests. If inspection or witnessing of tests is required, Eskom will advise the contractor who will then give a minimum of 8 weeks' notice of the date on which impending inspection or testing will take place.
- d) Any design change must be verified by tests wherever applicable and will be subject to Eskom's approval.

3.2.1 General

Insulators manufactured from glazed porcelain shall comply with the testing requirements of IEC/SANS 60168.

Eskom reserves the right to request the Supplier to conduct sample and routine tests during manufacturing and to request the associated type test reports. Eskom reserves the right to request for copies of routine test certificates before or after the date of delivery.

Eskom further reserves the right to subject randomly selected insulators that have been delivered, to qualifying tests.

3.2.2 Type Tests

3.2.2.1 Standard Tests

Post insulators shall be subject to the following standard type tests for outdoor applications as specified in IEC/SANS 60168:

- a) Verification of dimensions
- b) Dry lightning impulse withstand voltage test
- c) Wet switching impulse withstand voltage test
- d) Wet power-frequency withstand voltage test
- e) Mechanical failing load test carried out in bending

Note 1: Additional mechanical load failing tests may be required depending on the insulator application as agreed between the Eskom and the manufacturer

3.2.2.2 Special Tests according to IEC

Where indicated in the technical schedules, the following special tests are required:

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- a) Radio interference test (see IEC 60437). For ceramic post insulators, the RIV test shall be performed as in service with the relevant fittings installed for applications at nominal system voltages of 132kV and above. The test shall be compensated for relative air density consistent with an altitude of 1800m above sea level. The limit for RIV shall be 65dB at 0.5MHz under dry conditions at the service altitude of 1800m.

Details of tests undertaken and the test setup used must be supplied with the tender submission and will be evaluated by Eskom for its conformity to field service conditions. If required, additional tests may be stipulated, for the cost of the supplier, to better represent field service conditions.

- b) Artificial pollution test (see IEC 60507). Details of artificial pollution tests conducted in accordance with IEC 60507 and pollution levels evaluated must be supplied with the tender submission. This will be evaluated for its acceptability in relation to the creepage levels offered and their intended application in the different pollution environments as stipulated in section 3.1.9.1. If required, additional tests may be stipulated, for the cost of the supplier, to better represent field service conditions.

3.2.3 Sample Tests

The following sample tests shall be performed, as applicable on the number of post insulators selected at random from the lot, in accordance with IEC/SANS 60168:

- a) Verification of the dimensions
- b) Temperature cycle test
- c) Mechanical failing load test carried out in bending
- d) Porosity test
- e) Galvanizing test

Note: Samples that are subjected to tests that may affect their mechanical and/or electrical characteristics shall not be used in service that is b, c and d.

3.2.4 Routine Tests

Routine tests shall be performed in accordance with IEC/SANS 60168 on all post insulators units prior to despatch from the manufacturer's works.

Test certificates of the results of production routine tests shall be retained by the supplier and shall be available for Eskom's inspection. The following tests are to be carried out on all insulator units:

Visual examination

Mechanical test (50 % of the specified mechanical failing load, shall be applied in four mutually perpendicular directions, each for a minimum time of 3 s)

Note: The routine mechanical test should be a bending test, unless otherwise indicated by the duty required of the post insulator (e.g. Switch disconnector application). The method for the routine test shall be agreed between Eskom and the manufacturer.

3.3 Keywords

Station Post Insulator, Insulator, Disconnector, Creepage

4. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Kevin Kleinhans	Chief Engineer
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5. Revisions

Date	Rev.	Compiler	Remarks
March 2020	5	F Witbooi	New revision. KIPTS requirement removed. SCD rationalised to 31mm/kV for up to 132kV.
August 2015	4	T Govender Chief Engineer	Minor corrections, inclusion of summary sheets for type tests, drawing details and deviations.
June 2014	3	T Govender Chief Engineer	Changes undertaken to comply with new procurement policy. Non-KIPTS items included.
May 2014	2	T Govender Chief Engineer	25 mm/kV for $U_n \leq 132\text{kV}$ is introduced. The supply of mounting bolts and fittings are incorporated. Additional items for Weskesfleur substation is included.
May 2013	1	K. Kleinhans Chief Engineer	Final Document for Publication
Nov 2012	0	K. Kleinhans Chief Engineer	Draft document for Review created from DSP 34-2202

6. Development team

The following people were involved in the development of this document:

- F Witbooi

7. Acknowledgements

None

Annex A – Technical Schedules

Item	Title	Offered (Y/N)	Item	Title	Offered (Y/N)
1	INSUL POST C4-150 31mm/kV		13A	INSUL POST C10-1425 25mm/kV	
2	INSUL POST C4-200 31mm/kV		13B	INSUL POST C10-1425 31mm/kV	
3	INSUL POST C4-325 31mm/kV		14A	INSUL POST C6-1550 25mm/kV	
4	INSUL POST C4-550 31mm/kV		14B	INSUL POST C6-1550 31mm/kV	
5	INSUL POST C6-550 31mm/kV		14C	INSUL POST C6-1550 38mm/kV	
6	INSUL POST C10-550 31mm/kV		15A	INSUL POST C10-1550 25mm/kV	
7	INSUL POST C12.5-550 31mm/kV		15B	INSUL POST C10-1550 31mm/kV	
8A	INSUL POST C10-1050 25mm/kV		15C	INSUL POST C10-1550 38mm/kV	
8B	INSUL POST C10-1050 31mm/kV		16A	INSUL POST C12.5-1550 25mm/kV	
9A	INSUL POST C4-1175 25mm/kV		16B	INSUL POST C12.5-1550 31mm/kV	
9B	INSUL POST C4-1175 31mm/kV		16C	INSUL POST C12.5-1550 38mm/kV	
10A	INSUL POST C6-1175 25mm/kV		17A	INSUL POST C16-1550 25mm/kV	
10B	INSUL POST C6-1175 31mm/kV		17B	INSUL POST C16-1550 31mm/kV	
11A	INSUL POST C10-1175 25mm/kV		17C	INSUL POST C16-1550 38mm/kV	
11B	INSUL POST C10-1175 31mm/kV		18A	INSUL POST C8-2100 25mm/kV	
12A	INSUL POST C12.5-1175 25mm/kV		18B	INSUL POST C8-2100 31mm/kV	
12B	INSUL POST C12.5-1175 31mm/kV				

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Annex B — C4-150 (ITEMS 1)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

		INSUL POST C4-150 (ITEM 1)				
Item	Clause	Description	Units	Schedule A		Schedule B
1		General				
1.1		Item description				
		"IEC 60273" Classification	-	C4-150		
		Specific creepage distance	mm/kV	31		
1.2		Purchasing details				
		SAP Number	-	-		
		Supplier	-	-		
		Manufacturer	-	-		
		Manufacturer product type designation/code	-	-		
1.3		Site conditions of service				
		Maximum ambient temperature	Degrees Celcius	45		
		Minimum ambient temperature		-10		
		Maximum daily average		35		
		Maximum daily variation		35		
2		Technical requirements				
2.1		Insulator details				
		Insulator type	-	Solid core		
		Number of insulating units	-	-		
		Mass of complete insulator	kg	-		
		Insulator material	-	Porcelain		
		Colour of glaze	-	Dark Brown		
2.2		Electrical insulation levels				
		Rated lightning impulse withstand voltage (peak)	kV	150		
		Rated switching impulse withstand voltage, wet (peak)	kV	-		
		Rated short time power freq. withstand voltage, wet	kV r.m.s	50		
2.3		Dimensional characteristics				
		Minimum nominal total creepage distance (l)	mm	-		
		Arcing distance (S)	mm	-		
		Creepage factor (l/S)	-	31	4	

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				mm/kV	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	25	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	355 ± 1	
		Maximum nominal diameter of insulating part	mm	195	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	4000	
		Torsion failing load	Nm	1000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	76	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M12	
		Bottom fitting pitch circle diameter	mm	76	
		Bottom fitting - number of holes	-	4	
		Bottom fitting - diameter of holes	-	M12	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
3		Packaging			
		Number of post insulators per pallet	-	-	
		Maximum mass per pallet	kg	1800	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		No	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			

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		a) Radio interference test (see IEC 60437);		No	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

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Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

		INSUL POST C4-200 (ITEMS 2)			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C4-200	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	200	
		Rated switching impulse withstand voltage, wet (peak)	kV	-	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	70	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	

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		Arcing distance (S)	mm	-	
		Creepage factor (I/S)	-	31 mm/kV	4
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	25	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	475 ± 1	
		Maximum nominal diameter of insulating part	mm	210	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	4000	
		Torsion failing load	Nm	1200	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	76	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M12	
		Bottom fitting pitch circle diameter	mm	76	
		Bottom fitting - number of holes	-	4	
		Bottom fitting - diameter of holes	-	M12	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
3		Packaging			
		Number of post insulators per pallet	-	-	
		Maximum mass per pallet	kg	1800	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		No	
		d) Wet power-frequency withstand voltage test		Yes	

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		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		No	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

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Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

		INSUL POST C4-325 (ITEMS 3)			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C4-325	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	350	
		Rated switching impulse withstand voltage, wet (peak)	kV	-	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	140	
2.3		Dimensional characteristics			

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		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	31 mm/kV	4
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	770 ± 1	
		Maximum nominal diameter of insulating part	mm	225	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	4000	
		Torsion failing load	Nm	1200	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	127	
		Bottom fitting - number of holes	-	4	
		Bottom fitting - diameter of holes	-	M16	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		No	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	

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4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		No	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

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**OUTDOOR CERAMIC STATION POST INSULATORS FOR
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Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

		INSUL POST C4-550 (ITEMS 4)			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C4-550	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	550	
		Rated switching impulse withstand voltage, wet (peak)	kV	-	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	230	

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2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	31 mm/kV	4
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	1220 ± 1	
		Maximum nominal diameter of insulating part	mm	300	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	4000	
		Torsion failing load	Nm	3000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	127	
		Bottom fitting - number of holes	-	4	
		Bottom fitting - diameter of holes	-	M16	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		No	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	

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		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		No	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

Annex F – C6-550 (ITEMS 5)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

		INSUL POST C6-550 (ITEMS 5)			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C6-550	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	550	
		Rated switching impulse withstand voltage, wet (peak)	kV	-	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	230	
2.3		Dimensional characteristics			

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		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	31 mm/kV	4
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	1220 ± 1	
		Maximum nominal diameter of insulating part	mm	300	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	6000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	127	
		Bottom fitting - number of holes	-	4	
		Bottom fitting - diameter of holes	-	M16	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		No	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			

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		a) Radio interference test (see IEC 60437);		No	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

Annex G – C10-550 (ITEMS 6)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

		INSUL POST C10-550 (ITEMS 6)			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C10-550	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	550	
		Rated switching impulse withstand voltage, wet (peak)	kV	-	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	230	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	

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		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	31 mm/kV	4
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	1220 ± 1	
		Maximum nominal diameter of insulating part	mm	350	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	225	
		Bottom fitting - number of holes	-	4	
		Bottom fitting - diameter of holes	-	M18	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		No	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			

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		a) Radio interference test (see IEC 60437);		No	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

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Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Note: Details provided in Schedule B must be only for one item per sheet. Print and complete a new sheet for each separate item tendered for.

		INSUL POST C12.5-550 (ITEMS 7)			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C12.5-550	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	550	
		Rated switching impulse withstand voltage, wet (peak)	kV	-	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	230	

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2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	31 mm/kV	4
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	1220 ± 1	
		Maximum nominal diameter of insulating part	mm	350	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	12500	
		Torsion failing load	Nm	6000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	254	
		Bottom fitting - number of holes	-	4	
		Bottom fitting - diameter of holes	-	M18	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		No	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	

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4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		No	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

**OUTDOOR CERAMIC STATION POST INSULATORS FOR
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Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 8a		INSUL POST C10-1050 25mm/kV				
Item	Clause	Description	Units	Schedule A	Schedule B	
1		General				
1.1		Item description				
		"IEC 60273" Classification	-	C10-1050		
		Specific creepage distance	mm/kV	25		
1.2		Purchasing details				
		SAP Number	-	-		
		Supplier	-	-		
		Manufacturer	-	-		
		Manufacturer product type designation/code	-	-		
1.3		Site conditions of service				
		Maximum ambient temperature	Degrees Celcius	45		
		Minimum ambient temperature		-10		
		Maximum daily average		35		
		Maximum daily variation		35		
2		Technical requirements				
2.1		Insulator details				
		Insulator type	-	Solid core		
		Number of insulating units	-	-		
		Mass of complete insulator	kg	-		
		Insulator material	-	Porcelain		
		Colour of glaze	-	Dark Brown		
2.2		Electrical insulation levels				
		Rated lightning impulse withstand voltage (peak)	kV	1050		
		Rated switching impulse withstand voltage, wet (peak)	kV	750		
		Rated short time power freq. withstand voltage, wet	kV r.m.s	460		
2.3		Dimensional characteristics				
		Minimum nominal total creepage distance (l)	mm	-		
		Arcing distance (S)	mm	-		

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		Creepage factor (I/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2300±3,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	275	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			

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		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 8b		INSUL POST C10-1050 31mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C10-1050	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1050	

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		Rated switching impulse withstand voltage, wet (peak)	kV	750	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	460	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2300±3,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	275	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	

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		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Annex J – C4-1175 (ITEMS 9A & 9B)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 9a		INSUL POST C4-1175 25mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C4-1175	
		Specific creepage distance	mm/kV	25	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1175	
		Rated switching impulse withstand voltage, wet (peak)	kV	850	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (I)	mm	-	
		Arcing distance (S)	mm	-	

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		Creepage factor (I/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2650±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	4000	
		Torsion failing load	Nm	3000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	225	
		Bottom fitting - number of holes	-	4	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			

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		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 9b		INSUL POST C4-1175 31mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C4-1175	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1175	

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		Rated switching impulse withstand voltage, wet (peak)	kV	850	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2650±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	4000	
		Torsion failing load	Nm	3000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	225	
		Bottom fitting - number of holes	-	4	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	

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		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Annex K – C6-1175 (ITEMS 10A & 10B)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 10a		INSUL POST C6-1175 25mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C6-1175	
		Specific creepage distance	mm/kV	25	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1175	
		Rated switching impulse withstand voltage, wet (peak)	kV	850	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	

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		Arcing distance (S)	mm	-	
		Creepage factor (I/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2650±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	6000	
		Torsion failing load	Nm	3000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	254	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	

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4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 10b		INSUL POST C6-1175 31mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C6-1175	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	

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2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1175	
		Rated switching impulse withstand voltage, wet (peak)	kV	850	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2650±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	6000	
		Torsion failing load	Nm	3000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	254	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	

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		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Annex L – C10-1175 (ITEMS 11A & 11B)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 11a		INSUL POST C10-1175 25mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C10-1175	
		Specific creepage distance	mm/kV	25	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1175	
		Rated switching impulse withstand voltage, wet (peak)	kV	850	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	

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		Arcing distance (S)	mm	-	
		Creepage factor (I/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2650±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	275	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	

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4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 11b		INSUL POST C10-1175 31mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C10-1175	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	

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2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1175	
		Rated switching impulse withstand voltage, wet (peak)	kV	850	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2650±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	275	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	

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		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Annex M – C12.5-1175 (ITEMS 12A & 12B)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 12a		INSUL POST C12.5-1175 25mm/kV				
Item	Clause	Description	Units	Schedule A	Schedule B	
1		General				
1.1		Item description				
		"IEC 60273" Classification	-	C12.5-1175		
		Specific creepage distance	mm/kV	25		
1.2		Purchasing details				
		SAP Number	-	-		
		Supplier	-	-		
		Manufacturer	-	-		
		Manufacturer product type designation/code	-	-		
1.3		Site conditions of service				
		Maximum ambient temperature	Degrees Celcius	45		
		Minimum ambient temperature		-10		
		Maximum daily average		35		
		Maximum daily variation		35		
2		Technical requirements				
2.1		Insulator details				
		Insulator type	-	Solid core		
		Number of insulating units	-	-		
		Mass of complete insulator	kg	-		
		Insulator material	-	Porcelain		
		Colour of glaze	-	Dark Brown		
2.2		Electrical insulation levels				
		Rated lightning impulse withstand voltage (peak)	kV	1175		
		Rated switching impulse withstand voltage, wet (peak)	kV	850		
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-		
2.3		Dimensional characteristics				
		Minimum nominal total creepage distance (I)	mm	-		
		Arcing distance (S)	mm	-		

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		Creepage factor (I/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2650±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	12500	
		Torsion failing load	Nm	6000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	300	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			

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		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 12b		INSUL POST C12.5-1175 31mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C12.5-1175	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1175	

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		Rated switching impulse withstand voltage, wet (peak)	kV	850	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	2650±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	12500	
		Torsion failing load	Nm	6000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	300	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	

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		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Annex N- C10-1425 (ITEMS 13A & 13B)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 13a		INSUL POST C10-1425 25mm/kV				
Item	Clause	Description	Units	Schedule A	Schedule B	
1		General				
1.1		Item description				
		"IEC 60273" Classification	-	C10-1425		
		Specific creepage distance	mm/kV	25		
1.2		Purchasing details				
		SAP Number	-	-		
		Supplier	-	-		
		Manufacturer	-	-		
		Manufacturer product type designation/code	-	-		
1.3		Site conditions of service				
		Maximum ambient temperature	Degrees Celcius	45		
		Minimum ambient temperature		-10		
		Maximum daily average		35		
		Maximum daily variation		35		
2		Technical requirements				
2.1		Insulator details				
		Insulator type	-	Solid core		
		Number of insulating units	-	-		
		Mass of complete insulator	kg	-		
		Insulator material	-	Porcelain		
		Colour of glaze	-	Dark Brown		
2.2		Electrical insulation levels				
		Rated lightning impulse withstand voltage (peak)	kV	1425		
		Rated switching impulse withstand voltage, wet (peak)	kV	950		
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-		
2.3		Dimensional characteristics				

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		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3150±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	300	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	

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		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 13b		INSUL POST C10-1425 31mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C10-1425	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			

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		Rated lightning impulse withstand voltage (peak)	kV	1425	
		Rated switching impulse withstand voltage, wet (peak)	kV	950	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3150±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	300	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			

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		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Annex O- C6-1550 (ITEMS 14A, 14B & 14C)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 14a		INSUL POST C6-1550 25mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C6-1550	
		Specific creepage distance	mm/kV	25	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1550	
		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	

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		Arcing distance (S)	mm	-	
		Creepage factor (I/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3350±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	6000	
		Torsion failing load	Nm	3000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	254	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	

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4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

Item 14b		INSUL POST C6-1550 31mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C6-1550	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			

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		Rated lightning impulse withstand voltage (peak)	kV	1550	
		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3350±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	6000	
		Torsion failing load	Nm	3000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	254	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			

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		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

Item 14c		INSUL POST C6-1550 38mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C6-1550	
		Specific creepage distance	mm/kV	38	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			

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		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1550	
		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	xxxx	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	6000	
		Torsion failing load	Nm	3000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	127	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	M16	
		Bottom fitting pitch circle diameter	mm	254	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	

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		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		Yes	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Annex P- C10-1550 (ITEMS 15A, 15B & 15C)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 15a		INSUL POST C10-1550 25mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C10-1550	
		Specific creepage distance	mm/kV	25	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1550	
		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (I)	mm	-	
		Arcing distance (S)	mm	-	

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		Creepage factor (I/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3350±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	300	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			

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		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 15b		INSUL POST C10-1550 31mm/kV				
Item	Clause	Description	Units	Schedule A	Schedule B	
1		General				
1.1		Item description				
		"IEC 60273" Classification	-	C10-1550		
		Specific creepage distance	mm/kV	31		
1.2		Purchasing details				
		SAP Number	-	-		
		Supplier	-	-		
		Manufacturer	-	-		
		Manufacturer product type designation/code	-	-		
1.3		Site conditions of service				
		Maximum ambient temperature	Degrees Celcius	45		
		Minimum ambient temperature		-10		
		Maximum daily average		35		
		Maximum daily variation		35		
2		Technical requirements				
2.1		Insulator details				
		Insulator type	-	Solid core		
		Number of insulating units	-	-		
		Mass of complete insulator	kg	-		
		Insulator material	-	Porcelain		
		Colour of glaze	-	Dark Brown		
2.2		Electrical insulation levels				
		Rated lightning impulse withstand voltage (peak)	kV	1550		

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		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3350±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	300	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	

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		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 15c		INSUL POST C10-1550 38mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C10-1550	
		Specific creepage distance	mm/kV	38	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	

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2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1550	
		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	xxxx	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	10000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	300	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	

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		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Annex Q- C12.5-1550 (ITEMS 16A, 16B & 16C)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 16a		INSUL POST C12.5-1550 25mm/kV				
Item	Clause	Description	Units	Schedule A	Schedule B	
1		General				
1.1		Item description				
		"IEC 60273" Classification	-	C12.5-1550		
		Specific creepage distance	mm/kV	25		
1.2		Purchasing details				
		SAP Number	-	-		
		Supplier	-	-		
		Manufacturer	-	-		
		Manufacturer product type designation/code	-	-		
1.3		Site conditions of service				
		Maximum ambient temperature	Degrees Celcius	45		
		Minimum ambient temperature		-10		
		Maximum daily average		35		
		Maximum daily variation		35		
2		Technical requirements				
2.1		Insulator details				
		Insulator type	-	Solid core		
		Number of insulating units	-	-		
		Mass of complete insulator	kg	-		
		Insulator material	-	Porcelain		
		Colour of glaze	-	Dark Brown		
2.2		Electrical insulation levels				
		Rated lightning impulse withstand voltage (peak)	kV	1550		
		Rated switching impulse withstand voltage, wet (peak)	kV	1050		
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-		
2.3		Dimensional characteristics				
		Minimum nominal total creepage distance (l)	mm	-		

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		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3350±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	12500	
		Torsion failing load	Nm	6000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	325	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	

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4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 16b		INSUL POST C12.5-1550 31mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C12.5-1550	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			

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		Rated lightning impulse withstand voltage (peak)	kV	1550	
		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3350±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	12500	
		Torsion failing load	Nm	6000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	325	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			

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		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Item 16C		INSUL POST C12.5-1550 38mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C12.5-1550	
		Specific creepage distance	mm/kV	38	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	

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2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1550	
		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	xxxx	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	12500	
		Torsion failing load	Nm	6000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	325	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	

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		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions			
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination			
		b) Mechanical test		Yes	

Annex R- C16-1550 (ITEMS 17A, 17B & 17C)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 17a		INSUL POST C16-1550 25mm/kV				
Item	Clause	Description	Units	Schedule A	Schedule B	
1		General				
1.1		Item description				
		"IEC 60273" Classification	-	C16-1550		
		Specific creepage distance	mm/kV	25		
1.2		Purchasing details				
		SAP Number	-	-		
		Supplier	-	-		
		Manufacturer	-	-		
		Manufacturer product type designation/code	-	-		
1.3		Site conditions of service				
		Maximum ambient temperature	Degrees Celcius	45		
		Minimum ambient temperature		-10		
		Maximum daily average		35		
		Maximum daily variation		35		
2		Technical requirements				
2.1		Insulator details				
		Insulator type	-	Solid core		
		Number of insulating units	-	-		
		Mass of complete insulator	kg	-		
		Insulator material	-	Porcelain		
		Colour of glaze	-	Dark Brown		
2.2		Electrical insulation levels				
		Rated lightning impulse withstand voltage (peak)	kV	1550		
		Rated switching impulse withstand voltage, wet (peak)	kV	1050		
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-		
2.3		Dimensional characteristics				

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		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3350±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	16000	
		Torsion failing load	Nm	6000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	356	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	

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		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

Item 17b		INSUL POST C16-1550 31mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C16-1550	
		Specific creepage distance	mm/kV	31	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			
2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			

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		Rated lightning impulse withstand voltage (peak)	kV	1550	
		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	3350±4,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	16000	
		Torsion failing load	Nm	6000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	356	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			

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		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

Item 17c		INSUL POST C16-1550 38mm/kV			
Item	Clause	Description	Units	Schedule A	Schedule B
1		General			
1.1		Item description			
		"IEC 60273" Classification	-	C16-1550	
		Specific creepage distance	mm/kV	38	
1.2		Purchasing details			
		SAP Number	-	-	
		Supplier	-	-	
		Manufacturer	-	-	
		Manufacturer product type designation/code	-	-	
1.3		Site conditions of service			
		Maximum ambient temperature	Degrees Celcius	45	
		Minimum ambient temperature		-10	
		Maximum daily average		35	
		Maximum daily variation		35	
2		Technical requirements			

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2.1		Insulator details			
		Insulator type	-	Solid core	
		Number of insulating units	-	-	
		Mass of complete insulator	kg	-	
		Insulator material	-	Porcelain	
		Colour of glaze	-	Dark Brown	
2.2		Electrical insulation levels			
		Rated lightning impulse withstand voltage (peak)	kV	1550	
		Rated switching impulse withstand voltage, wet (peak)	kV	1050	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	xxxx	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	16000	
		Torsion failing load	Nm	6000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	356	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland	

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				cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

Annex S- C8-2100 (ITEMS 18A & 18B)

Schedule A: Eskom's particular requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item 18a		INSUL POST C8-2100 25mm/kV				
Item	Clause	Description	Units	Schedule A	Schedule B	
1		General				
1.1		Item description				
		"IEC 60273" Classification	-	C18-2100		
		Specific creepage distance	mm/kV	25		
1.2		Purchasing details				
		SAP Number	-	-		
		Supplier	-	-		
		Manufacturer	-	-		
		Manufacturer product type designation/code	-	-		
1.3		Site conditions of service				
		Maximum ambient temperature	Degrees Celcius	45		
		Minimum ambient temperature		-10		
		Maximum daily average		35		
		Maximum daily variation		35		
2		Technical requirements				
2.1		Insulator details				
		Insulator type	-	Solid core		
		Number of insulating units	-	-		
		Mass of complete insulator	kg	-		
		Insulator material	-	Porcelain		
		Colour of glaze	-	Dark Brown		
2.2		Electrical insulation levels				
		Rated lightning impulse withstand voltage (peak)	kV	2100		
		Rated switching impulse withstand voltage, wet (peak)	kV	1300		
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-		
2.3		Dimensional characteristics				
		Minimum nominal total creepage distance (I)	mm	-		
		Arcing distance (S)	mm	-		

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		Creepage factor (I/S)	-	3.875	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	4700±5,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	8000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	325	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	
		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			

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		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

Item 18b		INSUL POST C8-2100 31mm/kV				
Item	Clause	Description	Units	Schedule A	Schedule B	
1		General				
1.1		Item description				
		"IEC 60273" Classification	-	C8-2100		
		Specific creepage distance	mm/kV	31		
1.2		Purchasing details				
		SAP Number	-	-		
		Supplier	-	-		
		Manufacturer	-	-		
		Manufacturer product type designation/code	-	-		
1.3		Site conditions of service				
		Maximum ambient temperature	Degrees Celcius	45		
		Minimum ambient temperature		-10		
		Maximum daily average		35		
		Maximum daily variation		35		
2		Technical requirements				
2.1		Insulator details				
		Insulator type	-	Solid core		
		Number of insulating units	-	-		
		Mass of complete insulator	kg	-		
		Insulator material	-	Porcelain		
		Colour of glaze	-	Dark Brown		
2.2		Electrical insulation levels				
		Rated lightning impulse withstand voltage (peak)	kV	2100		

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		Rated switching impulse withstand voltage, wet (peak)	kV	1300	
		Rated short time power freq. withstand voltage, wet	kV r.m.s	-	
2.3		Dimensional characteristics			
		Minimum nominal total creepage distance (l)	mm	-	
		Arcing distance (S)	mm	-	
		Creepage factor (l/S)	-	4	
		Shed profile: Plain or Alternating	-	Alternating	
		Minimum shed spacing to projection (s/p) ratio	-	0.65	
		Minimum distance between sheds of the same diameter	mm	30	
		Maximum creepage distance vs. clearance	-	5	
		Shed angle (Between 5 and 22,5 degrees)	Degrees	-	
		Insulator height (across mounting flanges)	mm	4700±5,5	
		Maximum nominal diameter of insulating part	mm	450	
2.4		Mechanical characteristics			
		Bending (cantilever) failing load	N	8000	
		Torsion failing load	Nm	4000	
2.5		Fixing arrangements			
		Top fitting pitch circle diameter	mm	225	
		Top fitting - number of holes	-	4	
		Top fitting - diameter of holes	-	18 (plain)	
		Bottom fitting pitch circle diameter	mm	325	
		Bottom fitting - number of holes	-	8	
		Bottom fitting - diameter of holes	-	18 (plain)	
		Flange material	-	Cast iron	
		Metal finish - minimum hot dip galvanizing thickness	µm	100	
		Cementing material	-	Portland cement	
		Mounting bolt: Length	mm	-	
		Mounting bolt: Type	Grade	8.8	
		Mounting bolt: Size	mm	-	
		Confirmation of the integrity of the supplied fastening arrangement	-	Yes	
4.		Test requirements			
4.1		Type tests - Standard			
		a) Verification of dimensions		Yes	
		b) Dry lightning impulse withstand voltage test		Yes	

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		c) Wet switching impulse withstand voltage test		Yes	
		d) Wet power-frequency withstand voltage test		No	
		e) Mechanical failing load test carried out in bending		Yes	
		f) Mechanical failing load test carried out in torsion		Yes	
4.2		Type tests - Special			
		a) Radio interference test (see IEC 60437);		Yes	
		b) Artificial pollution test (see IEC 60507)		Yes	
4.3		Sample tests			
		a) Verification of the dimensions		Yes	
		b) Temperature cycle test		Yes	
		c) Mechanical failing load test carried out in bending		Yes	
		d) Porosity test		Yes	
		e) Galvanizing test		Yes	
4.4		Routine tests			
		a) Visual examination		Yes	
		b) Mechanical test		Yes	

Annex T- - Type test report summary sheet (To be completed per item)

		Item Number as per Annex A convention :						
Test		File name of electronic test report submitted	Applicable page number	Product code used in type test report	Full product code of item offered	Name of test facility and electronic file name of accreditation certificate/evidence	Comments	Outcome Passed/ Failed
1	Verification of dimensions							
2	Dry lightning impulse withstand voltage test							
3	Wet switching impulse withstand voltage test							
4	Wet power-frequency withstand voltage test							
5	Mechanical failing load test carried out in bending							
6	Radio interference test for items 132kV and above							
7	Artificial pollution test							

Notes:

- [1] If a type test is not submitted or not applicable to the design offered, clear justification must be provided in the comments column.
- [2] Should the product naming convention used in type test report differ from that of the product offered, clear unambiguous explanation must be given indicating how the product tested is applicable to that offered in the comments column provided.
- [3] If any, remaining type tests in the relevant SANS/ IEC standards for Ceramic Station Post Insulators are not listed above, it will be requested and evaluated before factory evaluation or contract award.

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- [4] If more than one type test is contained in a single report, page numbers must also be provided.
- [5] All documents to be provided in hard copy in addition to any soft copies offered, as per tender requirements.

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Annex U- Summary sheet of drawings (To be completed per item)

Item Number as per Annex A convention :							
Detail/Drawing required		Electronic File name of drawing/sheet	Product code used in Drawing/Sheet	Full product code of item offered	Date of Issue	Comments	Submitted (Y/N)
1	All dimensions and associated tolerances of all fasteners and associated fittings						
2	All dimensions and associated tolerances of the insulator body and top and bottom end fittings (mounting hole details, PCD etc.)						
3	Detailed dimensioned profile of shed pair.						
4	Electrical properties: The lightning impulse withstand level (basic insulation level), switching impulse withstand level, power frequency withstand level,						

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	etc.						
5	Mechanical properties: The minimum cantilever and torsion failing loads.						
6	Minimum nominal total creepage distance and specific creepage distance						
7	Corona ring outlines for units 275 kV and above						
8	Mass of complete insulator assembly.						
9	Colour of the glaze						

Notes:

- [1] If a drawing or requested detail is not submitted or not applicable, clear justification must be provided in the comments column. Omission of key information may result in disqualification.
- [2] Drawings must contain the manufacturers name, logo and a unique drawing number as a minimum
- [3] Should the product naming convention used in the drawing/sheet differ from that of the product offered, clear unambiguous explanation must be given indicating how the product indicated is applicable to that offered in the comments column provided.
- [4] All documents to be provided in hard copy in addition to any soft copies offered, as per tender requirements.

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Annex V- Deviations and Declaration (To be completed per item)

Item Number as per Annex A convention :		
Deviation		Comments
1		
2		
3		
4		
5		
6		
7		

Notes:

- [1] For each item, all deviations to any requirement in this specification and associated technical schedule or annex must be listed above with clear explanations/ justification with regards to fitness for use for the full expected life of the product
- [2] All documents to be provided in hard copy in addition to any soft copies offered, as per tender requirements.

Declaration by supplier:

With the exception of the above deviations, this specification, associated technical schedules, factory evaluation and annexes together with the requirements contained within, will be fully complied with in the manufacture, testing, supply, provision of drawing and documents, packaging, labelling, transport and delivery of the product being offered, amongst others. Further it is declared that all information provided has been checked and is correct.

Signature_____ Date: _____

Full Name and Designation of Authorised Representative:_____

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