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TITLE	**SPECIFICATION FOR POLE MOUNTED DISTRIBUTION TRANSFORMERS**	REFERENCE **CP_TSSPEC_096**	REV **8**
		DATE: **MAY 2025**	
		PAGE: **1** OF	**64**

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FOREWORD

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INTRODUCTION

City Power makes use of distribution transformers in the provision of electricity to its customers. Efficiency and reliability of transformers is critical in terms of meeting statutory Quality of Supply parameters as well as customer satisfaction and cost-effective network operation. It is therefore essential that the transformers comply with relevant standards and specifications.

1 SCOPE

This specification defines City Power's requirements for pole-mounted, oil immersed and dry type distribution transformers rated at 100 kVA, 200 kVA, 315 kVA and 500 kVA. Distribution transformers are intended for operation at primary voltages of 6,6 kV and/or 11 kV, and 22 kV.

2 NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

SANS 60815 - Guide for the selection of insulators in respect of polluted conditions.

SANS 61109 - Composite insulators for a.c. overhead lines with a nominal voltage greater than 1 000 Volts – Definitions, test methods and acceptance criteria.

SANS 555 - Unused and reclaimed mineral insulating oils for transformers and switchgear

SANS 780: 2021 - Distribution Transformers

SANS 60076-11:2020 - Dry Type Distribution Transformers

SANS 1091 - National Colour Standard

SANS 60137 - Insulated bushings for alternating voltages above 1000 volts

SANS 121:2009 - Hot-dip galvanized coatings and fabricated iron and steel articles – specifications and test methods

NRS 053 - Accessories for medium voltage power cables (3,8/6,6 kV to 19/33 kV)

CP_TSSPEC_081 - Specification for thermal indicator stickers

3 DEFINITIONS AND ABBREVIATIONS

The definitions and abbreviations in the above documents shall apply to this specification.

Abbreviations

mm – millimetres

SR – single ratio

DR – dual ratio

% - percentage

LV – low voltage

MV – medium voltage

4 REQUIREMENTS

4.1 General

4.1.1 All transformers shall comply with SANS 780 and SANS 60076-11 for dry type transformers and this specification.

4.1.2 Nothing in this specification shall lessen the obligations of the supplier. The supplier shall be fully responsible for the design and its satisfactory performance in service. Acceptance by City Power shall not relieve the supplier of the responsibility for the adequacy of the design.

4.1.3 In accordance with SANS 780 for oil immersed type and SANS 60076-11 for dry type transformers, the following construction details shall be applicable:

a) Transformers shall be sealed;

b) Oil level indicators are not required;

c) Drain valves are not required;

d) Pole-mounting brackets are required (100 kVA and 200 kVA); and

e) 315 and 500 kVA transformers shall be mounted on platforms (H-structures).

4.1.4 All transformers shall be three phase with a Dyn 11 vector group.

4.1.5 The MV nominal voltage shall be 11 kV and 22 kV for the 100 kVA, 200 kVA and 500 kVA transformers. 315 kVA transformer shall be 6,6 kV/11 kV (dual ratio). The rated voltage (U_m) of the transformer shall be 7,2 kV, 12 kV and 24 kV for 6,6 kV, 11 kV and 22 kV systems respectively. The transformer shall be capable of operating continuously at U_m without loss of service due to over-fluxing of the core.

4.1.6 The rated impulse voltage withstand level (BIL) and the rated short-duration power frequency withstand rms voltage (1 minute) of the transformer shall be as specified in Table 1 below.

Rated voltage(kV rms)	BIL (kV peak)	Rated short-duration power frequency withstand rms. voltage (kV rms – 1 minute)
24	150	50
12 or 7,2	95	28
0,415	30	8

Table 1: Rated insulation levels

4.1.7 All transformers shall be supplied filled with new insulating oil complying with SANS 555. The oil level shall be at least 150 mm above any live part.

4.1.8 All outdoor transformers shall be hot dip galvanised in accordance with SANS 780:2021 (clause 8.23.4).

4.1.9 All transformers shall be supplied with a self-adhesive temperature rise thermal indicator sticker which shall indicate any overloading which occurs. The sticker shall be situated alongside the tap-changer, and shall comply with CP_TSSPEC_081.

4.1.10 All neutral conductors within the transformer shall have the same cross-sectional area as the phase conductors and in addition shall be rated to carry the full phase current continuously.

4.1.11 The final colour of the transformers shall be Avocado Green (C12 of SANS 1091).

4.1.12 Transformer faults that cannot be explained adequately by City Power personnel will be referred to the supplier. Such faults shall be investigated by the supplier and a detailed written report submitted to City Power within one month of the supplier being notified of the fault. The supplier's portion of the cost of the investigation shall be for the supplier's account, and City Power shall not entertain any claims in this respect.

4.1.13 If an alternative to oil immersed distribution transformers is to be provided, (e.g. Dry type distribution transformers), all data sheet and type test reports are to be submitted as per SANS 60076-11.

4.1.14 All windings (MV and LV) shall be copper. Aluminium windings shall not be accepted.

4.1.15 A transformer shall be so designed and constructed as to have an audio-sound level, measured in accordance with SANS 60076-10, which does not exceed the values given in table 2 below:

Rated Power (kVA)	Maximum audio sound level dB(A)
5 to 200	48
≤315	50
≤500	52

Table 2: Maximum limits of transformer audio sound levels

4.1.16 The pole mounted transformers covered by this specification are required to be installed on poles or H – structures and shall comply with SANS 780 as per table 5 and table 6.

4.2 No-load secondary voltage

4.2.1 The transformers shall have a no-load secondary voltage of 415 V at the 11 kV or 22 kV principal tap.

4.3 Tapping connections

4.3.1 The transformers shall have a tapping range of -6 %, -3 %, 0 %, +3 % and +6 %, achieved by an off-load (off-circuit) tapping switch.

4.3.2 The operation of the off-load tapping switch shall be such that by turning the tap handle clockwise, the tap position number is increased in accordance with Table 2 below.

Tap position number	Primary voltage (%)	No-load secondary voltage
1	106	415
2	103	415
3	100	415
4	97	415
5	94	415

Table 3: Off-load tapping switch connection

4.4 Earthing terminals

4.4.1 Earthing terminals shall be fitted. They shall comprise a stainless steel M12 boss welded to the tank and fitted with an M12 stainless steel bolt. One terminal shall be on the low-voltage side of the tank, directly below the neutral terminal, and one on the high-voltage side of the tank, directly below the centre bushing. The threads and boss face may not be painted.

4.4.2 Earthing terminals shall be positioned at least 50 mm above the base level of the transformer, and at least 50 mm from any cooling tube. The LV earthing terminal shall be between 250 mm and 300 mm below the neutral bushing.

4.4.3 An earthing terminal (in the form of a stud welded to the inside of the terminal box), together with washers, a nut and a lock-nut, shall be fitted.

4.4.4 A suitable removable tinned copper bus bar shall be fitted to bond the LV neutral transformer bushing and the LV earth terminal.

4.5 Surge arrester brackets

4.5.1 Where the mounting of an MV surge arrester is required on a transformer fitted with outdoor bushings, suitable brackets shall be fitted adjacent to the MV bushings

4.5.2 The surge arrester bracket shall be mounted high enough on the transformer tank such that the bottom of the surge arrester does not extend below the base of the tank.

4.5.3 The brackets shall allow sufficient clearance from the tank such that the tank does not interfere with the operation of the surge arrester. Each bracket shall have a hole of diameter 14 mm for mounting the surge arrester (see Figure A.1).

4.6 Pole mounting brackets

4.6.1 The 100 kVA and 200 kVA transformers, which are intended for single pole mounting, shall be equipped with single pole mounting brackets in accordance with Figure A.3.

4.6.2 In addition to the requirements of 4.6.1, two clamps and four threaded rods (M20 x 250 mm) shall be supplied. Each threaded rod shall be supplied with two nuts, two flat washers and one spring washer. The clamps, threaded rods, flat washers, spring washers and nuts shall be hot dip galvanised. The centres of the top and bottom brackets shall be 400 mm apart.

Note: 315 kVA and 500 kVA transformers shall also be able to be mounted on platforms (H-structure)

4.7 Bushings

4.7.1 Outdoor immerged bushings shall comply with the relevant requirements of SANS 1037 (ceramic) and SANS 60137 or SANS 61462 (hollow core composite bushings).

4.7.2 Bushings within cable connected boxes shall comply with the relevant requirements of SANS 876 and SANS 60137.

4.7.3 All bushings other than bushings intended for cable connected boxes and for indoor and enclosed installations (for example, a miniature substation), shall be of the outdoor type.

4.7.4 Bushings shall comply with the following requirements:

a) Outdoor MV bushings shall be clamped at the base of the bushing.
b) Taking into consideration specific environmental and service conditions, outdoor bushings shall comply with the requirements of the relevant part of SANS 60815.
c) MV bushings shall have an M12 (12 mm diameter) stem.
d) LV bushings of 100 kVA or smaller transformers shall have an M12 stem, 200kVA shall have a M14 stem, 315 KVA shall have a M18 stem and 500kVA shall have a M24 stem.

NOTE 1: On a fully threaded stem, the nut used for the sealing of bushings shall be one size larger than that used for the fastening of conductors.

NOTE 2: See 4.5 for the requirements for the current rating of neutral bushings in SANS 780

4.7.5 Only bushings made of porcelain or silicone rubber shall be acceptable.

4.7.6 The minimum creepage distance of the bushings shall be 31 mm/kV.

4.7.7 The MV bushing stem shall be copper with an M12 diameter and shall be threaded.

4.7.8 The LV bushings shall be supplied with a flag suitable for the connection of the total load of the transformer. The flag shall have 2 holes, each hole shall be fitted with a M12 set screw, 2 x flat washers, a spring washer and a nut. The set screw lengths shall be 40 mm for the 100 kVA, 200 kVA and 315 kVA transformers and 50 mm for the 500 kVA transformers.

4.7.9 The phase sequence of all bushings shall be clearly marked.

4.8 Losses

4.8.1 The design of the transformer shall be approved by City Power and the calculations for the losses shall be done for the proto type transformer after the awarding of the tender. The following capitalization formula will be used in the evaluation of any tender, to establish the net present value of the total cost of the transformer:

$$Total\ cost = A + C_i P_i + C_c P_c$$

where

A is the cost of purchasing and installing the transformer (capital cost), R;

P_i is the no-load (iron) losses, kW;

P_c is the load (copper) losses, kW;

C_i is the capitalized cost of no-load (iron) loss, R/kW; and

C_c is the capitalized cost of load (copper) loss, R/kW.

4.8.2 The economic life of a transformer is assumed to be 25 years.

4.8.3 The values of parameters C_i and C_c are given in the technical schedules. These parameters shall be revised with each enquiry.

4.8.4 Regardless of the use of the capitalization formula, the losses shall not be greater than those given in Table 4 below:

Rated power (kVA)	No-load loss (Po)	Load loss (PLL)
100	190	1500
200	320	2600
315	450	3600
500	630	5200

Item	Tolerance
a) Total losses See Note 1	+10 % of the total losses
b) Measured component losses See Note 1	+15 % of each component loss, provided that the tolerance for total losses is not exceeded

NOTE 1: The loss tolerances of multi-winding transformers apply to every pair of windings unless the guarantee states that they apply to a given load condition as per SANS 60076 -1.

Table 4 – Maximum losses

4.9 Dual ratio transformers

4.9.1 Where dual-ratio transformers are specified, the changeover from 6,6 kV to 11 kV shall be carried out by means of a suitable changeover switch. The changeover switch control handle shall be capable of being locked in either position by means of a padlock with a 6 mm diameter shackle. The switch control handle shall be positive in action and the selected arrangement of the winding clearly indicated. It shall not be possible for the switch to be left other than in a position where the winding is connected for either a 6,6 kV or 11 kV supply. A cover or similar arrangement shall be fitted over the switch handle clearly marked "DUAL RATIO CHANGEOVER SWITCH" in red lettering. The cover shall require the use of a tool in order to remove it. It shall not be possible to place the cover over the tap selector switch. In addition, the changeover switch itself shall be marked with the two positions so that it is possible, by inspection alone, to determine whether the winding is connected for 6,6 kV or 11 kV.

4.9.2 Dual ratio transformers shall carry a warning notice fixed to the transformer in a prominent position, bearing the following legend in red:

WARNING

6,6/11 kV Dual Ratio Transformer
Check that the transformer windings are correctly connected.

4.9.3 In addition to the above, one reversible brass tag engraved or stamped "CONNECTED FOR 11 kV" on one side and "CONNECTED FOR 6,6 kV" on the other, shall be bolted (not glued) adjacent to the rating plate near the tap changer and dual ratio changeover switch, where it can easily be observed.

4.9.4 The tap selector switch shall be clearly marked with a permanently affixed label bearing the words "TAP SWITCH". All labels shall be so placed such that no confusion exists as to the function of the ratio changeover switch or the tap selector switch.

4.9.5 Dual ratio and tap changer switch shall only be operated when the transformer is de-energised.

5 TESTS

5.1 Type Tests

The following type tests shall be performed on each design and in accordance with SANS 780 and SANS 60076-11:

e) Temperature rise test (for dry and oil type);

f) Full wave lightning impulse test (LI) (for dry type)

g) Dielectric type test (for oil type)

h) Short circuit (sc) trip test and transformer short circuit withstand test (CSP transformers) (for oil type)

i) Cable connected boxes test (for oil type)

j) Zero sequence impedance test (for oil type)

k) Overload temperature rise test (for oil type)

5.2 Routine tests

The following routine tests shall be performed in accordance with SANS 780 and SANS 60076-11 on each transformer:

a) Measurement of winding resistance (for dry type);

b) Measurement of voltage ratio and phase displacement (for dry type);

c) Measurement of short circuit impedance and load loss (for dry type);

d) Measurement of no-load loss and current (for dry type);

e) Applied voltage test (AV) (for dry type);

f) Induced voltage withstand test (IVW) (for dry type);

g) Measurement of paint thickness (for oil type); and

h) Test for the effectiveness of the sealing (for oil type).

6 MARKING AND PACKAGING

6.1 Each transformer shall bear the SANS 780 and SANS 60076-11 for dry type mark of approval.

6.2 In addition to the requirements of the relevant clauses of SANS 780 and SANS 60076-11 for dry type, each transformer rating plate shall have the following information:

a) Year of manufacture;

b) City Power order number; and

c) City Power SAP number.

6.3 The primary voltage, secondary voltage, transformer rating (in kVA), vector group, mass and City Power SAP number shall be clearly marked, in durable white paint, on the tank in letters not less than 50 mm high (e.g. 11000/6600/415 V Dyn 11 315 kVA 3 500 kg SAP No. 802).

7 DOCUMENTATION

7.1 Single copies of type test certificates, in English, shall be submitted.

7.2 Type test reports shall be arranged in the sequence given in the A and B schedules of this specification and shall be clearly marked with the number and title given in the Schedules (e.g. 31 - Temperature rise test). Any additional test certificates shall be marked “Additional Tests” and kept separate from the specified test certificates.

7.3 Single copies of drawings showing the following details shall be submitted as part of the tender:

a) outline dimensions, including the surge arresters;

b) transformer mounting hole arrangement;

c) terminal arrangement and labelling;

d) position of tapping switch;

e) earthing terminals; and

f) rating and diagram plate.

8 TRAINING

8.1 The following certified training course shall be offered for City Power's staff:

a) Correct procedure for the storage, handling and operation of transformers.

8.2 The associated costs for the certified training course in 8.1 shall be given per person and shall be fixed for the period of the contract at no cost.

9 QUALITY ASSURANCE

A quality management system shall be set up in order to assure the quality during manufacture, installation, removal, transportation and disposal of distribution transformer.Guidance on the requirements for a quality management system may be found in the following standards: ISO 9001:2015. The details shall be subject to agreement between the purchaser and supplier.

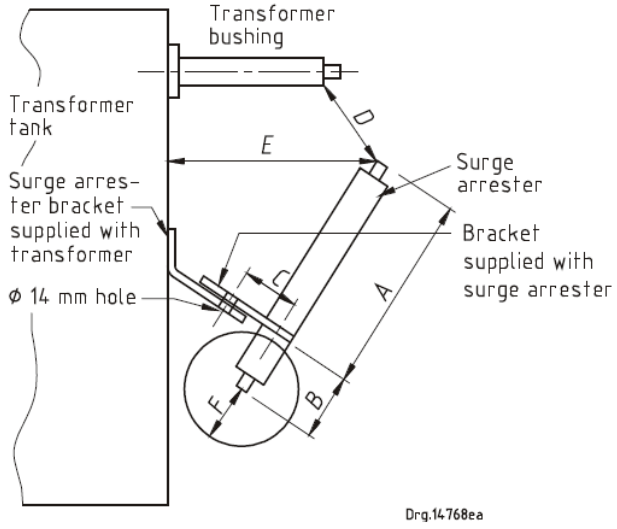
10 ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to ensure the proper environmental management and compliance is adhered to during manufacture, installation, removal, transportation and disposal of distribution transformer. Guidance on the requirements for an environmental management system shall be found in ISO 14001:2015 standards. The details shall be subject to agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy.

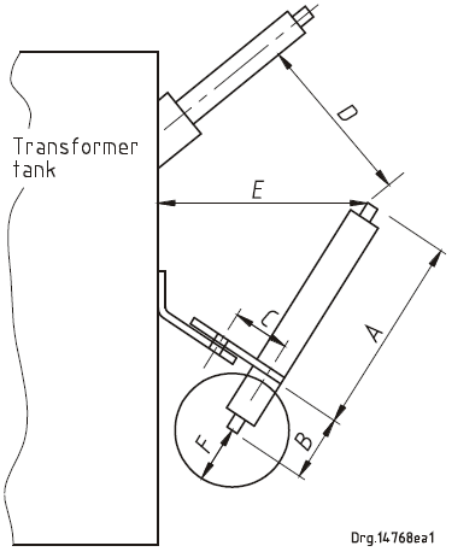
11 HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance during manufacture, installation, removal, transportation and disposal of distribution transformer. Guidance on the requirements of a health and safety plan shall be found in ISO 45001:2018 standards. The details shall be subject to agreement between City Power and the Supplier.

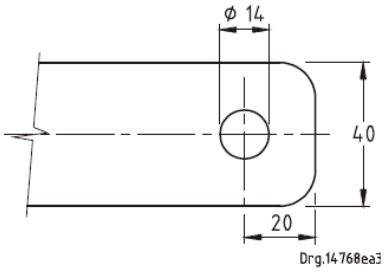
Annex A - Drawings



a) **Horizontal transformer bushing surge arrester clearances**



b) **Tilted transformer bushing surge arrester clearances**



c) **Transformer bracket for surge arrester**

1	2	3	4
Parameter	**Dimension** mm		
	Rated voltage of transformer		
	11 kV	22 kV	33 kV
A	200-300	300-400	370-570
B (max.)	75	75	75
C (min.)	130	130	130
D (min.)	200	200	200
E (min.)	190	300	400
F (min.)	150	150	150

Key

Parameters A, B and C are given values specified by the surge arrester manufacturer.

D shortest distance between the surge arrester line terminal and the transformer bushing.
E shortest distance between the surge arrester line terminal and any earthed metal.
F radius is clear of any object.

Transformers shall be designed to comply with parameters D, E and F.

Figure A.1 –Surge arrester bracket details (*extracted from* SANS 870:2021)

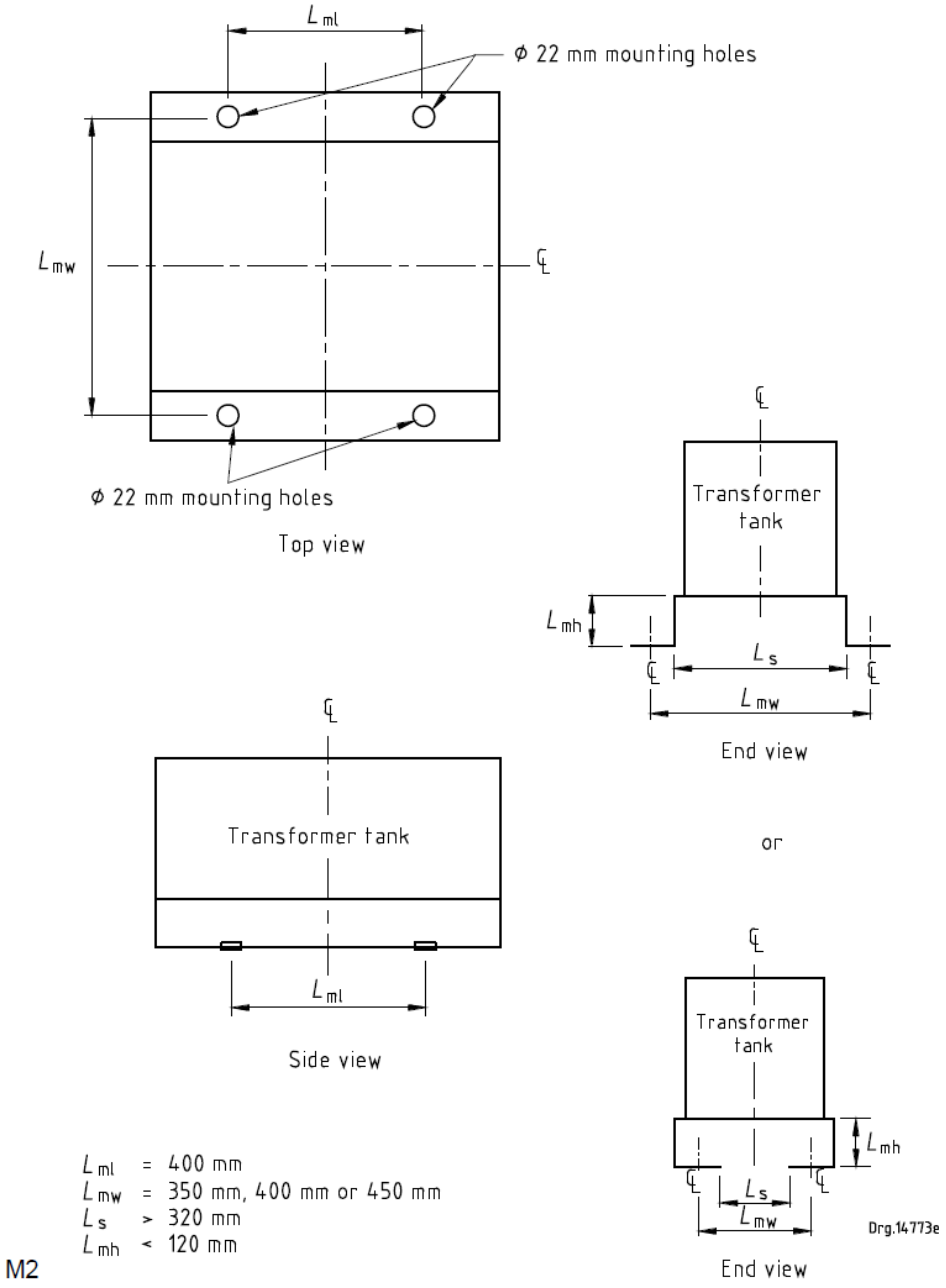


Figure A.2 – Transformer mounting hole arrangement (*extracted from* SANS 870:2021)

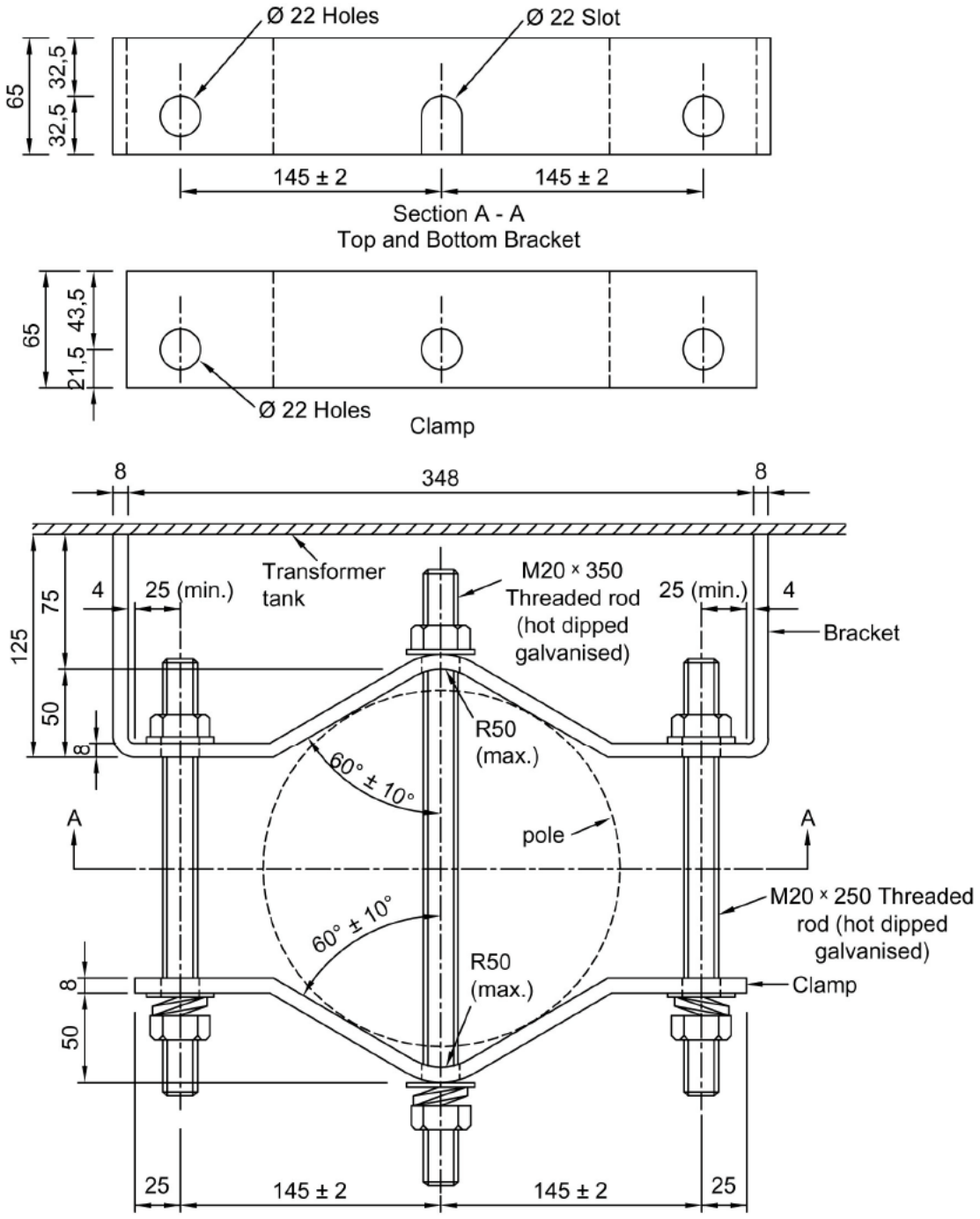


Figure A.3 – Pole mounting clamping details (*extracted from* SANS 870:2021)

Annex B - Bibliography

Eskom technical specification SCSSCAAH4 rev 3A, Oil-immersed power transformers up to 500 kVA and 33 kV

CP_TSSPEC_005, Specification for 11 kV miniature substations with rating not exceeding 1000 kVA

Annex C - Revision information

DATE	REV. NO.	NOTES
Nov 2003	0	First issue
March 2006	1	General editing, Update of format, Reference to CP_TSSPEC_081 included, Increased constructional requirements, removal of oil level indicators, A and B Schedules amended, Inclusion of copper winding material requirement
June 2009	2	General editing
June 2013	3	General editing, Updating new study committee, Addition of clause 4.1.13-dry type transformers
January 2018	4	General editing, Included technical schedule for dry type transformer
January 2022	5	General editing, updated SHERQ clauses and included 10, updated type and routine tests, inserted table 2 audio sound levels,
April 2022	6	General editing, Included documentation (7), removed resin type for LV bushings in technical schedule.
August 2022	7	General editing Revised all technical schedules Revised drawings as per SANS 780:2021 Updated all tests as per SANS 780:2021 Included stem sizes 4.7.4.(d)
January 2025	8	General editing, Revised clause 9,10 and 11 Remove corrugated tank Inclusion of 22 kV 315 kVA transformer

Annex C - Technical schedules A and B

for

11/6.6 kV 315 kVA Oil Type Pole Transformer - DR (SAP number 802)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	6,6/11	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	315	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
8	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
9	4.1.16	Transformer dimensions (width)	mm	1 100 max.	
10	4.1.16	Transformer dimensions (length)	mm	1 400 max.	
11	4.7	MV bushing type		Outdoor	
12	4.7	MV bushing material		Porcelain/ silicone	
13	4.7	MV bushing creepage distance	mm/kV	31	
14	4.7	MV stem diameter		M12	
15	4.7	LV bushing material		Porcelain	
16	4.7	LV bushing creepage distance	mm/kV	31	
17	4.7	LV stem diameter		M18	
18	4.7	Flag supplied?	Yes/No	Yes	
19	4.1.14	MV winding material		Copper	
20	4.1.14	LV winding material		Copper	
21		Type tests in accordance with SANS 780: 2019		XXXX	XXXX
22	5.1	a) temperature rise test	Yes/No	Yes	
23	5.1	b) Dielectric type test	Yes/No	Yes	
24	5.1	e) short-circuit (sc) trip test and transformer sc withstand test	Yes/No	Yes	
25	5.1	f) zero sequence impedance test	Yes/No	Yes	
26		Routine tests as per SANS 780:2019		XXXX	XXXX
27	5.2	a) measurement of paint thickness	Yes/No	Yes	
28	5.2	b) test for the effectiveness of the sealing	Yes/No	Yes	
29	7	Documentation	Yes/No	Yes	

Note: Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

Deviation schedule for

11/6.6 kV 315 kVA Oil Type Pole Transformer - DR (SAP number 802)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

for

11 kV 200 kVA Oil Type Pole Transformer SR (SAP number 994)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	11	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	200	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
8	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
9	4.1.16	Transformer dimensions (width)	mm	1 100 max.	
10	4.1.16	Transformer dimensions (length)	mm	1 400 max.	
11	4.7	MV bushing type		Outdoor	
12	4.7	MV bushing material		Porcelain/ silicone	
13	4.7	MV bushing creepage distance	mm/kV	31	
14	4.7	MV stem diameter		M12	
15	4.7	LV bushing material		Porcelain	
16	4.7	LV bushing creepage distance	mm/kV	31	
17	4.7	LV stem diameter		M14	
18	4.7	Flag supplied?	Yes/No	Yes	
19	4.1.14	MV winding material		Copper	
20	4.1.14	LV winding material		Copper	
21		Type tests in accordance with SANS 780: 2019		XXXX	XXXX
22	5.1	a) temperature rise test	Yes/No	Required	
23	5.1	b) Dielectric type test	Yes/No	Required	
24	5.1	e) short-circuit (sc) trip test and transformer sc withstand test	Yes/No	Required	
25	5.1	f) zero sequence impedance test			
27		Routine tests as per SANS 780:2019		XXXX	XXXX
28	5.2	a) measurement of paint thickness	Yes/No	Yes	
29	5.2	b) test for the effectiveness of the sealing	Yes/No	Yes	

30	7	Documentation	Yes/No	Yes	
31	4.6.1	Mounting brackets	Yes/No	Yes	

Note: Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

Deviation schedule for

11 kV 200 kVA Oil Type Pole Transformer SR (SAP number 994)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

for

22 kV 200 kVA Oil Type Pole Transformer SR- DYN11 (SAP number 2311)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	22	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	200	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
8	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
9	4.1.16	Transformer dimensions (width)	mm	1 100 max.	
10	4.1.16	Transformer dimensions (length)	mm	1 400 max.	
11	4.7	MV bushing type		Outdoor	
12	4.7	MV bushing material		Porcelain/ silicone	
13	4.7	MV bushing creepage distance	mm/kV	31	
14	4.7	MV stem diameter		M12	
15	4.7	LV bushing material		Porcelain	
16	4.7	LV bushing creepage distance	mm/kV	31	
17	4.7	LV stem diameter		M14	
18	4.7	Flag supplied	Yes/No	Yes	
19	4.1.14	MV winding material		Copper	
20	4.1.14	LV winding material		Copper	
21		Type tests in accordance with SANS 780: 2019		XXXX	XXXX
22	5.1	a) temperature rise test	Yes/No	Yes	
23	5.1	b) Dielectric type test	Yes/No	Yes	
24	5.1	c) short-circuit (sc) trip test and transformer sc withstand test	Yes/No	Yes	
25		d) zero sequence impedance test	Yes/No	Yes	
26		Routine tests as per SANS 780:2019		XXXX	XXXX
27	5.2	a) measurement of paint thickness	Yes/No	Yes	
28	5.2	b) test for the effectiveness of the sealing	Yes/No	Yes	

29	7	Documentation	Yes/No	Yes	
30	4.6.1	Mounting brackets	Yes/No	Yes	

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

Deviation schedule for

22 kV 200 kVA Oil Type Pole Transformer SR- DYN11 (SAP number 2311)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Annex C - Technical schedules A and B

for

22 kV 500 kVA Oil Type Pole Transformer - SR- DYN11 (SAP number 2312)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	22	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	500	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
8	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
9	4.1.16	Transformer dimensions (width)	mm	1 200 max.	
10	4.1.16	Transformer dimensions (length)	mm	1 800 max.	
11	4.7	MV bushing type		Outdoor	
12	4.7	MV bushing material		Porcelain/ silicone	
13	4.7	MV bushing creepage distance	mm/kV	31	
14	4.7	MV stem diameter		M12	
15	4.7	LV bushing material		Porcelain	
16	4.7	LV bushing creepage distance	mm/kV	31	
17	4.7	LV stem diameter		M24	
18	4.7	Flag supplied	Yes/No	Yes	
19	4.1.14	MV winding material		Copper	
20	4.1.14	LV winding material		Copper	
21		Type tests in accordance with SANS 780: 2019		XXXX	XXXX
22	5.1	a) temperature rise test	Yes/No	Yes	
23	5.1	b) Dielectric type test	Yes/No	Yes	
24	5.1	c) short-circuit (sc) trip test and transformer sc withstand test	Yes/No	Yes	
25	5.1	d) zero sequence impedance test	Yes/No	Yes	
26		Routine tests as per SANS 780:2019		XXXX	XXXX

27	5.2	a) measurement of paint thickness	Yes/No	Yes	
28	5.2	b) test for the effectiveness of the sealing	Yes/No	Yes	
29	7	Documentation	Yes/No	Yes	

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

Deviation schedule for

22 kV 500 kVA Oil Type Pole Transformer - SR- DYN11 (SAP number 2312)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

for

11 kV 100 kVA Oil Type Pole Transformer – SR- DYN11 (SAP number 993)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	11	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	100	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
8	4.1.16	Transformer dimensions (height)	mm	1 300 max.	
9	4.1.16	Transformer dimensions (width)	mm	1 000 max.	
10	4.1.16	Transformer dimensions (length)	mm	1 300 max.	
11	4.7	MV bushing type		Outdoor	
12	4.7	MV bushing material		Porcelain/ silicone	
13	4.7	MV bushing creepage distance	mm/kV	31	
14	4.7	MV stem diameter		M12	
15	4.7	LV bushing material		Porcelain	
16	4.7	LV bushing creepage distance	mm/kV	31	
17	4.7	LV stem diameter		M12	
18	4.7	Flag supplied	Yes/No	Yes	
19	4.1.14	MV winding material		Copper	
20	4.1.14	LV winding material		Copper	
21		Type tests in accordance with SABS 780: 2019		XXXX	XXXX
22	5.1	a) temperature rise test	Yes/No	Yes	
23	5.1	b) Dielectric type test	Yes/No	Yes	
24	5.1	e) short-circuit (sc) trip test and transformer sc withstand test	Yes/No	Yes	
25	5.1	c) zero sequence impedance test	Yes/No	Yes	
26		Routine tests as per SANS 780:2019		XXXX	XXXX
27	5.2	a) measurement of paint thickness	Yes/No	Yes	
28	5.2	b) test for the effectiveness of the sealing	Yes/No	Yes	
29	7	Documentation	Yes/No	Yes	

30	4.6.1	Mounting brackets	Yes/No	Yes	

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

Deviation schedule for

11 kV 100 kVA Oil Type Pole Transformer – SR- DYN11 (SAP number 993)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

for

22 kV 100 kVA Oil Type Pole Transformer – SR – DYN11- (SAP number 831)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	22	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	100	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
8	4.1.16	Transformer dimensions (height)	mm	1 300 max.	
9	4.1.16	Transformer dimensions (width)	mm	1 000 max.	
10	4.1.16	Transformer dimensions (length)	mm	1 300 max.	
11	4.7	MV bushing type		Outdoor	
12	4.7	MV bushing material		Porcelain/ silicone	
13	4.7	MV bushing creepage distance	mm/kV	31	
14	4.7	MV stem diameter		M12	
15	4.7	LV bushing material		Porcelain	
16	4.7	LV bushing creepage distance	mm/kV	31	
17	4.7	LV stem diameter		M12	
18	4.7	Flag supplied	Yes/No	Yes	
19	4.1.14	MV winding material		Copper	
20	4.1.14	LV winding material		Copper	
21		Type tests in accordance with SANS 780: 2019		XXXX	XXXX
22	5.1	a) temperature rise test	Yes/No	Yes	
23	5.1	b) Dielectric type test	Yes/No	Yes	
24	5.1	e) short-circuit (sc) trip test and transformer sc withstand test	Yes/No	Yes	
25	5.1	c) zero sequence impedance test	Yes/No	Yes	
26		Routine tests as per SANS 780:2019		XXXX	XXXX
27	5.2	a) measurement of paint thickness	Yes/No	Yes	
28	5.2	b) test for the effectiveness of the sealing	Yes/No	Yes	
29	7	Documentation	Yes/No	Yes	

30	4.6.1	Mounting brackets	Yes/No	Yes	

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Technical schedules A and B

Deviation schedule for

22 kV 100 kVA Oil Type Pole Transformer – SR – DYN11- (SAP number 831)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

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Name in block letters Signature

Full name of company: _____

Technical schedules A and B

for

22 kV 315 kVA Oil Type Pole Transformer – SR – DYN11- (SAP number 2931)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	22	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	315	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
8	4.1.16	Transformer dimensions (height)	mm	1 300 max.	
9	4.1.16	Transformer dimensions (width)	mm	1 000 max.	
10	4.1.16	Transformer dimensions (length)	mm	1 300 max.	
11	4.7	MV bushing type		Outdoor	
12	4.7	MV bushing material		Porcelain/ silicone	
13	4.7	MV bushing creepage distance	mm/kV	31	
14	4.7	MV stem diameter		M12	
15	4.7	LV bushing material		Porcelain	
16	4.7	LV bushing creepage distance	mm/kV	31	
17	4.7	LV stem diameter		M12	
18	4.7	Flag supplied	Yes/No	Yes	
19	4.1.14	MV winding material		Copper	
20	4.1.14	LV winding material		Copper	
21		Type tests in accordance with SANS 780: 2019		XXXX	XXXX
22	5.1	a) temperature rise test	Yes/No	Yes	
23	5.1	b) Dielectric type test	Yes/No	Yes	
24	5.1	e) short-circuit (sc) trip test and transformer sc withstand test	Yes/No	Yes	
25	5.1	c) zero sequence impedance test	Yes/No	Yes	
26		Routine tests as per SANS 780:2019		XXXX	XXXX
27	5.2	a) measurement of paint thickness	Yes/No	Yes	
28	5.2	b) test for the effectiveness of the sealing	Yes/No	Yes	
29	7	Documentation	Yes/No	Yes	

30	4.6.1	Mounting brackets	Yes/No	Yes	

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Full name of company: _____

Technical schedules A and B

Deviation schedule for

22 kV 315 kVA Oil Type Pole Transformer – SR – DYN11- (SAP number 2931)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Annex C - Technical schedules A and B

for

11 kV 315 kVA Dry Type Pole Transformer- DR – DYN11 (SAP number 3637)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	6,6/11	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	315	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
7	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
8	4.1.16	Transformer dimensions (width)	mm	1 100 max.	
9	4.1.16	Transformer dimensions (length)	mm	1 400 max.	
10	4.7	MV bushing type		Outdoor	
11	4.7	MV bushing material		Porcelain/ silicone	
12	4.7	MV bushing creepage distance	mm/kV	31	
13	4.7	MV stem diameter		M12	
14	4.7	LV bushing material		Porcelain	
15	4.7	LV bushing creepage distance	mm/kV	31	
16	4.7	LV stem diameter		M18	
17	4.1.14	MV winding material		Copper	
18	4.1.14	LV winding material		Copper	
19		Type tests as per SANS 60076-1 : 2020		XXXX	XXXX
20	5.1	a) temperature rise test		Required	
21	5.1	b) full wave lightning impulse test (LI)		Required	
22		Routine tests as per SANS 60076-11:2020		XXXX	XXXX
23	5.2	a) measurement of winding resistance	Yes/No	Yes	
24	5.2	b) measurement of voltage ratio and check of phase displacement	Yes/No	Yes	
25	5.2	c) measurement of short-circuit impedance and load loss	Yes/No	Yes	

26	5.2	d) measurement of no-load loss and current	Yes/No	Yes	
27	5.2	e) applied voltage test (AV)	Yes/no	Yes	
28	5.2	f) induced voltage withstand test (IVW)	Yes/No	Yes	
29	5.2	g) partial discharge measurement	Yes/No	Yes	
30	4.7	Flag supplied	Yes/No	Yes	
31	7	Documentation	Yes/No	Yes	

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

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Full name of company: _____

Technical schedules A and B

Deviation schedule for

11 kV 315 kVA Dry Type Pole Transformer- DR – DYN11 (SAP number 3637)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Full name of company: _____

Technical schedules A and B

for

11 kV 200 kVA Dry Type Pole Transformer – SR – DYN11 (SAP number 3638)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	11	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	200	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
7	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
8	4.1.16	Transformer dimensions (width)	mm	1 100 max.	
9	4.1.16	Transformer dimensions (length)	mm	1 400 max.	
10	4.7	MV bushing type		Outdoor	
11	4.7	MV bushing material		Porcelain/ silicone	
12	4.7	MV bushing creepage distance	mm/kV	31	
13	4.7	MV stem diameter		M12	
14	4.7	LV bushing material		Porcelain	
15	4.7	LV bushing creepage distance	mm/kV	31	
16	4.7	LV stem diameter		M14	
17	4.1.14	MV winding material		Copper	
18	4.1.14	LV winding material		Copper	
19		Type tests as per SANS 60076-1 : 2020		XXXX	XXXX
20	5.1	a) temperature rise test	Yes/No	Yes	
21	5.1	b) full wave lightning impulse test (LI)	Yes/No	Yes	
22		Routine tests as per SANS 60076-11:2020		XXXX	XXXX
23	5.2	a) measurement of winding resistance	Yes/No	Yes	
24	5.2	b) measurement of voltage ratio and check of phase displacement	Yes/No	Yes	
25	5.2	c) measurement of short-circuit impedance and load loss	Yes/No	Yes	
26	5.2	d) measurement of no-load loss and current	Yes/No	Yes	
27	5.2	e) applied voltage test (AV)	Yes/No	Yes	

28	5.2	f) induced voltage withstand test (IVW)	Yes/No	Yes	
29	5.2	g) partial discharge measurement	Yes/No	Yes	
30	4.7	Flag supplied?	Yes/No	Yes	
31	7	Documentation	Yes/No	Yes	
32	4.6.1	Mounting brackets	Yes/No	Yes	

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Technical schedules A and B

Deviation schedule for

11 kV 200 kVA Dry Type Pole Transformer – SR – DYN11 (SAP number 3638)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Technical schedules A and B

for

22 kV 200 KVA Dry Type Pole Transformer – SR – DYN11 (SAP number 3641)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	22	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	200	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
7	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
8	4.1.16	Transformer dimensions (width)	mm	1 100 max.	
9	4.1.16	Transformer dimensions (length)	mm	1 400 max.	
10	4.7	MV bushing type		Outdoor	
11	4.7	MV bushing material		Porcelain/ silicone	
12	4.7	MV bushing creepage distance	mm/kV	31	
13	4.7	MV stem diameter		M12	
14	4.7	LV bushing material		Porcelain	
15	4.7	LV bushing creepage distance	mm/kV	31	
16	4.7	LV stem diameter		M14	
17	4.1.14	MV winding material		Copper	
18	4.1.14	LV winding material		Copper	
19		Type tests as per SANS 60076-1 : 2020		XXXX	XXXX
20	5.1	a) temperature rise test	Yes/No	Yes	
21	5.1	b) full wave lightning impulse test (LI)	Yes/No	Yes	
22		Routine tests as per SANS 60076-11:2020		XXXX	XXXX
23	5.2	a) measurement of winding resistance	Yes/No	Yes	
24	5.2	b) measurement of voltage ratio and check of phase displacement	Yes/No	Yes	
25	5.2	c) measurement of short-circuit impedance and load loss	Yes/No	Yes	
26	5.2	d) measurement of no-load loss and current	Yes/No	Yes	

27	5.2	e) applied voltage test (AV)	Yes/No	Yes	
28	5.2	f) induced voltage withstand test (IVW)	Yes/No	Yes	
29	5.2	g) partial discharge measurement	Yes/No	Yes	
30	4.7	Flag supplied	Yes/No	Yes	
31	7	Documentation	Yes/No	Yes	
32	4.6.1	Mounting brackets	Yes/No	Yes	

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

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Technical schedules A and B

Deviation schedule for

22 kV 200 KVA Dry Type Pole Transformer – SR – DYN11 (SAP number 3641)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Annex D - Technical schedules A and B

for

22 kV 500 kVA Dry Type Pole Transformer – SR – DYN11 (SAP number 3642)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	22	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	500	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
7	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
8	4.1.16	Transformer dimensions (width)	mm	1 200 max.	
9	4.1.16	Transformer dimensions (length)	mm	1 800 max.	
10	4.7	MV bushing type		Outdoor	
11	4.7	MV bushing material		Porcelain/ silicone	
12	4.7	MV bushing creepage distance	mm/kV	31	
13	4.7	MV stem diameter		M12	
14	4.7	LV bushing material		Porcelain	
15	4.7	LV bushing creepage distance	mm/kV	31	
16	4.7	LV stem diameter		M24	
17	4.1.14	MV winding material		Copper	
18	4.1.14	LV winding material		Copper	
19		Type tests as per SANS 60076-1 : 2020		XXXX	XXXX
20	5.1	a) temperature rise test	Yes/No	Yes	
21	5.1	b) full wave lightning impulse test (LI)	Yes/No	Yes	
22		Routine tests as per SANS 60076-11:2020		XXXX	XXXX
23	5.2	a) measurement of winding resistance	Yes/No	Yes	
24	5.2	b) measurement of voltage ratio and check of phase displacement	Yes/No	Yes	

25	5.2	c) measurement of short-circuit impedance and load loss	Yes/No	Yes	
26	5.2	d) measurement of no-load loss and current	Yes/No	Yes	
27	5.2	e) applied voltage test (AV)	Yes/No	Yes	
28	5.2	f) induced voltage withstand test (IVW)	Yes/No	Yes	
29	5.2	g) partial discharge measurement	Yes/No	Yes	
30	4.7	Flag supplied	Yes/No	Yes	
31	7	Documentation	Yes/No	Yes	

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

Deviation schedule for

22 kV 500 kVA Dry Type Pole Transformer – SR – DYN11 (SAP number 3642)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of Draft spec**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

for

11 kV 100 KVA Dry Type Pole Transformer – SR – DYN11 (SAP number 3639)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	11	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	100	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
7	4.1.16	Transformer dimensions (height)	mm	1 300 max.	
8	4.1.16	Transformer dimensions (width)	mm	1 000 max.	
9	4.1.16	Transformer dimensions (length)	mm	1 300 max.	
10	4.7	MV bushing type		Outdoor	
11	4.7	MV bushing material		Porcelain/ silicone	
12	4.7	MV bushing creepage distance	mm/kV	31	
13	4.7	MV stem diameter		M12	
14	4.7	LV bushing material		Porcelain	
15	4.7	LV bushing creepage distance	mm/kV	31	
16	4.7	LV stem diameter		M12	
17	4.1.14	MV winding material		Copper	
18	4.1.14	LV winding material		Copper	
19		Type tests as per SANS 60076-1 : 2020		XXXX	XXXX
20	5.1	a) temperature rise test	Yes/No	Yes	
21	5.1	b) full wave lightning impulse test (LI)	Yes/No	Yes	
22		Routine tests as per SANS 60076-11:2020		XXXX	XXXX
23	5.2	a) measurement of winding resistance	Yes/No	Yes	
24	5.2	b) measurement of voltage ratio and check of phase displacement	Yes/No	Yes	
25	5.2	c) measurement of short-circuit impedance and load loss	Yes/No	Yes	
26	5.2	d) measurement of no-load loss and current	Yes/No	Yes	
27	5.2	e) applied voltage test (AV)	Yes/No	Yes	

28	5.2	f) induced voltage withstand test (IVW)	Yes/No	Yes	
29	5.2	g) partial discharge measurement	Yes/No	Yes	
30	4.7	Flag supplied?	Yes/No	Yes	
31	7	Documentation	Yes/No	Yes	
32	4.6.1	Mounting brackets	Yes/No	Yes	

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Tenderer's Authorised Signatory: _____

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Full name of company: _____

Technical schedules A and B

Deviation schedule for

11 kV 100 KVA Dry Type Pole Transformer – SR – DYN11 (SAP number 3639)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Name in block letters Signature

Full name of company: _____

Technical schedules A and B

for

22 kV 100 kVA Dry Type Pole Transformer – SR - DYN11 (SAP number 3640)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	22	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	100	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
7	4.1.16	Transformer dimensions (height)	mm	1 300 max.	
8	4.1.16	Transformer dimensions (width)	mm	1 000 max.	
9	4.1.16	Transformer dimensions (length)	mm	1 300 max.	
10	4.7	MV bushing type		Outdoor	
11	4.7	MV bushing material		Porcelain/ silicone	
12	4.7	MV bushing creepage distance	mm/kV	31	
13	4.7	MV stem diameter		M12	
14	4.7	LV bushing material		Porcelain	
15	4.7	LV bushing creepage distance	mm/kV	31	
16	4.7	LV stem diameter		M12	
17	4.1.14	MV winding material		Copper	
18	4.1.14	LV winding material		Copper	
19		Type tests as per SANS 60076-1 : 2020		XXXX	XXXX
20	5.1	a) temperature rise test	Yes/No	Yes	
21	5.1	b) full wave lightning impulse test (LI)	Yes/No	Yes	
22		Routine tests as per SANS 60076-11:2020		XXXX	XXXX
23	5.2	a) measurement of winding resistance	Yes/No	Yes	
24	5.2	b) measurement of voltage ratio and check of phase displacement	Yes/No	Yes	
25	5.2	c) measurement of short-circuit impedance and load loss	Yes/No	Yes	
26	5.2	d) measurement of no-load loss and current	Yes/No	Yes	
27	5.2	e) applied voltage test (AV)	Yes/No	Yes	

28	5.2	f) induced voltage withstand test (IVW)	Yes/No	Yes	
29	5.2	g) partial discharge measurement	Yes/No	Yes	
30	4.7	Flag supplied	Yes/No	Yes	
31	7	Documentation	Yes/No	Yes	
32	4.6.1	Mounting brackets	Yes/No	Yes	

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Technical schedules A and B

Deviation schedule for

22 kV 100 kVA Dry Type Pole Transformer – SR - DYN11 (SAP number 3640)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Name in block letters Signature

Full name of company: _____

Annex D - Technical schedules A and B

for

11 kV 500 kVA Oil Type PoleTransformer – SR- DYN11 (SAP number 4032)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	11	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	500	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
8	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
9	4.1.16	Transformer dimensions (width)	mm	1 200 max.	
10	4.1.16	Transformer dimensions (length)	mm	1 800 max.	
11	4.7	MV bushing type		Outdoor	
12	4.7	MV bushing material		Porcelain/ silicone	
13	4.7	MV bushing creepage distance	mm/kV	31	
14	4.7	MV stem diameter		M12	
15	4.7	LV bushing material		Porcelain	
16	4.7	LV bushing creepage distance	mm/kV	31	
17	4.7	LV stem diameter		M24	
18	4.7	Flag supplied?	Yes/No	Yes	
19	4.1.14	MV winding material		Copper	
20	4.1.14	LV winding material		Copper	
21		Type tests in accordance with SABS 780: 2019		XXXX	XXXX
22	5.1	a) temperature rise test	Yes/No	Yes	
23	5.1	b) Dielectric type test	Yes/No	Yes	
24	5.1	c) short-circuit (sc) trip test and transformer sc withstand test	Yes/No	Yes	
25	5.1	d) zero sequence impedance test	Yes/No	Yes	
26		Routine tests as per SANS 780:2019		XXXX	XXXX

27	5.2	a) measurement of paint thickness	Yes/No	Yes	
28	5.2	b) test for the effectiveness of the sealing	Yes/No	Yes	
29	7	Documentation	Yes/No	Yes	

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

Tender Number: _____

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Name in block letters Signature

Full name of company: _____

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Deviation schedule for

11 kV 500 kVA Oil Type PoleTransformer - SR- DYN11 (SAP number 4032)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of Draft spec**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

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Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Annex C - Technical schedules A and B

for

11 kV 500 kVA Dry Type PoleTransformer – SR – DYN11 (SAP number 4931)

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of CP_TSSPEC_096	Description		Schedule A Required	Schedule B
1		Name of manufacturer		XXXX	
2		Place of manufacture		XXXX	
3	4.1.5	Primary voltage	kV	11	
4	4.2	Secondary voltage	V	415	
5	4.1.5	Rated power	kVA	500	
6	4.1.1	Does transformer bear SABS mark?	Yes/No	Yes	
7	4.1.16	Transformer dimensions (height)	mm	1 600 max.	
8	4.1.16	Transformer dimensions (width)	mm	1 200 max.	
9	4.1.16	Transformer dimensions (length)	mm	1 800 max.	
10	4.7	MV bushing type		Outdoor	
11	4.7	MV bushing material		Porcelain/ silicone	
12	4.7	MV bushing creepage distance	mm/kV	31	
13	4.7	MV stem diameter		M12	
14	4.7	LV bushing material		Porcelain	
15	4.7	LV bushing creepage distance	mm/kV	31	
16	4.7	LV stem diameter		M24	
17	4.1.14	MV winding material		Copper	
18	4.1.14	LV winding material		Copper	
19		Type tests as per SANS 60076-1 : 2020		XXXX	XXXX
20	5.1	a) temperature rise test	Yes/No	Yes	
21	5.1	b) full wave lightning impulse test (LI)	Yes/No	Yes	
22		Routine tests as per SANS 60076-11:2020		XXXX	XXXX
23	5.2	a) measurement of winding resistance	Yes/No	Yes	
24	5.2	b) measurement of voltage ratio and	Yes/No	Yes	

		check of phase displacement			
25	5.2	c) measurement of short-circuit impedance and load loss	Yes/No	Yes	
26	5.2	d) measurement of no-load loss and current	Yes/No	Yes	
27	5.2	e) applied voltage test (AV)	Yes/No	Yes	
28	5.2	f) induced voltage withstand test (IVW)	Yes/No	Yes	
29	5.2	g) partial discharge measurement	Yes/No	Yes	
30	4.7	Flag supplied	Yes/No	Yes	
31	7	Documentation	Yes/No	Yes	

Note: Ticks, Cross [√, X], asterisk [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Technical schedules A and B

Deviation schedule for

11 kV 500 kVA Dry Type PoleTransformer – SR – DYN11 (SAP number 4931)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	**Sub-clause of CP_TSSPEC_096**	**Proposed deviation**

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] shall not be accepted

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Full name of company: _____

Annex E – Stock Items

Material Group: TRANS-DST

Item	SAP No.	SAP Short Description	SAP Long Description
1	802	TX OIL TYPE POLE 315 KVA DR DYN11 AV	TRANSFORMER, POLE MOUNTED, DISTRIBUTION, 315 kVA, DUAL RATIO 11/6,6kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
2	994	TX OIL TYPE POLE 200 KVA SR DYN11 AV	TRANSFORMER, POLE MOUNTED, DISTRIBUTION, 200 kVA, SINGLE RATIO 11kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
3	993	TX OIL TYPE POLE 100 KVA SR DYN11 AV	TRANSFORMER, POLE MOUNTED, DISTRIBUTION, 100 kVA, SINGLE RATIO 11kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
4	831	TX OIL TYPE POLE 22 KV 100 KVA SR DYN 11 AV	TRANSFORMER, POLE MOUNTED, DISTRIBUTION, 100 kVA, SINGLE RATIO 22kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
5	2311	TX OIL TYPE POLE 22 KV 200 KVA SR DYN 11 AV	TRANSFORMER, POLE MOUNTED, DISTRIBUTION, 200 kVA, SINGLE RATIO 22kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
6	2312	TX OIL TYPE POLE 22 KV 500 KVA SR DYN 11 AV	TRANSFORMER, POLE MOUNTED, DISTRIBUTION, 500 kVA, SINGLE RATIO 22kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
7	3637	TX DRY TYPE POLE 315 KVA DR DYN11 AV	TRANSFORMER DRY TYPE, POLE MOUNTED, DISTRIBUTION, 315 kVA, DUAL RATIO 11/6,6 kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
8	3638	TX DRY TYPE POLE 200KVA SR DYN11 AV	TRANSFORMER DRY TYPE POLE MOUNTED, DISTRIBUTION, 200 kVA, SINGLE RATIO 11kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
9	3639	TX DRY TYPE POLE 100KVA SR DYN11 AV	TRANSFORMER DRY TYPE POLE MOUNTED, DISTRIBUTION, 100 kVA, SINGLE RATIO 11kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
10	3640	TX DRY TYPE POLE 22 KV 100 KVA SR DYN 11 AV	TRANSFORMER DRY TYPE POLE MOUNTED, DISTRIBUTION, 100 kVA, SINGLE RATIO 22kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.

11	3641	TX DRY TYPE POLE 22 KV 200 KVA SR DYN 11 AV	TRANSFORMER DRY TYPE POLE MOUNTED, DISTRIBUTION, 200 kVA, SINGLE RATIO 22kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
12	3642	TX DRY TYPE POLE 22 KV 500 KVA SR DYN 11 AV	TRANSFORMER DRY TYPE POLE MOUNTED, DISTRIBUTION, 500 kVA, SINGLE RATIO 22kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
13	4032	TX OIL TYPE POLE 11 KV 500 KVA SR DYN 11 AV	TRANSFORMER, POLE MOUNTED, DISTRIBUTION, 500 kVA, SINGLE RATIO 11kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
14	4931	TX DRY TYPE POLE 11 KV 500 KVA SR DYN 11 AV	TRANSFORMER DRY TYPE POLE MOUNTED, DISTRIBUTION, 500 kVA, SINGLE RATIO 11kV,415 V, Dyn 11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.
15	2931	TX POLE 22kV 315kVA SR Dyn11 AV	TRANSFORMER, POLE MOUNTED, DISTRIBUTION, 315kVA, SINGLE RATIO 22/0,415kV, Dyn11 VECTOR GROUP, AVOCADO. ITEM SPECIFICATION CP_TSSPEC_096.