



**PANEL FOR SUPPLY, DELIVERY AND OFF-LOADING OF
11kV MINI-SUBSTATIONS (UP TO 1000kVA) TO RAY
NKONYENI MUNICIPALITY FOR A THREE-YEAR PERIOD**

**NOTICE: 076 of 2024
BID NO:8/2/RNM0494.**

BID NO: 8/2/RNM0494.

NAME OF THE BIDDER

BID AMOUNT R _____

TECHNICAL SERVICES
P.O. BOX 5
PORT SHEPSTONE
4240

APRIL 2024

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RAY NKONYENI MUNICIPALITY

NOTICE: 076 of 2024

BID NO: 8/2/RNM0494.

PANEL FOR SUPPLY, DELIVERY AND OFF-LOADING OF 11kV MINI-SUBSTATIONS (UP TO 1000kVA) TO RAY NKONYENI MUNICIPALITY FOR A THREE-YEAR PERIOD

Bids are hereby invited for the Panel for supply, delivery and off-loading of 11kV mini-sub-stations (up to 1000kVA) to Ray Nkonyeni Municipality stores for a three-year period.

Bid documents can be downloaded on www.etenders.gov.za or www.rnm.gov.za, from Friday 26 April 2024

Reference: “Tender No 8/2/RNM0494: Panel for supply, delivery and off-loading of 11kV mini sub-stations (up to 1000kVA) to Ray Nkonyeni Municipality stores for a three-year period.

Bidders to submit two (02) copies of the bid document together with the original bid document, bidders that fail to submit copies will be disqualified. Fully completed Bid documents must be submitted in a sealed envelope, clearly marked “**PANEL FOR SUPPLY, DELIVERY AND OFF-LOADING OF 11kV MINI SUB-STATIONS (UP TO 1000kVA) TO RAY NKONYENI MUNICIPALITY STORES FOR A THREE-YEAR PERIOD**” and must be deposited in the Bid box at the Municipal offices at 10 Connor Street, Port Shepstone, no later than 12:00 on Tuesday, 28 May 2024 after which all Bids will be opened in public.

The procedure for the evaluation of responsive Bid Offers will be Method 4 (Financial Offer, preference, and quality (functionality) with 80/20 Preference Points System. Bidders that fail to Score a minimum of 60% for functionality will not be evaluated further. The total score awarded will be the addition of the two scores for price and preference. Preference points claimed in terms of the Preferential Procurement Policy Framework Regulations of 2022

Functionality Criteria	Points	Verification documents
Company previous relevant experience	10	Appointment letter(s) or official purchase orders and corresponding delivery notes
Total Points	10	

SPECIFIC GOALS	POINTS	Verification Documents
Companies within Ray Nkonyeni Municipality	20	Proof of company address
Total points	20	

A compulsory clarification virtual meeting will be held on Tuesday 14 May 2024 @ 10:00. Please confirm your attendance by sending an email to Ms Nandi Sihlali nandi.sihlali@rnm.gov.za and cc Vaneshree Moodley vaneshree.moodley@rnm.gov.za before end of business Friday, the 10 May 2024.

All queries to be directed to Ms Nandi Sihlali, Manager Electrical Section on 039-688-2088 or via email nandi.sihlali@rnm.gov.za.

NOTE TO BIDDERS ON PRE-CONDITIONS OF THE BID:

- The Supply Chain Management Policy of Ray Nkonyeni Municipality will apply. The Council reserves the right not to accept the lowest bid or any bid and reserves the right to accept the whole or part of the bid, or to reject all bids and cancel the notice to bid;
- No late comers will be entertained, and they will not be allowed to join the meeting.
- Only service providers registered in the Central Supplier Database (CSD) will be considered, attach proof of registration failure to attach will result in your bid not evaluated further. Proof of registration to be attached. Failure to attach will result in your bid not being further evaluated.
- Members or Directors of Companies or Service Providers who are state employees are not allowed to bid or quote;
- Unsuccessful bidders will be informed of the Bid outcome through the Municipal website. Aggrieved unsuccessful bidders will be allowed to lodge, within fourteen (14) days of the decision or action, a written objection or complaint to the Office of the Municipal Manager through email, mm@rnm.gov.za or fax number 0865297195. Complaints or objections received after fourteen (14) days of the date of the notice **will not** be entertained; and
- The original bid document plus TWO **extra** (02) copy must be submitted, failure to submit two copies will result in disqualification.
- Bids submitted are to be valid for a period of **120 days**.

K J ZULU
MUNICIPAL MANAGER

Ray Nkonyeni Municipality
10 Connor Street
P O Box 5
PORT SHEPSTONE
4240

**ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS
(NOT TO BE RE-TYPED)**

NB!!!! Please attach copies of the following documents.

- **Company registration documents.**
- **Certified copy of ID documents of directors/owners/members/
shareholders.**
- **Copy of a valid TAX Compliance Certificate
Or Tax Compliance Status PIN Sheet.**
- **Declarations (MBD 4, 6.1, 8 & 9).**
- **Joint Venture agreements (where applicable)**



THIS BID IS SUBJECT TO THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT. THIS BID WILL BE EVALUATED AND ADJUDICATED ACCORDING TO THE FOLLOWING CRITERIA:

1. Relevant specifications
2. Value for money
3. Capability to execute the contract
4. PPPFA & associated regulations

NB: NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE

RAY NKONYENI MUNICIPALITY

STANDARD FORM FOR BIDS

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE RAY NKONYENI MUNICIPALITY					
BID NUMBER:	8/2/RNM0494	CLOSING DATE:	28 MAY 2024	CLOSING TIME:	12h00
DESCRIPTION	PANEL FOR SUPPLY, DELIVERY AND OFF-LOADING OF 11KV MINI-SUBSTATIONS (UP TO 1000kVA) TO RAY NKONYENI MUNICIPALITY FOR A THREE-YEAR PERIOD.				
THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (MBD7).					
BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX SITUATED AT (STREET ADDRESS)					
SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
FACSIMILE NUMBER	CODE		NUMBER		
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
TAX COMPLIANCE STATUS	TCS PIN:		OR	CSD No:	
ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	<input type="checkbox"/> Yes <input type="checkbox"/> No [IF YES ENCLOSE PROOF]		ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?	<input type="checkbox"/> Yes <input type="checkbox"/> No [IF YES, ANSWER PART B:3]	
TOTAL NUMBER OF ITEMS OFFERED			TOTAL BID PRICE	R	
SIGNATURE OF BIDDER			DATE		
CAPACITY UNDER WHICH THIS BID IS SIGNED					
BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:			TECHNICAL INFORMATION MAY BE DIRECTED TO:		
CONTACT PERSON	Treasury		DEPARTMENT	Technical Services	
TELEPHONE NUMBER	Bongani Mfenqa		CONTACT PERSON	Nandi Sihlali	
FACSIMILE NUMBER	039 312 8304		TELEPHONE NUMBER	039 688 2088	
E-MAIL ADDRESS	Bongani.mfenqa@rnm.gov.za		FACSIMILE NUMBER		
			E-MAIL ADDRESS	Nandi.Sihlali@rnm.gov.za	

PART B TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:
<p>1.1. BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.</p> <p>1.2. ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED--(NOT TO BE RE-TYPED) OR ONLINE</p> <p>1.3. THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT REGULATIONS, 2022, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.</p> <p>1.4. THE BID OFFER MUST BE SIGNED BY A PERSON AUTHORIZED TO SIGN ON BEHALF OF THE BIDDER;</p> <p>1.5. A BIDDER WHO SUBMITTED A BID AS A JOINT VENTURE HAS INCLUDED AN ACCEPTABLE JOINT VENTURE AGREEMENT WITH HIS/HER BID;</p> <p>1.6. A BIDDER WHO IS A JOINT VENTURE HAS INCLUDED MBD 4, 8 & 9 FOR EACH ENTITY IN THE JOINT VENTURE / CONSORTIUM WITH HIS/HER BID</p> <p>1.7. THE BIDDER OR A COMPETENT AUTHORISED REPRESENTATIVE OF THE CONTRACTOR WHO SUBMITTED THE BID HAS ATTENDED THE COMPULSORY CLARIFICATION MEETING OR SITE INSPECTION;</p>
2. TAX COMPLIANCE REQUIREMENTS
<p>2.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.</p> <p>2.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VIEW THE TAXPAYER'S PROFILE AND TAX STATUS.</p> <p>2.3 APPLICATION FOR THE TAX COMPLIANCE STATUS (TCS) CERTIFICATE OR PIN MAY ALSO BE MADE VIA E-FILING. IN ORDER TO USE THIS PROVISION, TAXPAYERS WILL NEED TO REGISTER WITH SARS AS E-FILERS THROUGH THE WEBSITE WWW.SARS.GOV.ZA.</p> <p>2.4 FOREIGN SUPPLIERS MUST COMPLETE THE PRE-AWARD QUESTIONNAIRE IN PART B:3.</p> <p>2.5 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.</p> <p>2.6 IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.</p> <p>2.7 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.</p>
3. QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS
<p>3.1. IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>3.2. DOES THE ENTITY HAVE A BRANCH IN THE RSA? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>3.3. DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>3.4. DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>3.5. IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 ABOVE.</p>

**NB: FAILURE TO PROVIDE ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.
NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE.**

SIGNATURE OF BIDDER:

CAPACITY UNDER WHICH THIS BID IS SIGNED:

DATE:

EVALUATION OF TENDER OFFERS

The procedure for evaluation of responsive Bid Offers will be **METHOD 4 if applicable to your bid: (Financial Offer, preference and quality (functionality))** with 80/20 Preference Points System. Bidders that fail to Score a minimum of 60% for functionality will not be evaluated further. The total score awarded will be the addition of the two scores for price and preference.

The following formula will be used in Calculation of Percentage for Functionality

$$PS = \frac{So \times Ap}{Ms}$$

Ms

Where:

Ps = percentage scored for functionality by Bid/proposal under consideration

So = total score of bid/proposal under consideration

Ms = Maximum possible score

Ap = percentage allocated for functionality

ASPECT	CRITERIA	POSSIBLE POINTS	VERIFICATION METHOD
Company Previous Experience	Company that has successfully supplied and delivered 5 or more 11kV mini sub-stations > 300kVA or similar switchgear equipment.	10	Attach 5 or more relevant appointment letters or 5 or more official purchase orders with corresponding delivery notes.
	Company that has successfully supplied and delivered 3 to 4 11kV mini sub-station > 300kVA or similar switchgear equipment.	6	Attach 3 to 4 relevant appointment letters or 3 to 4 official purchase orders with corresponding delivery notes
	Company that has successfully supplied and delivered 1 to 2 11kV mini sub-stations > 300 kVA or similar switchgear equipment.	4	Attach 1 to 2 relevant appointment letters or 1 to 2 official purchase orders with corresponding delivery notes
	Company with no relevant experience in supply, delivery of mini sub-station or similar switchgear equipment.	0	No attached relevant appointment letters or official purchase orders with no corresponding delivery notes.
MAXIMUM POSSIBLE POINTS		10 points	

SPECIFIC GOALS	POINTS	Verification Documents
Companies within Ray Nkonyeni Municipality	20	Proof of company address

Companies within Ugu District Municipality	15	Proof of company address
Companies within KwaZulu Natal	10	Proof of company address
Other	5	Proof of company address
Total points	20	

b) Financial Offer

The financial offer will be scored using the following formula:

$$Nf = W1 \times [1 - (P - P_m) / P_m]$$

Where:

W1 = **80** for financial values up to R 50, 000, 000.00 (inclusive of VAT) of all responsive tenders received;

P_m = the value of the comparative offer of the most favourable tender;

P = the value of the comparative offer under consideration;

In the application of the 90/10 preference point system, if all bids received are below R 50, 000, 000.00, the bid must be cancelled. If one or more of the acceptable bid(s) received are above R 50, 000, 000.00 threshold, all bids received must be evaluated on the 90/10 preference point system.

c) Preferences

Up to **20** points (for financial values up to R 50, 000, 000.00), will be awarded to bidders who complete the preference schedule and who are found to be eligible for the preference claimed.

The applicable preference point system for this tender is the 80/20 preference point system.

1.1 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

- (a) Price; and
- (b) Specific Goals.

1.2 To be completed by the organ of state:

The maximum points for this tender are allocated as follows:

	POINTS
PRICE	80
SPECIFIC GOALS	20
Total points for Price and SPECIFIC GOALS	100

- 1.3 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.
- 1.4 The organ of state reserves the right to require of a tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

GENERAL CONDITIONS OF CONTRACT TABLE OF CLAUSES

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General Conditions of Contract

1. **Definitions**
 - 1.1 The following terms shall be interpreted as indicated:
 - 1.2 "Closing time" means the date and hour specified in the bidding documents for the receipt of bids.
 - 1.3 "Contract" means the written agreement entered into between the purchaser and the supplier, as recorded in the contract form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
 - 1.4 "Contract price" means the price payable to the supplier under the contract for the full and proper performance of his contractual obligations.
 - 1.5 "Corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution.
 - 1.6 "Countervailing duties" are imposed in cases where an enterprise abroad is subsidized by its government and encouraged to market its products internationally.
 - 1.7 "Country of origin" means the place where the goods were mined, grown or produced or from which the services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembly of components, a commercially recognized new product results that is substantially different in basic characteristics or in purpose or utility from its components.
 - 1.8. "Database application form" means the application form required by the Ray Nkonyeni Municipality to be filled in by the successful Bidder, following the award of the contract, for inclusion on the RNM database before payment is made.
 - 1.9 "Day" means calendar day.
 - 1.10 "Delivery" means delivery in compliance of the conditions of the contract or order.
 - 1.11 "Delivery ex stock" means immediate delivery directly from stock actually on hand.
 - 1.12 "Delivery into consignees store or to his site" means delivered and unloaded in the specified store or depot or on the specified site in compliance with the conditions of the contract or order, the supplier bearing all risks and charges involved until the goods are so delivered and a valid receipt is obtained.
 - 1.13 "Dumping" occurs when a private enterprise abroad market its goods on own initiative in the RSA at lower prices than that of the country of origin and which have the potential to harm the local industries in the RSA.

- 1.14 "Force majeure" means an event beyond the control of the supplier and not involving the supplier's fault or negligence and not foreseeable. Such events may include, but is not restricted to, acts of the purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.
- 1.15 "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of any bidder, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the bidder of the benefits of free and open competition.
- 1.16 "GCC" means the General Conditions of Contract.
- 1.17 "Goods" means all of the equipment, machinery, and/or other materials that the supplier is required to supply to the purchaser under the contract.
- 1.18 "Imported content" means that portion of the bidding price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or his subcontractors) and which costs are inclusive of the costs abroad, plus freight and other direct importation costs such as landing costs, dock dues, import duty, sales duty or other similar tax or duty at the South African place of entry as well as transportation and handling charges to the factory in the Republic where the goods covered by the bid will be manufactured.
- 1.19 "Local content" means that portion of the bidding price, which is not included in the imported content provided that local manufacture does take place.
- 1.20 "Manufacture" means the production of products in a factory using labour, materials, components and machinery and includes other related value-adding activities.
- 1.21 "Order" means an official written order issued for the supply of goods or works or the rendering of a service.
- 1.22 "Project site," where applicable, means the place indicated in bidding documents.
- 1.23 "Purchaser" means the organization purchasing the goods.
- 1.24 "Republic" means the Republic of South Africa.
- 1.25 "SCC" means the Special Conditions of Contract.
- 1.26 "Services" means those functional services ancillary to the supply of the goods, such as transportation and any other incidental services, such as installation, commissioning, provision of technical assistance, training, catering, gardening, security, maintenance and other such obligations of the supplier covered under the contract.

- 1.27 “Supplier” means the successful bidder who is awarded the contract to maintain and administer the required and specified service(s) to the State.
- 1.28 “Tort” means in breach of contract.
- 1.29 “Turnkey” means a procurement process where one service provider assumes total responsibility for all aspects of the project and delivers the full end product / service required by the contract.
- 1.30 “Written” or “in writing” means hand-written in ink or any form of electronic or mechanical writing.
- 2. Application**
- 2.1 These general conditions are applicable to all bids, contracts and orders including bids for functional and professional services (excluding professional services related to the building and construction industry), sales, hiring, letting and the granting or acquiring of rights, but excluding immovable property, unless otherwise indicated in the bidding documents.
- 2.2 Where applicable, special conditions of contract are also laid down to cover specific goods, services or works.
- 2.3 Where such special conditions of contract are in conflict with these general conditions, the special conditions shall apply.
- 3. General**
- 3.1 Unless otherwise indicated in the bidding documents, the purchaser shall not be liable for any expense incurred in the preparation and submission of a bid. Where applicable a nonrefundable fee for documents may be charged.
- 3.2 Invitations to bid are usually published in locally distributed news media and on the municipality/municipal entity website.
- 4. Standards**
- 4.1 The goods supplied shall conform to the standards mentioned in the bidding documents and specifications.
- 5. Use of contract documents and information inspection**
- 5.1 The supplier shall not, without the purchaser’s prior written consent, disclose the contract, or any provision thereof, or any specifications, plan, drawing, pattern, sample, or information furnished by or on behalf of the purchaser in connection therewith, to any person other than a person employed by the supplier in the of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.
- 5.2 The supplier shall not, without the purchaser’s prior written consent, make use of any document or information mentioned in GCC clause 5.1 except for purposes of performing the contract.

- 5.3 Any document, other than the contract itself mentioned in GCC clause 5.1 shall remain the property of the purchaser and shall be returned (all copies) to the purchaser on completion of the supplier's performance under the contract if so required by the purchaser.
- 5.4 The supplier shall permit the purchaser to inspect the supplier's records relating to the performance of the supplier and to have them audited by auditors appointed by the purchaser, if so required by the purchaser.
- 6. Patent rights**
- 6.1 The supplier shall indemnify the purchaser against all third party claims of infringement of patent, trademark, or industrial design rights arising from use of the goods or any part thereof by the purchaser.
- 6.2 When a supplier developed documentation / projects for the municipality / municipal entity, the intellectual, copy and patent rights or ownership of such documents or projects will vest in the municipality / municipal entity.
- 7. Performance security**
- 7.1 Within thirty (30) days of receipt of the notification of contract award, the successful bidder shall furnish to the purchaser the performance security of the amount specified in SCC.
- 7.2 The proceeds of the performance security shall be payable to the purchaser as compensation for any loss resulting from the supplier's failure to complete his obligations under the contract.
- 7.3 The performance security shall be denominated in the currency of the contract, or in a freely convertible currency acceptable to the purchaser and shall be in one of the following forms:
- (a) a bank guarantee or an irrevocable letter of credit issued by a reputable bank located in the purchaser's country or abroad, acceptable to the purchaser, in the form provided in the bidding documents or another form acceptable to the purchaser; or
 - (b) a cashier's or certified cheque.
- 7.4 The performance security will be discharged by the purchaser and returned to the supplier not later than thirty (30) days following the date of completion of the supplier's performance obligations under the contract, including any warranty obligations, unless otherwise specified.
- 8. Inspections, tests and analyses**
- 8.1 All pre-bidding testing will be for the account of the bidder.
- 8.2 If it is a bid condition that goods to be produced or services to be rendered should at any stage be subject to inspections, tests and analyses, the bidder or contractor's premises shall be open, at all reasonable hours, for inspection by a representative of the purchaser or organization acting on behalf of the purchaser.

- 8.3 If there are no inspection requirements indicated in the bidding documents and no mention is made in the contract, but during the contract period it is decided that inspections shall be carried out, the purchaser shall itself make the necessary arrangements, including payment arrangements with the testing authority concerned.
- 8.4 If the inspections, tests and analyses referred to in clauses 8.2 and 8.3 show the goods to be in accordance with the contract requirements, the cost of the inspections, tests and analyses shall be defrayed by the purchaser.
- 8.5 Where the goods or services referred to in clauses 8.2 and 8.3 do not comply with the contract requirements, irrespective of whether such goods or services are accepted or not, the cost in connection with these inspections, tests or analyses shall be defrayed by the supplier.
- 8.6 Goods and services which are referred to in clauses 8.2 and 8.3 and which do not comply with the contract requirements may be rejected.
- 8.7 Any contract goods may on or after delivery be inspected, tested or analysed and may be rejected if found not to comply with the requirements of the contract. Such rejected goods shall be held at the cost and risk of the supplier who shall, when called upon, remove them immediately at his own cost and forthwith substitute them with goods, which do comply with the requirements of the contract. Failing such removal the rejected goods shall be returned at the suppliers cost and risk. Should the supplier fail to provide the substitute goods forthwith, the purchaser may, without giving the supplier further opportunity to substitute the rejected goods, purchase such goods as may be necessary at the expense of the supplier.
- 8.8 The provisions of clauses 8.4 to 8.7 shall not prejudice the right of the purchaser to cancel the contract on account of a breach of the conditions thereof, or to act in terms of Clause 22 of GCC.

9. Packing

- 9.1 The supplier shall provide such packing of the goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packing, case size weights shall take into consideration, where appropriate, the remoteness of the goods' final destination and the absence of heavy handling facilities at all points in transit.
- 9.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the contract, including additional requirements, if any, and in any subsequent instructions ordered by the purchaser.

10. Delivery and documents

- 10.1 Delivery of the goods and arrangements for shipping and clearance obligations, shall be made by the supplier in accordance with the terms specified in the contract.

- 11. Insurance** 11.1 The goods supplied under the contract shall be fully insured in a freely convertible currency against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified.
- 12. Transportation** 12.1 Should a price other than an all-inclusive delivered price be required, this shall be specified.
- 13. Incidental services** 13.1 The supplier may be required to provide any or all of the following services, including additional services, if any:
- (a) performance or supervision of on-site assembly and/or commissioning of the supplied goods.
 - (b) furnishing of tools required for assembly and/or maintenance of the supplied goods.
 - (c) furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied goods.
 - (d) performance or supervision or maintenance and/or repair of the supplied goods, for a period of time agreed by the parties, provided that this service shall not relieve the supplier of any warranty obligations under this contract; and
 - (e) training of the purchaser's personnel, at the supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied goods.
- 13.2 Prices charged by the supplier for incidental services, if not included in the contract price for the goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the supplier for similar services.
- 14. Spare parts** 14.1 As specified, the supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the supplier:
- (a) such spare parts as the purchaser may elect to purchase from the supplier, provided that this election shall not relieve the supplier of any warranty obligations under the contract; and
 - (b) in the event of termination of production of the spare parts:
 - (i) advance notification to the purchaser of the pending termination, in sufficient time to permit the purchaser to procure needed requirements; and
 - (ii) following such termination, furnishing at no cost to the purchaser, the blueprints, drawings, and specifications of the spare parts, if requested.

- 15. Warranty**
- 15.1 The supplier warrants that the goods supplied under the contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided otherwise in the contract. The supplier further warrants that all goods supplied under this contract shall have no defect, arising from design, materials, or workmanship (except when the design and/or material is required by the purchaser's specifications) or from any act or omission of the supplier, that may develop under normal use of the supplied goods in the conditions prevailing in the country of final destination.
- 15.2 This warranty shall remain valid for twelve (12) months after the goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the contract, or for eighteen (18) months after the date of shipment from the port or place of loading in the source country, whichever period concludes earlier, unless specified otherwise.
- 15.3 The purchaser shall promptly notify the supplier in writing of any claims arising under this warranty.
- 15.4 Upon receipt of such notice, the supplier shall, within the period specified and with all reasonable speed, repair or replace the defective goods or parts thereof, without costs to the purchaser.
- 15.5 If the supplier, having been notified, fails to remedy the defect(s) within the period specified, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expense and without prejudice to any other rights which the purchaser may have against the supplier under the contract.
- 16. Payment**
- 16.1 The method and conditions of payment to be made to the supplier under this contract shall be specified.
- 16.2 The supplier shall furnish the purchaser with an invoice accompanied by a copy of the delivery note and upon fulfillment of other obligations stipulated in the contract.
- 16.3 Payments shall be made promptly by the purchaser, but in no case later than thirty (30) days after submission of an invoice or claim by the supplier.
- 16.4 Payment will be made in Rand unless otherwise stipulated.
- 16.5. Payment will only be made if the supplier has filled in and submitted the necessary database application form to the satisfaction of the Chief Financial Officer.
- 17. Prices**
- 17.1 Prices charged by the supplier for goods delivered and services performed under the contract shall not vary from the prices quoted by the supplier in his bid, with the exception of any price

adjustments authorized or in the purchaser's request for bid validity extension, as the case may be.

- 18. Variation orders** 18.1 In cases where the estimated value of the envisaged changes in purchase does not vary more than 15% of the total value of the original contract, the contractor may be instructed to deliver the goods or render the services as such. In cases of measurable quantities, the contractor may be approached to reduce the unit price, and such offers may be accepted provided that there is no escalation in price.
- 19. Assignment** 19.1 The supplier shall not assign, in whole or in part, its obligations to perform under the contract, except with the purchaser's prior written consent.
- 20. Subcontracts** 20.1 The supplier shall notify the purchaser in writing of all sub-contracts awarded under this contracts if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the supplier from any liability or obligation under the contract.
- 21. Delays in the supplier's performance** 21.1 Delivery of the goods and performance of services shall be made by the supplier in accordance with the time schedule prescribed by the purchaser in the contract.
- 21.2 If at any time during performance of the contract, the supplier or its subcontractor(s) should encounter conditions impeding timely delivery of the goods and performance of services, the supplier shall promptly notify the purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the supplier's notice, the purchaser shall evaluate the situation and may at his discretion extend the supplier's time for performance, with or without the imposition of penalties, in which case the extension shall be ratified by the parties by amendment of contract.
- 21.3 The right is reserved to procure outside of the contract small quantities or to have minor essential services executed if an emergency arises, the supplier's point of supply is not situated at or near the place where the goods are required, or the supplier's services are not readily available.
- 21.4 Except as provided under GCC Clause 25, a delay by the supplier in the performance of its delivery obligations shall render the supplier liable to the imposition of penalties, pursuant to GCC Clause 22, unless an extension of time is agreed upon pursuant to GCC Clause 22.2 without the application of penalties.
- 21.5 Upon any delay beyond the delivery period in the case of a goods contract, the purchaser shall, without cancelling the contract, be entitled to purchase goods of a similar quality and up to the same quantity in substitution of the goods not supplied in conformity with the

contract and to return any goods delivered later at the supplier's expense and risk, or to cancel the contract and buy such goods as may be required to complete the contract and without prejudice to his other rights, be entitled to claim damages from the supplier.

22. Penalties

22.1 Subject to GCC Clause 25, if the supplier fails to deliver any or all of the goods or to perform the services within the period(s) specified in the contract, the purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, as a penalty, a sum calculated on the delivered price of the delayed goods or unperformed services using the current prime interest rate calculated for each day of the delay until actual delivery or performance. The purchaser may also consider termination of the contract pursuant to GCC Clause 23.

23. Termination for default

23.1 The purchaser, without prejudice to any other remedy for breach of contract, by written notice of default sent to the supplier, may terminate this contract in whole or in part:

- (a) if the supplier fails to deliver any or all of the goods within the period(s) specified in the contract, or within any extension thereof granted by the purchaser pursuant to GCC Clause 21.2;
- (b) if the supplier fails to perform any other obligation(s) under the contract; or
- (c) if the supplier, in the judgement of the purchaser, has engaged in corrupt or fraudulent practices in competing for or in executing the contract.

23.2 In the event the purchaser terminates the contract in whole or in part, the purchaser may procure, upon such terms and in such manner, as it deems appropriate, goods, works or services similar to those undelivered, and the supplier shall be liable to the purchaser for any excess costs for such similar goods, works or services. However, the supplier shall continue performance of the contract to the extent not terminated.

23.3 Where the purchaser terminates the contract in whole or in part, the purchaser may decide to impose a restriction penalty on the supplier by prohibiting such supplier from doing business with the public sector for a period not exceeding 10 years.

23.4 If a purchaser intends imposing a restriction on a supplier or any person associated with the supplier, the supplier will be allowed a time period of not more than fourteen (14) days to provide reasons why the envisaged restriction should not be imposed. Should the supplier fail to respond within the stipulated fourteen (14) days the purchaser may regard the supplier as having no objection and proceed with the restriction.

23.5 Any restriction imposed on any person by the purchaser will, at the discretion of the purchaser, also be applicable to any other enterprise

or any partner, manager, director or other person who wholly or partly exercises or exercised or may exercise control over the enterprise of the first-mentioned person, and with which enterprise or person the first-mentioned person, is or was in the opinion of the purchaser actively associated.

23.6 If a restriction is imposed, the purchaser must, within five (5) working days of such imposition, furnish the National Treasury, with the following information:

- (a) the name and address of the supplier and / or person restricted by the purchaser;
- (b) the date of commencement of the restriction;
- (c) the period of restriction; and
- (d) the reasons for the restriction.

These details will be loaded in the National Treasury's central database of suppliers or persons prohibited from doing business with the public sector.

23.7 If a court of law convicts a person of an offence as contemplated in sections 12 or 13 of the Prevention and Combating of Corrupt Activities Act, No. 12 of 2004, the court may also rule that such person's name be endorsed on the Register for Bid Defaulters. When a person's name has been endorsed on the Register, the person will be prohibited from doing business with the public sector for a period not less than five years and not more than 10 years. The National Treasury is empowered to determine the period of restriction and each case will be dealt with on its own merits. According to section 32 of the Act the Register must be open to the public. The Register can be perused on the National Treasury website.

24. Anti-dumping and countervailing duties and rights

24.1 When, after the date of bid, provisional payments are required, or anti-dumping or countervailing duties are imposed, or the amount of amount of a provisional payment or anti-dumping or countervailing right is increased in respect of any dumped or subsidized import, the State is not liable for any amount so required or imposed, or for the amount of any such increase. When, after the said date, such a provisional payment is no longer required or any such anti-dumping or countervailing right is abolished, or where the amount of such provisional payment or any such right is reduced, any such favourable difference shall on demand be paid forthwith by the supplier to the purchaser or the purchaser may deduct such amounts from moneys (if any) which may otherwise be due to the supplier in regard to goods or services which he delivered or rendered, or is to deliver or render in terms of the contract or any other contract or any other amount which may be due to him.

25. Force

25.1 Notwithstanding the provisions of GCC Clauses 22 and 23, the

- majeure** supplier shall not be liable for forfeiture of its performance security, damages, or termination for default if and to the extent that his delay in performance or other failure to perform his obligations under the contract is the result of an event of force majeure.
- 25.2 If a force majeure situation arises, the supplier shall promptly notify the purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the purchaser in writing, the supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the force majeure event.
- 26. Termination for insolvency** 26.1 The purchaser may at any time terminate the contract by giving written notice to the supplier if the supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the supplier, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the purchaser.
- 27. Settlement of disputes** 27.1 If any dispute or difference of any kind whatsoever arises between the purchaser and the supplier in connection with or arising out of the contract, the parties shall make every effort to resolve amicably such dispute or difference by mutual consultation.
- 27.2 If, after thirty (30) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the purchaser or the supplier may give notice to the other party of his intention to commence with mediation. No mediation in respect of this matter may be commenced unless such notice is given to the other party.
- 27.3 Should it not be possible to settle a dispute by means of mediation, it may be settled in a South African court of law.
- 27.4 Notwithstanding any reference to mediation and/or court proceedings herein,
- (a) the parties shall continue to perform their respective obligations under the contract unless they otherwise agree; and
- (b) the purchaser shall pay the supplier any monies due the supplier for goods delivered and / or services rendered according to the prescripts of the contract.
- 28. Limitation of liability** 28.1 Except in cases of criminal negligence or willful misconduct, and in the case of infringement pursuant to Clause 6;
- (a) the supplier shall not be liable to the purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the supplier to pay penalties and/or damages to the purchaser; and

(b) the aggregate liability of the supplier to the purchaser, whether under the contract, in tort or otherwise, shall not exceed the total contract price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

- 29. Governing language** 29.1 The contract shall be written in English. All correspondence and other documents pertaining to the contract that is exchanged by the parties shall also be written in English.
- 30. Applicable law** 30.1 The contract shall be interpreted in accordance with South African laws, unless otherwise specified.
- 31. Notices** 31.1 Every written acceptance of a bid shall be posted to the Supplier concerned by registered or certified mail and any other notice to him shall be posted by ordinary mail to the address furnished in his bid or to the address notified later by him in writing and such posting shall be deemed to be proper service of such notice.
- 31.2 The time mentioned in the contract documents for performing any act after such aforesaid notice has been given, shall be reckoned from the date of posting of such notice.
- 32. Taxes and duties** 32.1 A foreign supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the purchaser's country.
- 32.2 A local supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted goods to the purchaser.
- 32.3 No contract shall be concluded with any bidder whose tax matters are not in order. Prior to the award of a bid SARS must have certified that the tax matters of the preferred bidder are in order.
- 32.4 No contract shall be concluded with any bidder whose municipal rates and taxes and municipal services charges are in arrears.
- 33. Transfer of contracts** 33.1 The contractor shall not abandon, transfer, cede assign or sublet a contract or part thereof without the written permission of the purchaser.
- 34. Amendment of contracts** 34.1 No agreement to amend or vary a contract or order or the conditions, stipulations or provisions thereof shall be valid and of any force unless such agreement to amend or vary is entered into in writing and signed by the contracting parties. Any waiver of the requirement that the agreement to amend or vary shall be in writing, shall also be in writing.
- 35. Prohibition of restrictive practices** 35.1 In terms of section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998 as amended, an agreement between, or concerted practice by , firms or a decision by an association of firms, is prohibited if it is between parties in a horizontal relationship and if a bidder(s) is / are or a contractor(s) was / were involved in collusive bidding.
- 35.2 If a bidder(s) or contractor(s) based on reasonable grounds or evidence obtained by the purchaser has / have engaged in the restrictive practice

referred to above, the purchaser may refer the matter to the Competition Commission for investigation and possible imposition of administrative penalties as contemplated in section 59 of the Competition Act No 89 Of 1998.

- 35.3 If a bidder(s) or contractor(s) has / have been found guilty by the Competition Commission of the restrictive practice referred to above, the purchaser may, in addition and without prejudice to any other remedy provided for, invalidate the bid(s) for such item(s) offered, and / or terminate the contract in whole or part, and / or restrict the bidder(s) or contractor(s) from conducting business with the public sector for a period not exceeding ten (10) years and / or claim damages from the bidder(s) or contractor(s) concerned.

No contract will be awarded to a person who has failed to submit a copy of Tax Compliance Certificate with a PIN from the South African Revenue Service (“SARS”) certifying that the taxes of that person to be in order or that suitable arrangements have been made with SARS.

I certify that I have the appropriate authority to furnish the above-mentioned information and that the above information is correct at the time of completion.

Name:	Signature:
Designation:	Date:



TECHNICAL SPECIFICATIONS AND REQUIREMENTS FOR MEDIUM-VOLTAGE MINIATURE SUBSTATIONS (MINI-SUBS) WITH NOMINAL VOLTAGES OF 11KV

Foreword

The requirements for medium-voltage mini-substations for systems with nominal voltages of 11 kV in this specification are based on NRS 004 / SANS 1029, Mini-substations for rated A.C voltages up to and including 24 kV.

Keywords

Mini-sub, miniature substation, mini-substation, RMU, ring main unit, power distribution, MV, Medium Voltage, transformer

1 Scope

This specification covers the Ray Nkonyeni Municipality's minimum requirements for the selection, manufacture, testing and supply of outdoor type mini-substations. It is applicable to medium voltage prefabricated MV/LV substations for systems with a.c. rated nominal voltages from 11 kV up to and including 22 kV. The specification covers both Type A and Type B mini-substations up to and including a power rating of 1000 kVA and distinguishes between mini-substations for inland and coastal applications.

The requirements for mini-substations are based on NRS 004 / SANS 1029 Edition 3.

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. Information on currently valid national and international standards and specifications can be obtained from the Information Centre and Technology Standardization Department at Megawatt Park. Parties using this document shall apply the most recent edition of the documents listed below.

DSP 34-253, Distribution Standard Part 15: Distribution specification for electrical terminal blocks.

DSP 34-462, Distribution Standard Part 15: Standard design for distribution protection schemes.

DSP 34-1080 (DSP 0003), Distribution Standard – Part 4: Specification for earth fault indicators used for MV cable networks.

DSP 34-1658 (DISSCAAP9), Distribution Standard – Part 4: Corrosion protection specification for distribution outdoor equipment manufactured from steel.

DSP 34-2123, Distribution Standard – Part 18: Specification for telecontrol requirements for ring main units.

ESKASAAO4 (DST 32-333), Distribution Standard Part 15: Standard for electronic protection and fault monitoring equipment for power systems.

NRS 004 / SANS 1029, Mini-substations for rated A.C voltages up to and including 24 kV.

NRS 012 / SANS 876, Cable terminations and live conductors within air-filled enclosures (insulation coordination) for rated a.c. voltages from 7,2 kV and up to and including 36 kV.

NRS 053: Edition 2, Accessories for medium-voltage power cables (3,8/6,6 kV to 19/33 kV)..

SANS 121 / ISO 1461, Hot-dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods.

SANS 1019, Standard voltages, currents, and insulation levels for electricity supply.

SANS 1091, National colour standard.

SANS 60076-7, Power transformers – Part 7: Loading guide for oil-immersed power transformers.

SANS 60269-2:2007/IEC 60269-2:2006, Low-voltage fuses – Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) - Examples of standardized systems of fuses A to I.

SANS 60529, Degrees of protection provided by enclosures (IP Code).

SANS 60815-1:2009, Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information, and general principles.

SANS 60947-3:2009/IEC 60947-3:2008, Low-voltage switchgear and control gear – Part 3: Switches, disconnectors, switch-disconnectors, and fuse-combination units.

SANS 61243-5, Live working – Voltage detectors – Part 5: Voltage detecting systems (VDS).

SANS 61439-1, Low-voltage switchgear and control gear assemblies – Part 1: General rules.

2.1 Buyers Guide drawings

D-DT-0853 11 kV air-insulated cable junction box detail (Type A mini-sub)

D-DT-0859 Type 'B' mini-substation plinth details

D-DT-0860 11 kV and 22 kV Type A mini-sub cable termination detail

D-DT-0868 Schematic and wiring diagram

D-DT-1013 Mini-sub meter plate details

2.2 Buyers Guide Items

D-DT-3034	LV circuit breakers
D-DT-3088	Distribution transformer LV neutral surge arrester
D-DT-3132	Wire, meter sealing s/steel
D-DT-3181	LV fuses
D-DT-3409	Fuse holder, vertical 3P 440V
D-DT-3196	Ferrule, tinned Cu sealing 12mm LG
D-DT-3202	Danger sign (unauthorised entry prohibited)
D-DT-6073	Signs D & E (Treatment and Full First Aid Instructions)
D-DT-8016	Unscreened separable connectors (11kV)
D-DT-8017	Screened separable connectors (22kV)
D-DT-8019	Cable Clamp (black polypropylene)
D-DT-8026	LV flexible cables
D-DT-8029	Sealant strip for mini sub/RMU
D-DT-8050	Mini-substation 11 kV, Type B
D-DT-8051	Mini-substation 22 kV, Type B
D-DT-8052	Mini-substation 11 kV, Type A
D-DT-8053	Mini-substation 22 kV, Type A

3 Definitions and abbreviations

3.1 Definitions

The definitions given in NRS 004 / SANS 1029, IEV and the following shall apply:

Nominal voltage: The stated r.m.s. phase-to-phase voltage of the supply to which equipment is connected.

Rated voltage: The highest r.m.s. phase-to-phase voltage of the supply for which equipment is designed to operate continuously.

Ring main unit (RMU): A medium voltage metal-enclosed switchgear assembly that comprises a combination of two ring switch-disconnectors and a circuit-breaker tee-off function. These functions incorporate integral cable earthing switches and have facilities for cable testing.

Type A mini-sub: A mini-sub that is fitted with an off-load, dead-break isolating arrangement in the MV compartment, that consists of unscreened jumpers at 11 kV and extensible screened separable connectors at 22 kV.

Type B mini-sub: A mini-sub that is equipped with a ring main unit in the MV compartment.

4 Requirements

4.1 General requirements for all mini-substations

Mini-substations shall be manufactured in accordance with NRS 004 / SANS 1029 and the requirements of this specification. Where conflicting requirements with the relevant NRS or SANS specifications occur, this specification shall take precedence. 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.

This specification covers the requirements for both Type A and Type B mini-substations up to and including a maximum power rating of 1000 kVA. The specific requirements for Type A and Type B units are specified in sections 4.3, 4.4, 4.5 and 4.6.

The specification distinguishes between mini-substations for inland application and coastal application. The technical schedules of an enquiry document will be arranged to cater for both inland and coastal applications. It is assumed that except for corrosion protection, units will be exactly the same for the two different applications. If there are differences, they shall be indicated in schedule B.

4.1.1 Standard operating conditions

- a) In addition to the requirements of NRS 004, the mini-substation units shall be suitable for operation under the following service conditions:
- b) pollution level: “very heavy” for coastal (corrosive) applications
- c) pollution conditions inside the mini-substation enclosure shall be considered to be in accordance with ‘pollution degree 3’ of SANS 61439-1.
- d) The miniature type substation should be RTU (Ring Terminal Unit) ready for SCADA integration. This shall include current & voltage measurement devices for incomers & feeders.
- e) Unit to be vandal proof by making door, locks & protection facilities to be constructed from 6mm steel and reinforced heavy duty door hinges.
- f) Miniature substations in high risk areas to be fitted with a lockable steel cage.

4.1.2 Electrical requirements

4.1.2.1 Rated lightning impulse peak withstand level

4.1.2.1.1 The rated lightning impulse peak withstand level for all MV equipment shall be in accordance with “List 3” of table 1 given in NRS 012.

4.1.2.2 Transformer

4.1.2.2.1 The standard transformer power ratings for Type A and Type B mini-substations shall be:

- 1) 200 kVA (Type A only);
- 2) 315 kVA;
- 3) 500 kVA;
- 4) 600 kVA; and
- 5) 1000 kVA.

4.1.2.2.2 The MV nominal voltage shall be 11 kV, as specified in schedule A of the enquiry document.

4.1.2.2.3 The rated lightning impulse withstand voltage level for all MV equipment shall be in accordance with “List 3” in accordance with SANS 1019.

4.1.2.2.4 **There shall be no sealed transformer, unit must be bolted.** The unit shall have no drain valve or pressure release device / breather. An oil level indicator shall not be fitted.

4.1.2.3 Earthing

4.1.2.3.1 In the case of mini-sub of rating up to and including 500 kVA, a combined LV neutral-earth busbar (called the ‘LV neutral-earth’ bar) shall be provided. No separate LV earth bar shall be provided. See figure 1.

4.1.2.3.2 In the case of mini-sub of rating 1000 kVA, a separate LV earth bar and LV neutral busbar (called the ‘LV earth’ and ‘LV neutral’ bar respectively) shall be provided in the customer panel. See Figure 2.

4.1.2.3.3 The earthing configuration for the mini-sub shall make provision for a separate MV and LV earthing system. A 70 mm² copper connection between the LV neutral-earth (for mini-sub of rating up to and including 500 kVA) or LV earth bar (for mini-sub of rating 1000 kVA) and the MV earth bar shall be provided and installed in accordance with NRS 004.

4.1.2.3.4 A LV neutral surge arrester in accordance with D-DT-3088 shall be provided and positioned such that the 250 mm insulated jumper is connected to the LV neutral-earth (for mini-sub of rating up to and including 500 kVA) or LV earth bar (for mini-sub of rating 1000 kVA).

NOTE According to the Eskom earthing philosophy, if the MV and LV earth electrodes are to be separated on site, the electrical bridge between the mini-sub earth bar and the LV neutral-earth bar would then be removed as required, and the neutral surge-arrester would be made effective.

4.1.2.3.5 Two insulated electrolytic copper conductors of cross-sectional area of at least 70 mm² each shall be fitted to provide an electrical bridge between the cable gland plate support structure and the LV neutral earth (for mini-sub of rating up to and including 500 kVA) or LV earth bar (for mini-sub of rating 1000 kVA) as shown in figure 2.

4.1.2.3.6 The neutral terminal of the transformer LV winding shall be connected to the LV neutral-earth or LV neutral bar.

4.1.2.4 LV ASSEMBLY

4.1.2.4.1 The LV ASSEMBLY shall be fitted with LV phase and neutral busbars as shown in figures 1 and 2.

4.1.2.4.2 The LV panel shall be constructed and designed for the use of either vertical fuse-bases or large frame MCCBs as specified in schedule A of the enquiry document.

4.1.2.4.3 In the case of Type A mini-sub of rating up to and including 500 kVA, the LV ASSEMBLY shall be designed to accommodate a minimum of five outgoing LV cable feeder bays.

4.1.2.4.4 In the case of Type B mini-sub of rating up to and including 500 kVA, the LV ASSEMBLY shall be designed to accommodate a minimum of six outgoing LV cable feeder bays.

4.1.2.4.5 In the case of mini-sub of rating 1000 kVA (both Type A and Type B), the LV customer panel shall be designed to accommodate a minimum of six outgoing LV cable feeder bays.

4.1.2.4.6 If LV feeder MCCBs are called for at the time of tender, they shall be in accordance with the requirements of SANS 556-1 (see D-DT-3034). LV flexible cable used to connect the MCCBs from the LV busbars shall be in accordance with the requirements of D-DT-8026. MCCBs shall be fitted with individual inter-phase flash barriers. The spacing between the outer live terminals (metal) of adjacent MCCBs shall not be less than 25 mm. This is to ensure that the risk of a flashover occurring between adjacent MCCBs (i.e. between the blue and red phases) is minimised during a short circuit interruption event. The lug barrel and any exposed conductor of the single core flexible jumpers shall be adequately insulated.

4.1.2.4.7 If LV feeder vertical fuse holders are called for at the time of tender, they shall be in accordance with the requirements of SANS 60947-3 (see D-DT-3409) and suitable for type ‘gG-gL’ NH 2 (DIN) fuses for fuse system A in accordance with the requirements of SANS 60269-2 (see D-DT-3181).

4.1.2.4.8 The minimum diameter of the LV insulators used shall be 40 mm. The insulators shall have a cylindrical shape. The minimum diameter of the flat circular surface where the insulator makes contact with the frame and busbar shall be 25 mm. The insulators shall be at least 40 mm long (not including the projecting studs).

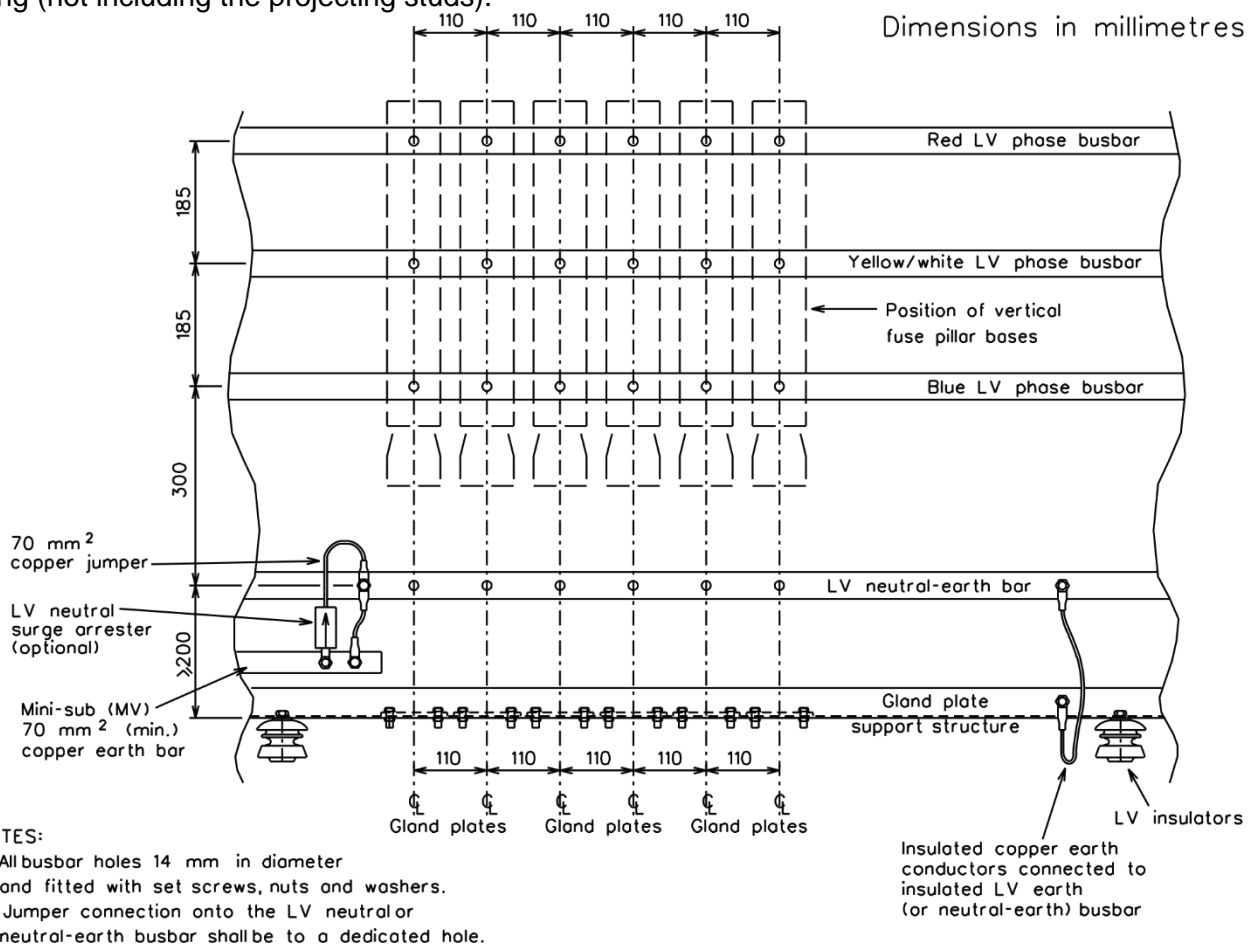


Figure 1 – LV panel showing busbar and gland plate arrangement (mini-sub's of rating up to and including 500 kVA)

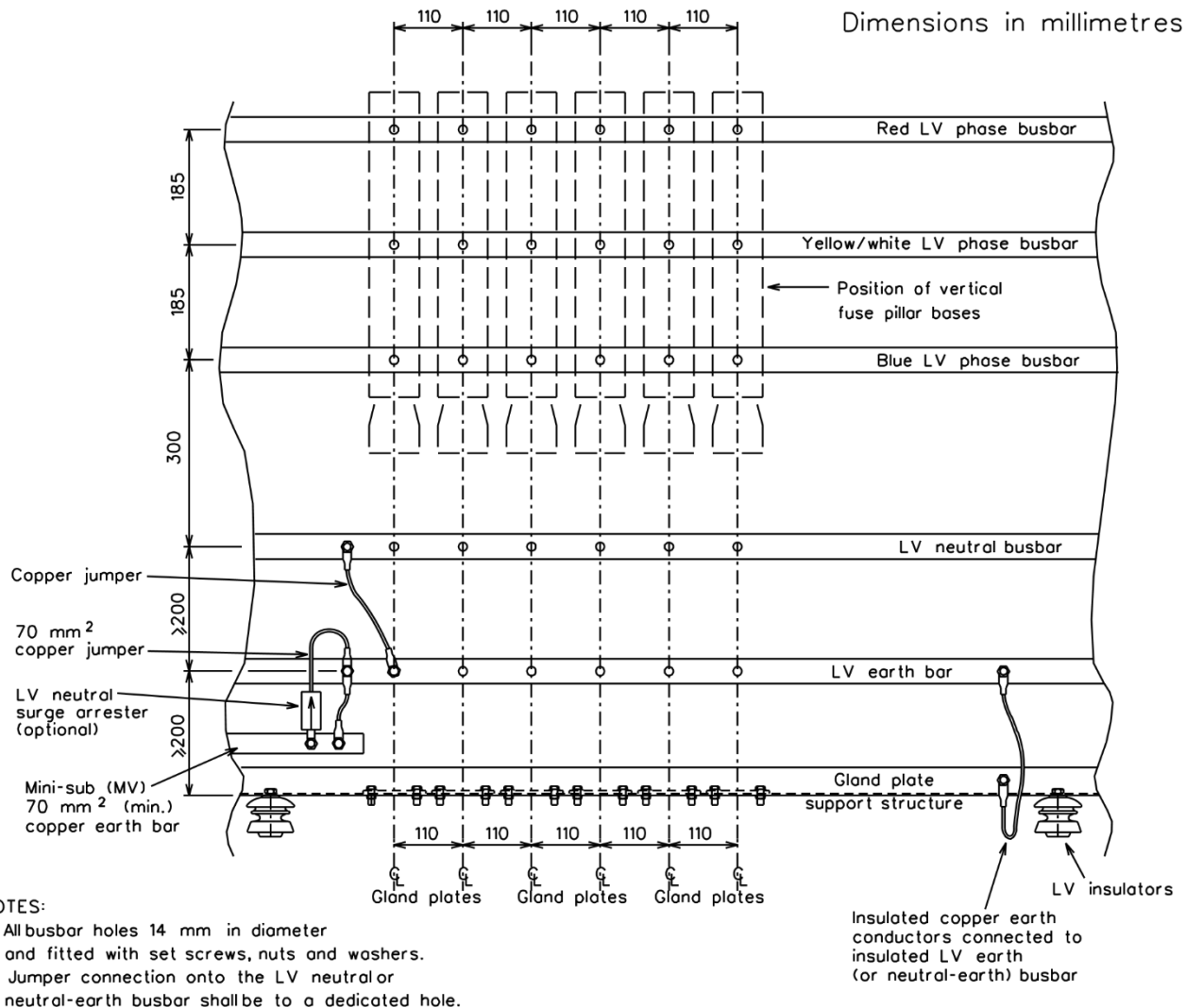


Figure 2 – LV customer panel showing busbar and gland plate arrangement (mini-sub of rating 1000 kVA)

4.1.2.5 LV busbars

4.1.2.5.1 The rated normal current of the busbars of the LV ASSEMBLY shall be equal to 1,2 times the rated secondary current of the transformer and are given in table 1.

Table 1 – LV busbar current ratings

1	2
Transformer rating kVA	LV busbar current rating A
200	330
315	520
500	825
1000	1650

4.1.2.5.2 Stainless steel M12 set screws, nuts, washers and spring washers shall be provided for each of the 14 mm holes drilled on the LV phase, neutral and earth busbars.

4.1.2.6 LV gland plate arrangement

A LV gland plate arrangement with outgoing feeder cable gland plates shall be provided.

4.1.2.7 The following LV auxiliary equipment shall be provided:

4.1.2.7.1 LV ammeters shall be provided for all three phases.

4.1.2.7.2 One voltmeter shall be provided with a selector switch.

4.1.2.7.3 A three pin socket outlet and associated protection equipment in accordance with NRS 004;

4.1.2.7.4 A removable blank plate shall be provided in the LV compartment for the installation of a streetlighting Photo Electric Control Unit (PECU) as and when required. The plate dimensions shall be approximately 300 mm x 300 mm and it shall be located as near as possible to or adjacent to the photocell compartment.

4.1.2.7.5 All auxiliary wiring shall be numbered using an approved type of numbering ferrule at both ends of the wire. All wiring and ferruling shall be in accordance with D-DT-0868.

4.1.2.7.6 An earth-fault indicator (EFI) shall be provided with the mini-sub i.e. Type A and Type B mini-sub. The EFI control unit shall be positioned on the right-hand side of the MV compartment, and the current sensor shall be fitted to the left-side ring cable. The EFI shall comply with the requirements of DSP 34-1080 (DSP 0003). The remote indicating unit shall be mounted on the outside of the mini-sub enclosure in such a manner that it can be clearly viewed from the front of the mini-sub (street-front). The type (make / product) of EFI shall be stated in schedule B and the design details shall be submitted at the tender stage.

4.1.2.8 General electrical requirements

- a) The mini-sub wiring shall be in accordance with D-DT-0868.
- b) All LV auxiliary fuses shall comply with the requirements of fuse system G in accordance with SANS 60269-2 and shall be of size E1.
- c) The current rating of the connections between the transformer LV bushings and the LV busbars (including those to and from the main LV interrupting device) shall be in accordance with table 1.
- d) The LV panel shall be so designed as to ensure thermal interaction does not unduly affect the performance of any of the components.
- e) All terminal blocks shall be in accordance with DSP 34-253 and shall have spring loaded screw terminals.

4.1.3 Construction requirements

4.1.3.1 Design

4.1.3.1.1 In the case of Type A mini-sub of rating up to and including 500 kVA, the general arrangement shall be in accordance with the Type A layout specified in NRS 004.

4.1.3.1.2 In the case of Type A mini-sub of rating 1000 kVA, the general arrangement shall be in accordance with the Type B layout specified in NRS 004.

4.1.3.1.3 In the case of Type B mini-sub, the general arrangement shall be in accordance with the Type B layout specified in NRS 004.

4.1.3.1.4 The base channel and sills of the doors shall be constructed with removable sections adjacent to the MV compartment door(s) to allow the MV cables to be moved into position. These sections shall be lap bolted with the nuts on the inside of the base channel and housing. The cable entry position shall correspond to that of the pre-cast plinth shown in drawing D-DT-0859.

4.1.3.1.5 The three-point locking mechanism on each compartment door shall have an additional, captive, 10 mm Allen cap screw.

4.1.3.1.6 All door handles shall be classified as "heavy-duty" and shall be manufactured from stainless steel.

4.1.3.1.7 A padlock protection facility shall be provided for outdoor mini-sub as shown in Figure 3.

Dimensions in millimetres

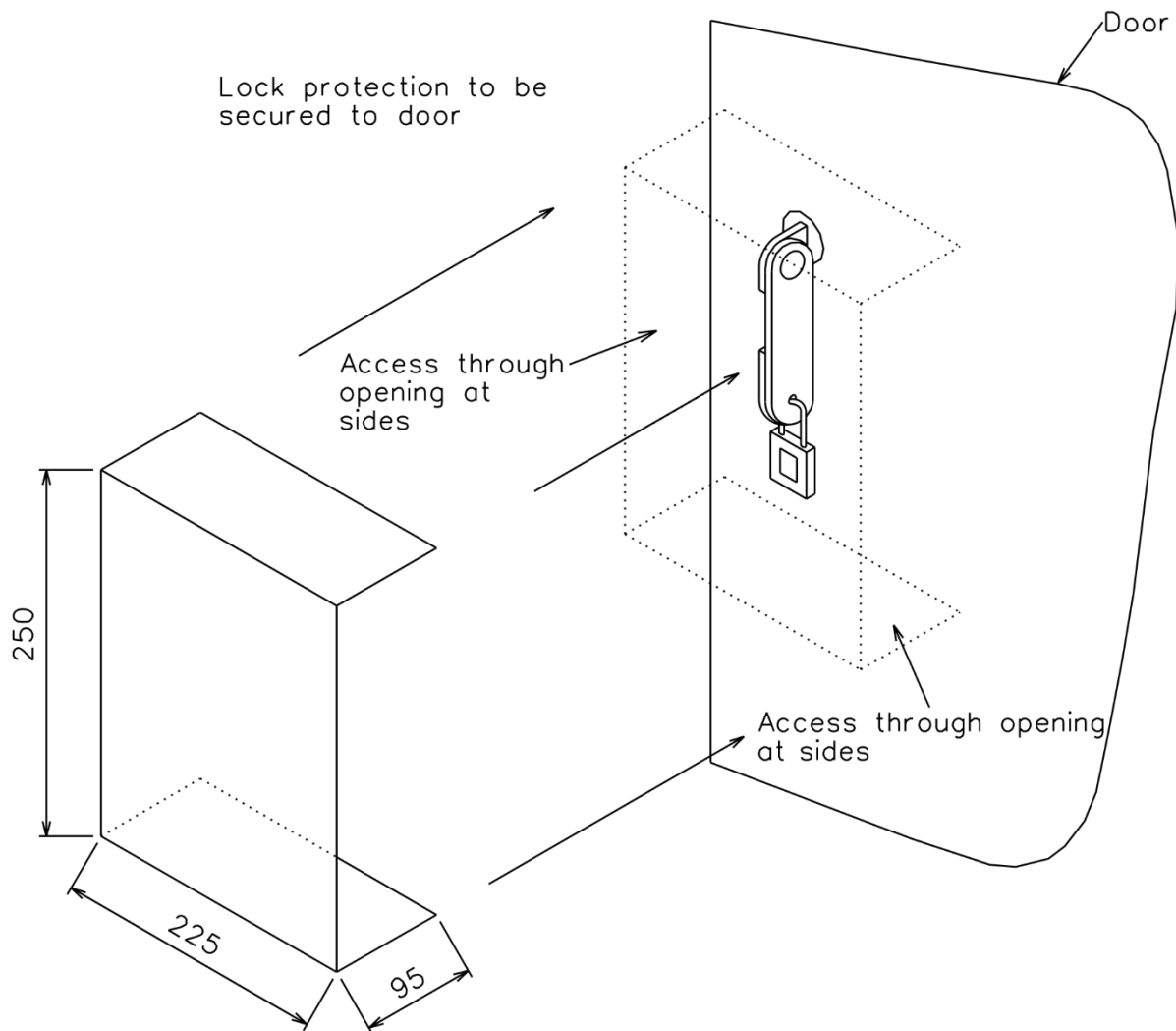


Figure 3 – Lock protection facility

Dimensions in millimetres

4.1.3.1.8 The padlock protection facility shall provide access to the padlock from both sides.

4.1.3.1.9 A Ø15 mm hole shall be provided in the front of the facility that corresponds with the position of the captive 10 mm Allen cap screw fitted in the door in accordance with NRS 006.

4.1.3.2 Materials and corrosion protection

4.1.3.2.1 It will be specified in schedule A whether the mini-sub is required for inland or coastal environments.

4.1.3.2.2 For mini-subs classified as “inland”, the class of pollution characterising the site severity shall be “b” (i.e. “light”) in accordance with SANS 60815-1:2009.

4.1.3.2.3 For mini-subs classified as “coastal”, the class of pollution characterising the site severity shall be “e” (i.e. “very heavy”) in accordance with SANS 60815-1:2009.

4.1.3.2.4 For inland applications, the mini-sub enclosure (lock protection facility, roof, compartments and doors), LV ASSEMBLY steelwork and transformer tank shall be mild steel.

4.1.3.2.5 For coastal applications, the mini-sub enclosure (lock protection facility, roof, compartments and doors), LV ASSEMBLY steelwork and transformer tank shall be 3CR12, stainless steel or zinc metal sprayed mild steel.

4.1.3.2.6 The transformer-cooling radiator shall be mild steel.

4.1.3.2.7 The mini-sub base shall be hot-dipped galvanized mild steel and shall be finished with a black coating.

4.1.3.2.8 For coastal applications, the gland plate support structure and gland plates shall be stainless steel.

4.1.3.2.9 Where a mini-sub is specified as suitable for "inland" applications, the detailed corrosion protection specification shall correspond to a "corrosivity category" of C2 (i.e. "low") or higher in accordance with DSP 34-1658. The detailed specification (DS) options in accordance with DSP 34-1658 are specified in schedule A. The detailed specification (DS) number offered in accordance with DSP 34-1658 shall be stated in schedule B.

4.1.3.2.10 Where a mini-sub is specified as suitable for "coastal" applications, the detailed corrosion protection specification shall correspond to a "corrosivity category" of C5 (i.e. "very heavy") in accordance with DSP 34-1658. The detailed specification (DS) options in accordance with DSP 34-1658 are specified in schedule A. The detailed specification (DS) number offered in accordance with DSP 34-1658 shall be stated in schedule B.

4.1.3.2.11 A 5 mm thick cork packing shall be installed between the mini-sub end compartments and the transformer tank section, between the base and the end compartments, and between the base and the transformer tank section.

4.1.3.2.12 The final colour of the mini-sub enclosure (roof, compartments, and doors) and transformer shall be Avocado C12 in accordance with SANS 1091.

4.1.3.3 Additional requirements for "high-risk" mini-sub

NOTE "High-risk" mini-sub refers to mini-sub intended for use in areas where the probability of vandalism is high – leading to potential safety risks as well as non-technical losses. The following additional requirements are required only for mini-sub classified as "high-risk".

4.1.3.3.1 All mini-sub doors (MV and LV) shall be recessed such that they are flush with the sides of the mini-sub enclosure.

4.1.3.3.2 The mini-sub enclosure, doors and lock protection facilities shall be manufactured using 6 mm thick steel.

4.1.3.3.3 The doors shall be re-enforced using additional steel strength members diagonally welded from corner to corner on the inside surface of the door.

4.1.3.3.4 Heavy duty hinges shall be fitted for the doors and shall be of 3CR12 (coastal) materials.

4.1.3.3.5 A four-point locking mechanism (i.e. at the top-centre, bottom-centre, left-centre and right-centre) using bars operated by a heavy-duty door handle shall be fitted.

4.2 Specific requirements for Type A mini-sub

A Type A mini-sub shall comprise the following:

- a) a medium-voltage compartment that is fitted with an off-load, dead-break isolating arrangement in the MV compartment, that consists of unscreened jumpers at 11 kV (see Figure 4) and extensible screened separable connectors at 22 kV (see figure 5);
- b) a transformer compartment housing the transformer; and
- c) a low-voltage compartment housing the LV ASSEMBLY for LV equipment.

4.2.1 Electrical requirements

4.2.1.1 Transformer MV bushings

4.2.1.1.1 For 11 kV mini-sub, the transformer bushing-centre spacing shall be ≥ 135 mm and the distance between the outer bushing-centres and the mini-sub metal enclosure shall be ≥ 90 mm. The actual distances provided shall be indicated in schedule B of the enquiry document.

4.2.1.1.2 For 22 kV mini-sub, the transformer bushing-centre spacing shall be ≥ 180 mm and the distance between the outer bushing-centres and the mini-sub metal enclosure shall be ≥ 80 mm. The actual distances provided shall be indicated in schedule B of the enquiry document. The transformer bushings shall be horizontally positioned.

4.2.1.2 LV main circuit breaker and transformer overload protection facility

4.2.1.2.1 A main LV circuit breaker shall be provided in the LV compartment between the transformer and the LV busbars. The type (i.e. make / product) of circuit breaker offered shall be stated in schedule B. The circuit breaker shall be fitted with a shunt-trip facility that is wired to a temperature-sensing element fitted to the transformer.

4.2.1.2.2 The transformer unit shall be fitted with a top-oil thermoelectric temperature-sensing element. This shall trip the LV circuit breaker through a shunt-trip facility when the transformer top-oil temperature exceeds 105 °C. The relay used to provide the shunt-trip facility shall be housed in an enclosure and sealed with a stainless-steel meter sealing wire (see D-DT-3132) and a 12 mm tinned copper ferrule (see D-DT3196).

4.2.1.2.3 The standard ratings for the main LV circuit breaker shall be as indicated in table 2.

Table 2 – Standard LV circuit breaker ratings

1	2
Transformer rating kVA	Circuit Breaker rating A
200	300
315	450
500	800
630	
1000	1600

4.2.2 Construction requirements

4.2.2.1 11 kV Type A mini-sub:

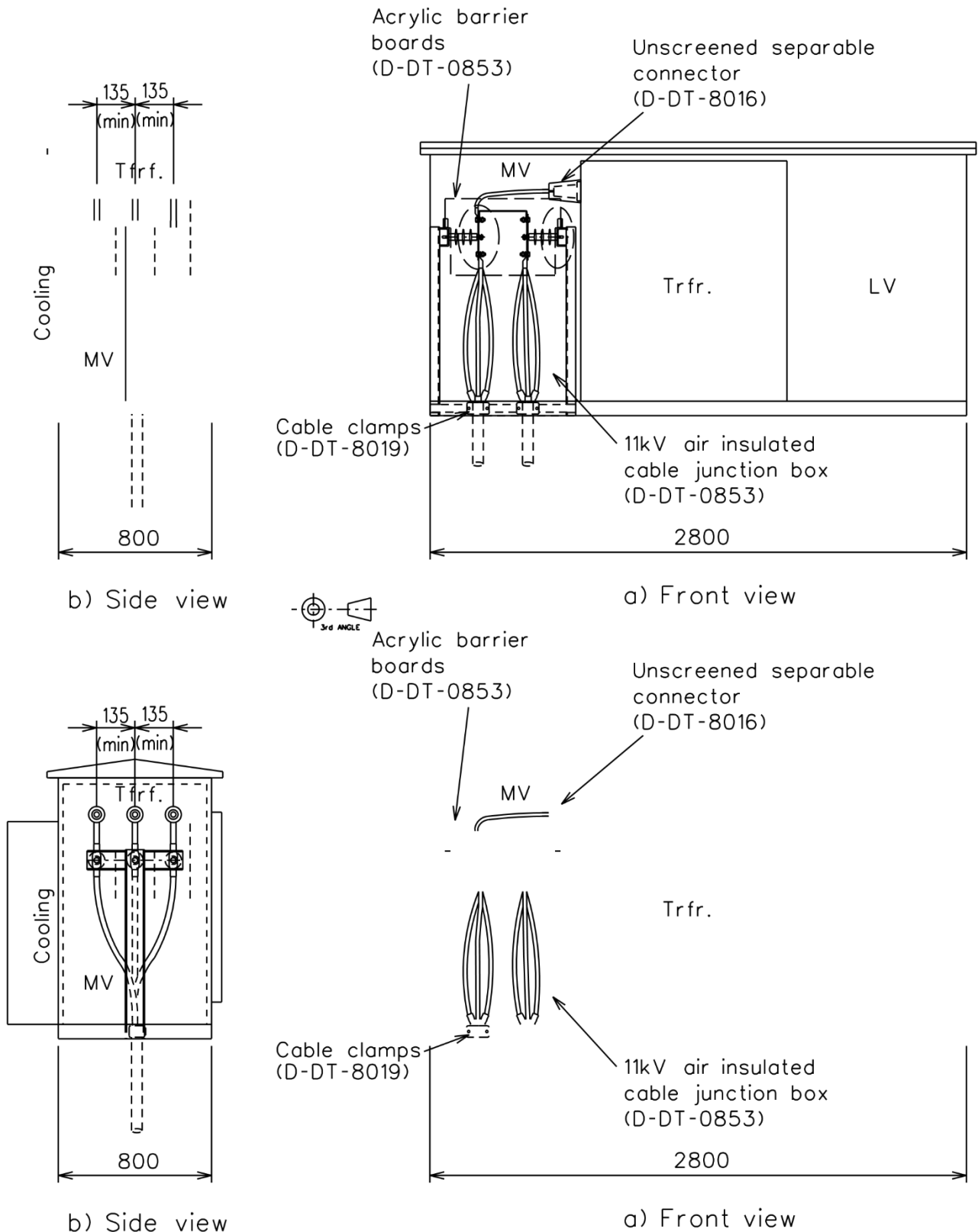
4.2.2.1.1 The MV compartment shall be supplied and fitted with an 11 kV air-insulated cable junction box as shown in D-DT-0853. The arrangement and size of the ring and transformer jumpers shall be in accordance with drawing D-DT-0853. The ring jumper copper bar shall be insulated (covered) with a suitable busbar insulation tube or tape. The jumpers shall be unscreened, single core, flame-retardant PVC insulated, copper conductors in accordance with the requirements of SANS 1507. The transformer jumpers shall be terminated on to the transformer bushings using unscreened separable connectors (USC). The unscreened separable connector (see D-DT-8016) to be used shall be in accordance with the requirements of NRS 053 and the type (i.e. make / product) offered shall be stated in schedule B.

NOTES:

In the case where lugs having M12 fixing holes are used, a stainless steel or brass M16 to M12 reducing stem, washer and spring washer is required to attach each jumper lug flush onto the face of the bushing.

In the case where lugs having M16 fixing holes are used, a stainless steel or brass M16 set screw with nut, washer and spring washer is required used to attach each jumper lug flush onto the face of the bushing.

4.2.2.1.2 Provision shall be made for the support (clamping) of two incoming cables in the MV compartment. Two cable clamps (see D-DT-8019) shall be provided with the mini-sub in accordance with NRS 012. The distance from the cable support point (clamp) to the point of connection shall be 800 mm (as shown in D-DT-0853). The cable support clamps shall range taking for cables with outer diameters of 50 – 75 mm. The clamps shall be securely fitted.



- 4.2.2.1.3 The two cable clamps shall be positioned such that the respective cables are supported directly below the centre-phase post insulators of the off-load, dead-break isolating arrangement (11 kV air insulated cable junction box).
- 4.2.2.1.4 The MV compartment shall only have a front door only (no end or rear doors are required).

Figure 4a – 11 kV Type A mini-sub of rating up to and including 500 kVA

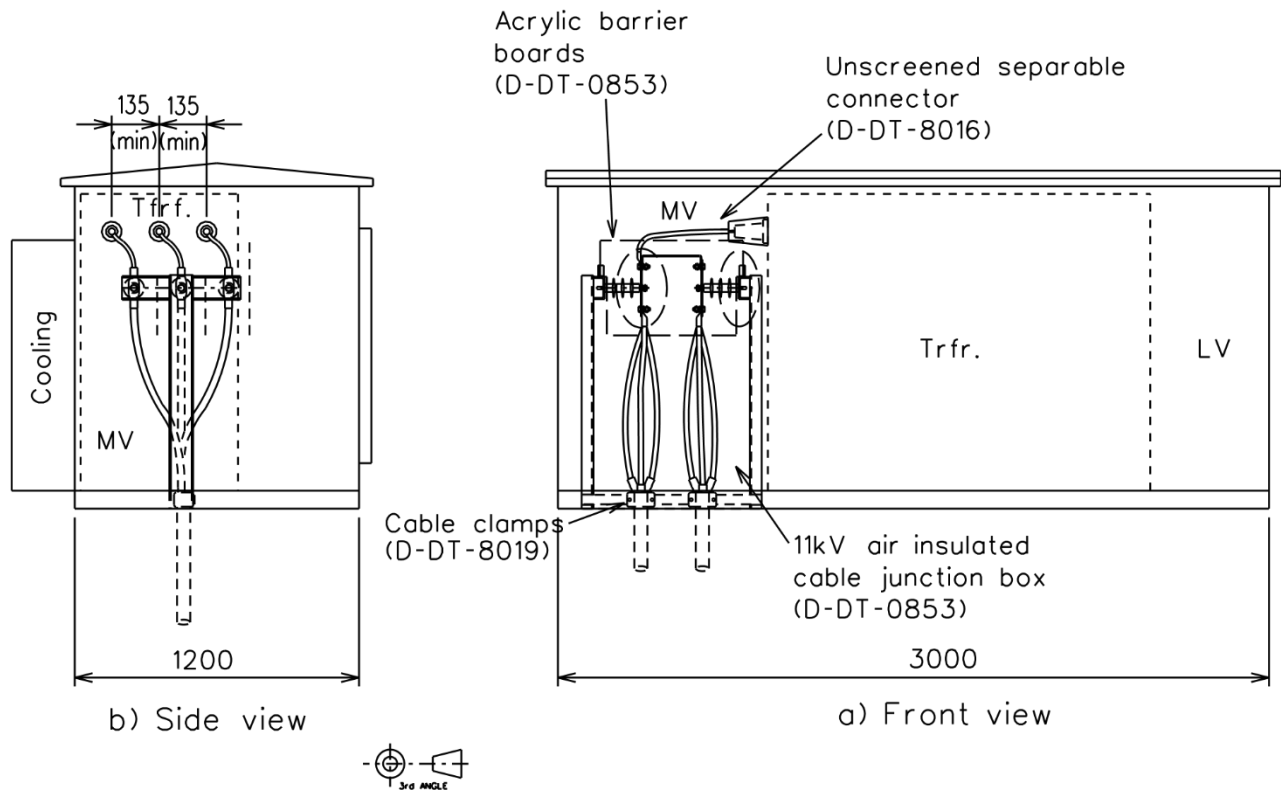


Figure 4b – 11 kV Type A mini-sub of rating 1000 kVA

4.2.2.2 22 kV Type A mini-sub:

4.2.2.2.1 The general arrangement of 22 kV mini-sub shall be in accordance with the Type A layout specified in NRS 004.

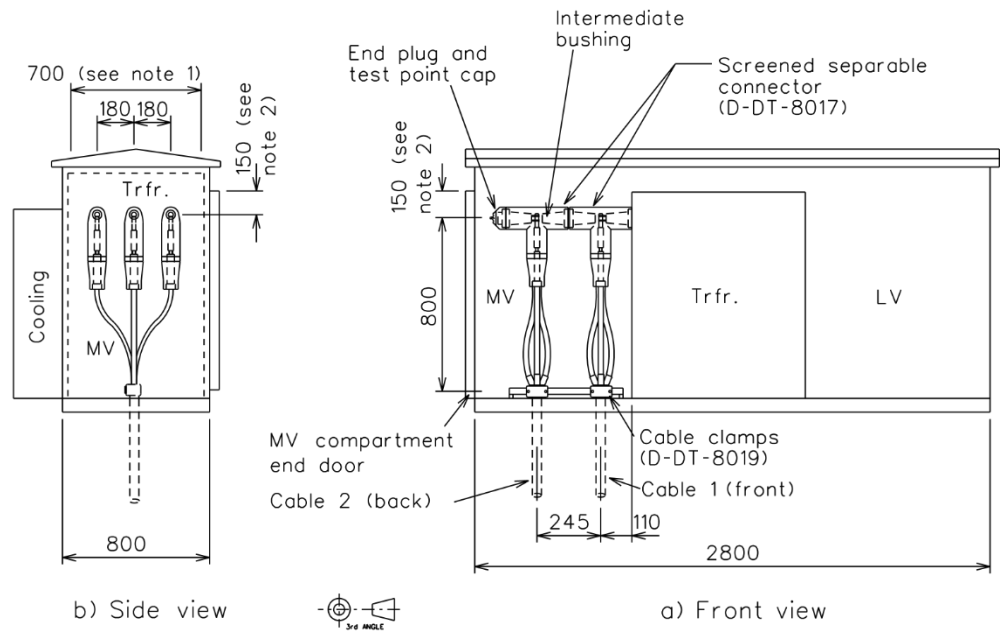
4.2.2.2.2 Provision shall be made for the support (clamping) of two incoming cables in the MV compartment. Two cable clamps (see D-DT-8019) shall be provided with the mini-sub in accordance with NRS 012. The distance from the cable support point (clamp) to the transformer bushing centres shall be at least 800 mm. The cable support clamps shall be range taking for cables with outer diameters of 75 – 100 mm. The clamps shall be securely fitted.

4.2.2.2.3 The transformer bushings shall be horizontally positioned in a straight line.

4.2.2.2.4 The MV compartment shall have a front and end door (no rear door is required).

4.2.2.2.5 The MV compartment shall have a minimum internal width of 700 mm.

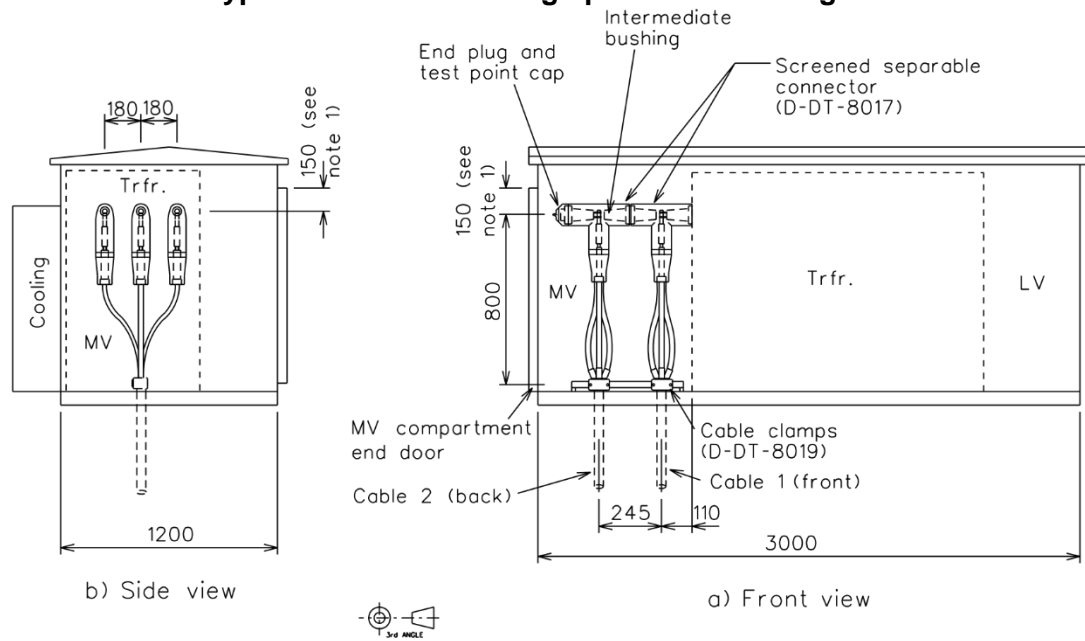
4.2.2.2.6 The height of the MV compartment door opening shall be at least 150 mm above the horizontal bushing centre-line.



NOTE:

1. Minimum internal width of MV compartment.
2. Minimum height of MV compartment door opening relative to connector/bushing centre - line to allow required access to connectors.

Figure 5a – 22 kV Type A mini-sub of rating up to and including 500 kVA



NOTE:

1. Minimum height of MV compartment door opening relative to connector/bushing centre - line to allow required access to connectors.

Figure 5b – 22 kV Type A mini-sub of rating 1000 kVA

4.3 Specific requirements for Type B mini-sub

A Type B mini-sub shall comprise the following:

- a) a medium-voltage compartment that is fitted with a non-extensible '2R-1B' ring main unit;

NOTE A '2R-1B' ring main unit consists of 2 ring switch-disconnectors ('R' functions) and a circuit breaker tee-off ('B' function) which is used to supply the mini-sub transformer. This is equivalent to a '2SD-1CB' ring main unit configuration in accordance with NRS 006.

- b) a transformer compartment housing the transformer; and
- c) a low-voltage compartment housing the LV ASSEMBLY for LV equipment.

4.3.1 Electrical requirements

4.3.1.1 MV ring main unit (RMU)

4.3.1.1.1 The ring main unit shall comply with the requirements of NRS 006 and the following:

4.3.1.1.2 Integral cable test facilities that do not require access to the cable termination enclosure (i.e. are independent of the cable termination enclosure) shall be provided for all 'R' functions (switch disconnectors). Each cable test facility shall be interlocked with its associated earth switch to ensure that the test terminals of the cable test facility are not accessible when the cable is energized. The cable test facility need not be capable of being padlocked.

4.3.1.1.3 Remote tripping (hand-held push-button remote-control unit)

- a) If provision is required for remote tripping and closing via a hand-held push-button remote-control unit (i.e. trip and close pendant control), it will be specified in schedule A.

NOTE Ring main units that are internal arc classified in accordance with NRS 006 do not require this facility.

- b) The plug-in connector for the hand-held remote-control unit shall be a circular bayonet type coupler. Details of connector shall be specified in schedule A. The male coupler shall be provided and positioned on the front of the ring main unit.
- c) Details of the provisions offered for remote tripping and closing via a hand-held push-button remote-control unit shall be given in schedule B (e.g. stored energy mechanism with latching functions / motorised mechanism, additional trip / close coils, portable battery tripping unit (BTU) power supply specification, BTU charging requirements).

4.3.1.1.4 Ring main unit cable termination enclosures

- a) The ring main cable termination enclosures shall be suitable for the termination of 3-core cables of conductor cross-sectional area up to 185 mm².
- b) For 11 kV ring main units, the minimum spacing between bushing centres and between the outer bushing centres and earthed metal enclosure shall be 105 mm and 55 mm respectively. Where screened separable connectors are used for the tee-off circuit-breaker, the minimum spacing between bushing centres and between the outer bushing centres and earthed metal enclosure of the tee-off circuit-breaker shall be 90 mm and 50 mm respectively.

NOTE These dimensions are based on the fact that for the ring main cable terminations at 11 kV, unscreened separable connectors are currently used.

- c) For 22 kV ring main units, the minimum spacing between bushing centres and between the outer bushing centres and earthed metal enclosure shall be 90 mm and 50 mm respectively.
- d) The range of the cable support clamp (in accordance with NRS 012 and D-DT-8019) fitted in each cable termination enclosure shall be

- i. in the case of XLPE-insulated cables and 22 kV paper-insulated cables, suitable for an outer cable diameter of 75 – 100 mm; and
- ii. in the case of 11 kV paper-insulated cables, suitable for an outer cable diameter of 50 - 75 mm.

4.3.1.1.5 An “integrated” voltage detection system (VDS) with fixed voltage indicators and test points in accordance with SANS 61243-5 shall be provided for each functional units.

4.3.1.1.6 Circuit breaker protection relay

- a) The protection tripping of the circuit breaker shall be through a self-powered protection relay.
- b) The protection relay shall be in accordance with DST 32-333 (ESKASAAO4).
- c) The protection CT type and class shall be stated in schedule B.
- d) The protection relay shall provide an over-current function with an HRC fuse characteristic or an extremely inverse (IDMTL) protection element in accordance with DSP 34-462.
- e) The setting ranges (pick-up settings, time multipliers, delay times) and resolutions of the overcurrent, earth fault and high-set instantaneous protection elements shall be in accordance with DSP 34-462.
- f) The setting ranges, resolutions and protection element curves provided shall be stated in schedule B.
- g) The protection relay and CT combination shall operate according to specification up to the rated short-circuit breaking current of the circuit breaker.
- h) The relay and terminal blocks of the protection relay shall be easily accessible from the front of the ring main unit (e.g. for testing purposes).
- i) The relay shall be positioned and installed in such a way that it is possible to exchange it with minimal effort and tools.
- j) The protection relay, current sensors or current transformers shall be installed and wired complete for service.
- k) The wiring from the protection relay to the current sensors or current transformers shall be in accordance with DST 32-333 (ESKASAAO4) unless otherwise approved.
- l) Once the relay has been set, it shall be sealed with a stainless-steel meter sealing wire (see D-DT3132) and a 12 mm tinned copper ferrule (see D-DT-3196) to indicate evidence of tampering.

4.3.1.1.7 Gas density monitoring device

- a) The device provided for monitoring the gas pressure on each tank shall respond to gas density (i.e. shall indicate pressure compensated for temperature).
- b) The RTU is to be supplied for remote monitoring and control, a density monitoring device (which may be integrated into the temperature compensated pressure gauge as a dual function device) shall be provided with contacts which shall operate in two stages as follows:

- i) on reaching the non-urgent alarm / warning level (i.e. where gas pressure is low but live switching is still possible);
 - ii) on reaching the critical level (i.e. where live switching can no longer be performed, and switchgear is to be taken out of service).
- c) Pressure gauges shall be numerically marked and calibrated in Pascal's (kPa or MPa). Only gauge pressure shall be indicated and rated pressure shall be no more than 80% of the full-scale reading. Gauge markings shall be clearly labelled 'Absolute' for gauges measuring absolute pressure or 'Atmospheric' for gauges measuring pressure exclusive of the atmosphere.
 - d) The type of gauge utilised shall be designed such to prevent any corrosion of moving parts and contacts inside the gauge.
 - e) When provided, the density monitoring device shall also give a positive and reliable response on reaching the operating values (no contact bounce).

4.3.1.2 MV Interconnections between ring main unit and transformer

- a) The screened cables shall be terminated onto the transformer bushings using screened separable connectors (SSCs).
- b) The screened separable connector (see D-DT-8017) to be used shall be in accordance with the requirements of NRS 053 and the type (i.e. make / product) offered shall be stated in schedule B.
- c) The design details of the interconnection arrangement shall be submitted at the tender stage.

4.3.1.3 Transformer MV bushings

The transformer bushing-centre spacing shall be ≥ 90 mm and the distance between the outer bushing centres and the mini-sub metal enclosure shall be ≥ 50 mm. The actual distances provided shall be indicated in schedule B of the enquiry document.

NOTE The transformer bushings centres are based on the fact that screened separable connectors (SSCs) are used for the termination of the MV interconnections onto the transformer bushings.

4.3.1.4 Transformer overload protection

The transformer unit shall be fitted with a top-oil thermoelectric temperature-sensing element. This shall trip the ring main unit tee-off circuit-breaker through a 240 V shunt-trip facility when the transformer top-oil temperature exceeds 105 °C. The relay used to provide the shunt-trip facility shall be housed in an enclosure and sealed with a stainless-steel meter sealing wire (see D-DT-3132) and a 12 mm tinned copper ferrule (see D-DT-3196).

4.3.1.5 LV main switch-disconnector or LV main breaker

- a) For mini-sub of rating up and including 500 kVA, a main LV switch-disconnector shall be provided in the LV end compartment in order to isolate the LV busbars from the transformer. The type (i.e. make / product) of switch-disconnector offered shall be stated in schedule B.
- b) For mini-sub of rating 1000 kVA, a main LV circuit breaker shall be provided in the LV end compartment between the transformer and the LV busbars. The type (i.e. make / product) of circuit breaker offered shall be stated in schedule B.
- c) The standard ratings for the main LV switch-disconnector or circuit breaker shall be as indicated in table 3.

Table 3 – Standard LV switch-disconnector / circuit breaker ratings

1	2	3
Transformer rating kVA	LV main switch disconnecter/ circuit breaker rating A	Switch Type
315	450	Switch-disconnector
500	800	Switch-disconnector
1000	1600	Circuit breaker

4.3.1.6 Remote control and monitoring of mini-sub (if applicable)

- a) If specified in schedule A, the mini-sub shall be supplied and fitted with a remote terminal unit (RTU) for remote monitoring and control of the RMU.
- b) The RTU shall comply with the requirements of DSP 34-2123.
- c) The RTU auxiliary supply shall be provided from the LV busbars of the mini-sub.
- d) The 230 V a.c. auxiliary supply for the RTU shall be fitted with the following:
 - i) a suitably rated HRC fuse; and
 - ii) a neutral fuse link.

4.3.2 Construction requirements (11kV and 22kV Type B mini-sub)

4.3.2.1 For mini-sub designed for the fitting of LV circuit breakers, the LV ASSEMBLY (i.e. busbars, circuit breaker mounting plate, barricades, gland plate support structure etc.) shall be at least 1000 mm in length to allow for the fitting of 6 x LV circuit breakers that are up to 150 mm wide and allowing for a clearance of 20 mm between circuit breakers.

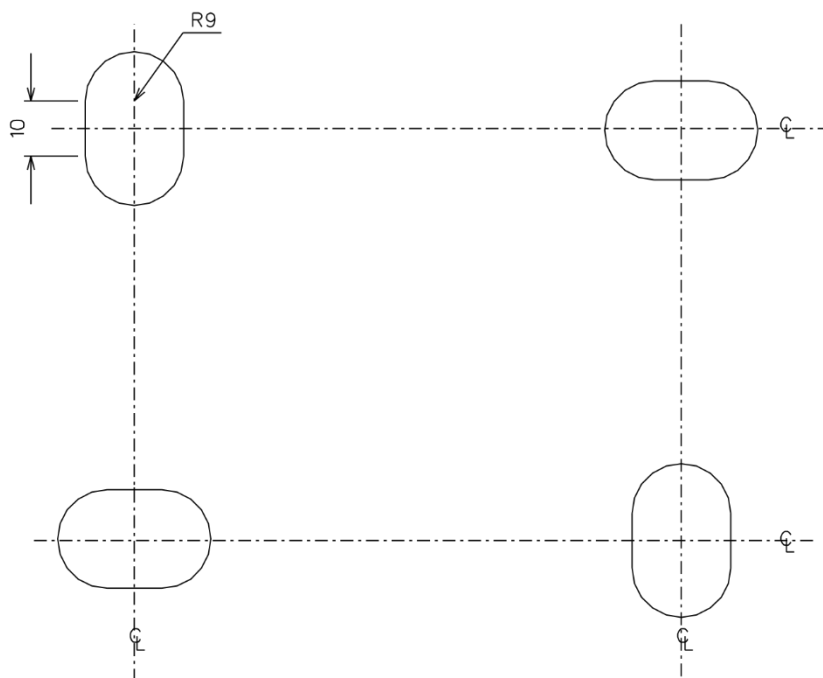
4.3.2.2 The LV busbars and gland plate support structure shall be pre-drilled for the full 1000 mm length (at 110 mm centres) to allow for up to 9 feeder bay positions in accordance with NRS 004.

NOTE Although the gland plate support structure will provide for up to 9 gland plate positions, only 6 gland plates need to be provided.

4.3.2.3 Provision for holding down the outdoor mini-sub

The outdoor mini-sub base shall have four Ø18 mm slotted mounting holes dimensioned and positioned as shown in figure 4 that are suitable for M16 holding-down setscrews.

NOTE Slotted holes are required to in order to make provision for manufacturing tolerances in the concrete plinth holding down positions.



Note
Slotted hole centre spacing in accordance with
holding-down positions on concrete plinth.

Figure 6 – Outdoor kiosk slotted mounting hole details

4.3.3 Ring main unit protection relay settings and testing

The protection relays shall be configured, set and tested by the mini-sub manufacturer in accordance with the requirements given in Annex A. The protection relays and current transformers shall be installed, completely wired, tested and ready for commissioning prior to delivery.

NOTE No relay settings or commissioning tests will be required to be carried out prior to energizing the mini-sub.

4.4 Additional general requirements for 1000 kVA mini-sub

4.4.1 Design and construction

4.4.1.1 The 1 MVA Type B mini-sub shall be suitable for the standard Type B mini-sub plinth and the 1 MVA Type A mini-sub shall be suitable for the special 1 MVA Type A mini-sub plinth in accordance with DDT-0859.

4.4.1.2 The LV compartment shall be divided into three sub-compartments (see figures 5 and 6) as follows:

- 1) Panel (mini-sub end compartment);
- 2) Metering and control panel (right-hand side LV compartment door); and
- 3) Customer panel (left-hand side LV compartment door).

4.4.1.3 Access to each LV sub-compartment shall be by way of an individual door that is lockable. Barricades shall be used to prevent access between sub-compartments.

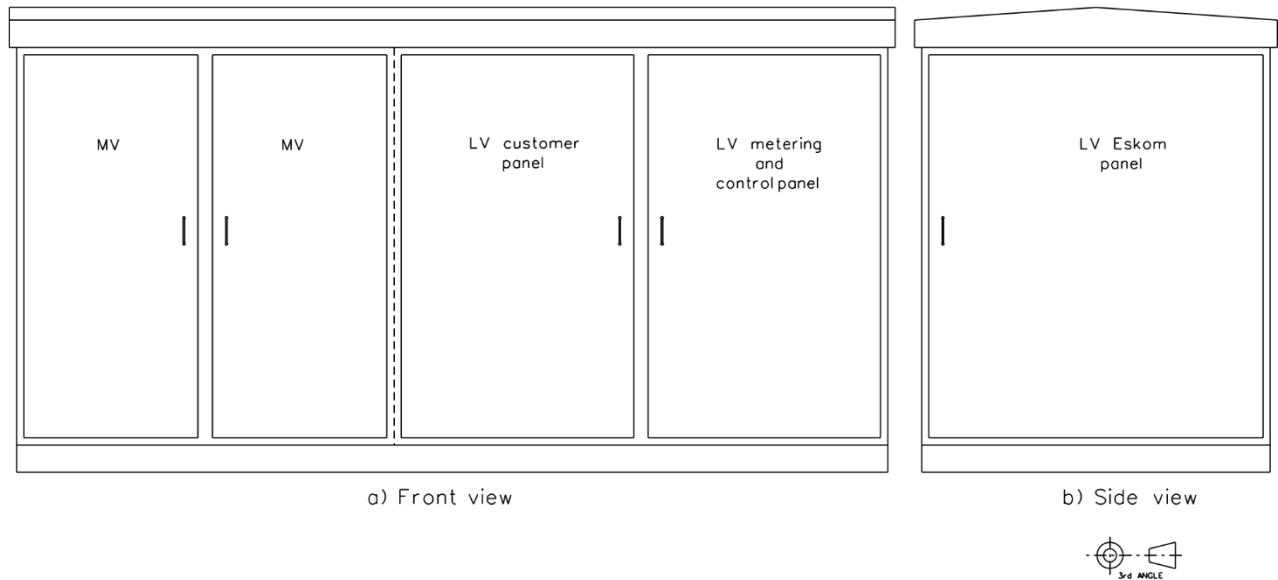


Figure 7 – 1000 kVA Mini-sub housing design

4.4.2 LV Compartment

4.4.2.1 Auxiliary wiring

All auxiliary wiring in the LV compartment shall be numbered using an approved type of numbering ferrule at both ends of the wire. All wiring and ferruling shall be in accordance with D-DT-0868.

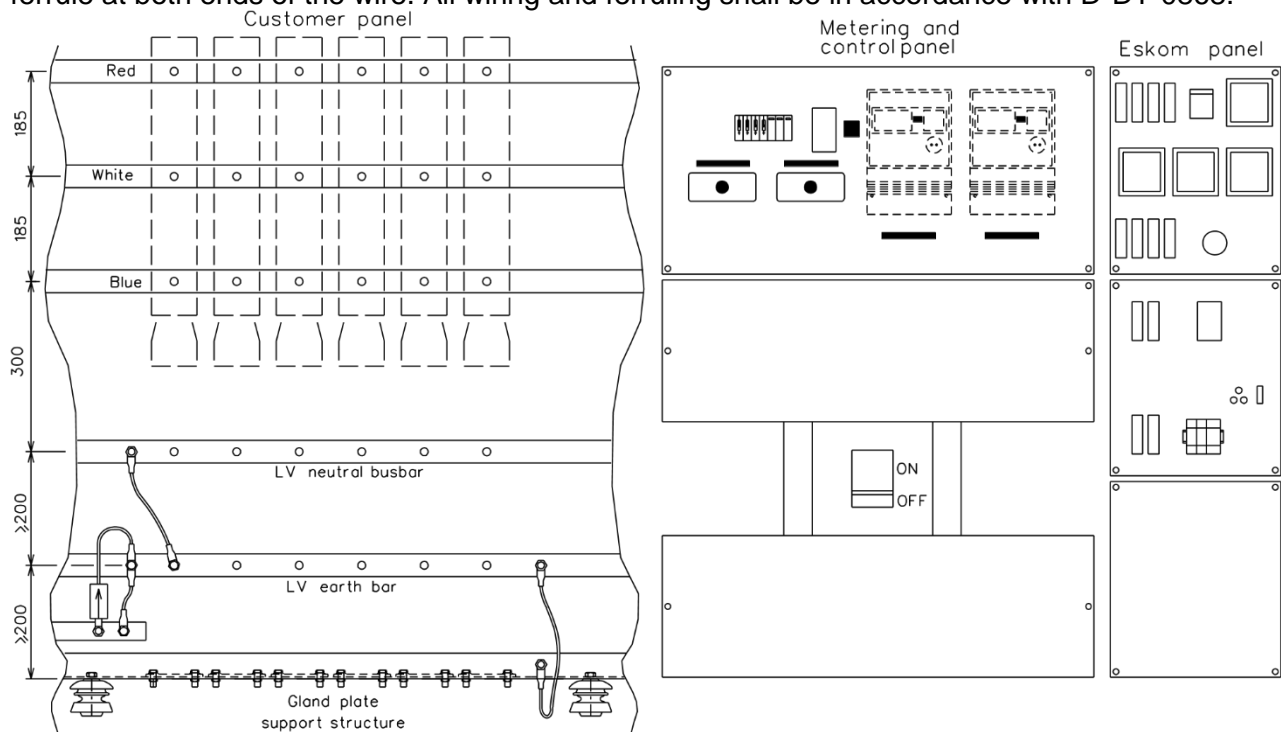


Figure 8 – LV ASSEMBLY design – modify metering panel based on D-DT-1013 revision

4.4.2.2 Panel (see figure 8)

The following equipment shall be fitted in the panel:

4.4.2.2.1 the single-phase 16 A three pin socket-outlet and protection equipment. The socket outlet supply shall be taken from the LV busbars upstream from the metering current transformers;

4.4.2.2.2 the LV ammeters;

4.4.2.2.3 the LV voltmeter and selector switch;

4.4.2.2.4 the earth fault indicator (EFI) LV supply ;

4.4.2.2.5 the transformer overload protection facility as specified in 4.2.1.2.2 and 4.3.1.4.

4.4.2.3 Metering and control panel (see figure 8 and D-DT-1013)

- a) A 1600 A main LV circuit-breaker shall be provided at the bottom of the panel in order to isolate the LV busbars from the transformer. The connections onto the circuit-breaker on the line and load side shall be barricaded using removable metallic barriers.
- b) A hinged meter plate shall be provided at the top of the panel (see D-DT-1013 sheet 1). The meter plate shall be fitted with the following:
 - 1) CT and VT test blocks;
 - 2) surge arresters; 3) HRC fuses; and
 - 4) terminals.

Note Meter(s) and modem will be supplied (where applicable).

- c) All wiring indicated on D-DT-1013 sheet 3 shall be provided and shall have sufficient slack to allow the meter plate to be hinged outward to at least 90° relative to the mini-sub LV compartment. The wiring that is to be terminated onto the meters shall be taken through the 32 mm diameter holes in the meter plate and shall have at least 300 mm of excess wire when measured from the 32 mm hole to the wire end with the meter plate hinged outward.
- d) 1600/5 A class 0,5 current transformers (CTs) shall be fitted to the phase busbars and shall only be accessible once the meter plate has been hinged outward.
- e) Adequate space shall be provided for the metering technicians to insert a primary current test probe over the LV busbars in order to confirm the CT ratios on site.
- f) All the current instrument transformers shall be tested for accuracy according to SANS 60044-1 by a SANAS approved laboratory before installation in the kiosk. The test results shall be shipped with the mini-sub in a suitable cover for protection against damage. A test label (sticker) shall be on each instrument transformer, certifying that the instrument transformer has been tested.

4.4.2.3.1 Metering voltage secondary circuit

- a) The voltage circuit shall take its supply from the busbars.
- b) The VT wires shall be connected onto fuse-holders situated on DIN rail A at the back of the panel.
- c) From the fuse-holders the wiring shall go to the bottom connections of a PK2 4-way testblock. The removal of the male adapter of the test block shall ensure the open-circuiting of the voltage circuit. The terminals that protrude into the panel shall be suitably insulated from the steel edges.
- d) Single-pole surge arresters shall be installed between the PK2 4-way test block and the terminals on the voltage circuit from all three phases – to ground and from neutral – to ground, to protect the meter from lightning.

- e) From the PK2 4-way test block the wiring shall go to the terminals and from there to the meter.

4.4.2.3.2 Metering current secondary circuit

- a) The current supply wiring shall come from the CTs onto the bottom terminals of the PK2 4-way test block and then to the meter.
- b) On removal of the male adapter, short-circuit parts shall ensure the short-circuiting of the current transformer terminals and earth. The terminals that protrude into the panel shall be suitably insulated from the steel edges.

4.4.2.3.3 Metering circuit surge arrester specification

- a) The surge arrester shall be the metal oxide, DIN rail mount type with LED indication suitable for Zone 1 protection. The arrester shall comply with SANS 61643-1 and bear the SABS mark.
- b) The technical specification for the surge arresters shall be:

I_{max} (8/20 μ s)	40 kA or 65 kA (4/20 μ s)
Response time	< 25 μ s
Max. operating voltage	275 V a.c. (phase-to-neutral) 360 V d.c.
Frequency	50 Hz
Internal fuse	Yes
Open-circuit	Open-circuit on expiry of the device
Indication	Clear change-of-state (functional or non-functional) indication

4.4.2.3.4 Metering circuit HRC fuse specification

The LV HRC fuses shall comply with the requirements of SANS 60269-2 and the fuse holders shall be suitable for DIN rail mounting.

4.4.2.3.5 Meter and metering modem (where applicable).

4.4.2.3.6 Metering circuit wiring

- a) The mini-sub metering circuit shall be wired in accordance with the drawing D-DT-1013.
- b) No individual wire numbering is required.
- c) Not more than two conductors shall be connected to a terminal.
- d) No bare wiring or bare part of lugs shall be exposed at termination points on the meter, the circuit breakers, the relay base, fuse holders and the terminals.
- e) Only JST type YNT or Cembre type HP4 crimping tools shall be used for the crimping of lugs.

4.4.2.4 Customer panel (see figure 8)

- a) The LV busbars, earth bars and a gland plate arrangement shall be fitted in the LV customer panel as shown in figure 2.
- b) The panel shall be designed and constructed for the use of either vertical fuse-bases or large frame MCCBs as specified in schedule A of the enquiry document.

4.4.3 LV main circuit breaker protection relay settings

The LV main circuit breaker protection relay shall be configured and set by the mini-sub manufacturer in accordance with the requirements given in Annex B. The protection relay shall be installed, completely wired and ready for commissioning prior to delivery.

NOTE No relay settings or commissioning tests will be required to be carried out prior to energizing the mini-sub.

4.5 Transformer losses and capitalization

- a) 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.
- b) The economic life of a transformer is assumed to be 25 years.
- c) The values of parameters C_i and C_c are given in the technical schedules. These parameters will be revised with each enquiry.
- d) Regardless of the use of the capitalization formula, the losses shall not be greater than those specified in SANS 780.
- e) Load and no-load losses, the percentage impedance and the X/R ratio of the transformer shall be stated in schedule B of the enquiry document. The load losses and the percentage impedance shall be stated at 75 °C, in accordance with SANS 780.

5 Tests

5.1 General

5.1.1 The supplier shall cover the cost of type testing and may be requested to provide the details of when and where these tests will be conducted. The supplier or manufacturer shall demonstrate an ability to provide means for tests to be witnessed.

5.1.2 Type tests are intended to establish design characteristics. They are normally only made once and repeated only when the design, components or the material of the unit are changed. The results of the type tests are recorded as evidence of compliance with design requirements.

5.1.3 Suppliers shall submit all the required type test reports. If the units offered have been tested for compliance with an internationally accepted standard. These type test reports and alternative test standards shall be submitted with the tender.

5.1.4 The qualifying type tests need not be performed if they were successfully completed on a previous tender, provided that the design and material have not been changed or modified in any way. The type test certificates of completed successful type tests previously submitted shall be submitted with the current tender. Any change in the components shall be indicated at the time of tender.

5.1.5 The transfer of test certificates between manufacturers will not be allowed.

5.1.6 The supplier shall ensure that type tests are valid.

5.1.7 If there is reasonable doubt as to the validity of test certificates submitted, for example, by virtue of modifications made to the mini-sub, It may direct that further tests are carried out at a accredited test facility in the presence of a representative of the purchaser, on a sample unit of the mini-sub in question. These tests shall be at the expense of the supplier.

5.1.8 Routine tests are intended to prove conformance of units to specific requirements and are made on every unit. These tests shall be non-destructive.

5.2 Qualifying tests

The tests specified in NRS 004 shall be performed to establish the design characteristics of the mini-sub and assure compliance with the requirements specified in this specification. The tests shall be conducted on new units in the same state as they are normally supplied.

5.2.1 Transformer temperature rise test.

In order to account higher average ambient temperatures in South Africa as well as for solar radiation on the mini-sub enclosure, the mini-sub transformer temperature rise limits shall be as follows:

- Top oil- temperature rise 55 K
- Average winding temperature rise 60 K

In addition, the transformer rated current (and thus load-losses) shall be increased by 5 % when carrying out the temperature rise test.

NOTE The additional 5 % current is specified so that the full mini-sub transformer rating plate power can be delivered when calculated using the full load secondary voltage of 400 V.

6 Marking, labelling, packaging, and transport

6.1 Marking and labelling

6.1.1 Signs

- a) A sign depicting "Treatment and Full First Aid Instructions" (see D-DT-6073 "SIGN D, E") shall be permanently attached to the inside of the MV and LV compartment doors. For Type B mini-sub, the sign shall be attached to the inside of the door that opens first.
- b) External aluminium or 'Chromadek' electrical symbolic MV warning signs (warning-flash, see D-DT3202, sheet 5 of 6) and LV warning signs (warning-flash, see D-DT-3202 sheet 4 of 6) shall be permanently attached to all the doors. If pop-rivets are used to attach the signs to the mini-sub doors, only aircraft or blind pop-rivets will be acceptable. Normal pop-rivets are not acceptable.

6.1.2 Labels

- a) The primary voltage, secondary voltage and 'kVA' rating shall be stencilled on the mini-sub housing.

- b) The corrosion protection category (i.e. "INLAND" or "COASTAL"), total mass (in kg) shall be neatly and uniformly stencilled on the back of the mini-sub.
- c) Main circuit designation labels shall be blank (orange-black-orange) sandwich-board or equivalent.
 - 1) For Type A mini-sub, the labels shall be located in fixed positions adjacent to the cable support clamps provided. A label need not be provided for the tee-off to the transformer.
 - 2) For Type B mini-sub, the labels shall be located on fixed positions at the front of the ring main unit adjacent to each cable box. A label shall be included for the tee-off to the transformer.
- d) For Type B mini-sub, the ring main unit push buttons provided for switching devices that incorporate stored energy operation shall be labelled accordingly (i.e. "TRIP" for the trip/open button and "CLOSE" for the close button if applicable). The labels shall be in text with black letters at least 10 mm high, on an orange background.
- e) For Type B mini-sub, a short operating procedure shall be provided for the ring main unit tee-off indicating the steps required to a) isolate and earth the tee-off and b) close the tee-off. The operating procedure shall be in text with black letters at least 5 mm high, on an orange background. A drawing depicting the wording of the operating procedure label shall be provided and referenced in schedule B.

6.2 Documentation

6.2.1 Technical schedules

The full Technical Schedule B and the Deviation Schedule shall be completed and, together with Technical Schedule A, shall be submitted at the time of tendering.

6.2.2 Drawings

6.2.2.1 In addition to the drawing requirements specified in NRS 004, the following information shall be shown on the drawings when submitted at the time of tendering:

- a) The general assembly drawing shall make reference, where applicable to the following Eskom Distribution Drawings: D-DT-8019, D-DT-3088, D-DT-3202, and D-DT-6073.
- b) Any revision to drawings and diagrams shall clearly indicate the revision number and date.

6.2.2.2 In the case of Type B mini-sub, an additional drawing depicting the wording of the operating procedure label for the ring main unit tee-off (see 6.1.3 e) shall be supplied by the supplier for approval.

6.2.3 Test certificates

All required type test certificates/reports shall be submitted, in English, by the manufacturer at the time of tendering and/or pre-qualification.

7 Spares

7.1 Accessories

7.1.1 For Type B mini-sub, if a hand-held push-button remote control unit with a portable power supply is to be supplied with the ring main unit, it shall be specified in schedule A. Details of the hand-held remote control unit (type of connector, length of umbilical cord, etc.) shall be specified in schedule A. The female coupler of the plug-in connector shall be connected to the end of the umbilical cord. Details of the portable power supply offered shall be given in schedule B.

7.1.2 A suitable quantity (length) of UV-stable sealant strip (e.g. wax-impregnated polyurethane foam strip) shall be supplied with every mini-sub. The sealant is intended for application between the mini-sub steel base and the concrete plinth and shall be in accordance with D-DT-8029. The total quantity (length) may be supplied in several smaller strips with a minimum length of 1,5 m each. The material shall be suitably packaged and stored inside the mini-sub MV compartment.

Annex A – Protection settings for Type B mini-sub RMU circuit breaker relays

(Normative)

A.1 VIP 35 relay supplied in Type B mini-sub fitted with Schneider Merlin Gerin RM6 ‘IDI’ type ring main units

A.1.1 The rotating selector switch settings for the VIP 35 relay shall be configured in accordance with the following tables:

Table A.1.1 – Rated primary current of transformer (I_s)

	11 kV			22 kV		
Transformer size [kVA]	315 kVA	500 kVA	1000 kVA	315 kVA	500 kVA	1000 kVA
Rated Primary Current [A]	16.5 A	26.2 A	52.5 A	8.3 A	13.1 A	26.2 A
Primary Current Setting (I_s) [A]	28 A	46 A	80 A	15 A	22 A	46 A

Table A.1.2a – Earth fault current protection parameters

Earth fault current ($I_o >$)	10 A
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Table A.1.2b – Earth fault current protection parameters

Tripping time delay for EF ($t_o >$)	0.2 sec
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A.1.2 The ‘inrush current delay’ setting on the VIP 35 relay shall be set to ‘on’

NOTES:

- 1) The ‘CRc 200/500/1 51007005F0’ sensors (toroid current transformers incorporated in the transformer tee-off bushings of the RMU) are to be fitted for the VIP 35 relay – with the current range (I_s) adjustable from 8A - 80A (200/1 ratio, S1-S2 wiring).
- 2) The primary current rating I_s has been selected to allow for cyclic loading of the transformer in accordance with the SANS 60076-7 loading guideline applicable to SABS 780 transformers (i.e. allowing 1.5 x I rated for cyclic loading).
- 3) The ‘inrush current delay’ setting on the VIP 35 relay shall be set to ‘on’ to prevent spurious earth fault tripping due to a false earth fault detection resulting from the DC component of transformer inrush currents while energizing the transformer.

A.1.3 The relay shall be tested in accordance with the following minimum requirements and a routine test certificate for the relay shall be produced and included with each mini-sub and stored in the documentation holder provided:

- a) A primary current injection test shall be carried out to confirm the correct operation of the relay (i.e. the current sensors, the wiring, and the relay settings). Primary current injection shall be carried out at $2 \times I_s$ and the tripping time shall be recorded. According to the protection characteristic, this should result in a protection operating time of between 12 and 22 seconds – with a typical tripping time of 17 seconds.

- b) A routine check shall be included on the test certificate that confirms that the relay rotary selector switch settings have been made in accordance with this specification.

Annex A
(continued)

A.2 SEG WIC1-2 relay supplied in Type B mini-subts fitted with ABB CCV Type ring main units

A.2.1 The DIP switches for the WIC1-2 relay shall be configured in accordance with the following tables:

Table A.2.1 – Rated primary current of transformer (Is):

	11 kV			22 kV		
	315 kVA	500 kVA	1000 kVA	315 kVA	500 kVA	1000 kVA
Transformer size [kVA]	315 kVA	500 kVA	1000 kVA	315 kVA	500 kVA	1000 kVA
Rated Primary Current [A]	16.5 A	26.2 A	52.5 A	8.3 A	13.1 A	26.2 A
Primary Current Setting (Is) [A]	20 A	30 A	56 A	16 A	16 A	32 A
DIP 1-1	OFF	ON	ON	OFF	OFF	OFF
DIP 1-2	ON	ON	ON	OFF	OFF	OFF
DIP 1-3	OFF	ON	ON	OFF	OFF	OFF
DIP 1-4	OFF	OFF	ON	OFF	OFF	ON

A.2.2 The WIC1-W2 CTs are to be fitted for the ABB WIC1-2 relay

Table A.2.2 – Protection characteristic curve

IDMT Characteristic Curve	HV-fuse
DIP 1-5	OFF
DIP 1-6	ON
DIP 1-7	ON
DIP 1-8	OFF

Table A.2.3a – Phase overcurrent protection parameters

Phase current threshold ('I>')	1
DIP 2-1	OFF
DIP 2-2	ON
DIP 2-3	OFF
DIP 2-4	OFF

Table A.2.3b – Phase overcurrent protection parameters

	11 kV			22 kV		
	315 kVA	500 kVA	1000 kVA	315 kVA	500 kVA	1000 kVA
Transformer size [kVA]	315 kVA	500 kVA	1000 kVA	315 kVA	500 kVA	1000 kVA
Time factor 'a' ('t1>')	Factor 'a' = 5	Factor 'a' = 6	Factor 'a' = 8	Factor 'a' = 0.8	Factor 'a' = 5	Factor 'a' = 5
DIP 2-5	OFF	ON	ON	OFF	OFF	OFF
DIP 2-6	ON	ON	ON	OFF	OFF	OFF
DIP 2-7	OFF	ON	ON	OFF	OFF	OFF
DIP 2-8	OFF	OFF	ON	OFF	OFF	ON

Table A.2.4a – Phase short-circuit protection parameters.

Annex A
(continued)

Phase current threshold (' $I_{>>}$ ')	EXIT (OFF)
DIP 3-1	ON
DIP 3-2	ON
DIP 3-3	ON
DIP 3-4	ON

Table A.2.4b – Phase short-circuit protection parameters.

Tripping time for DMT (' $t_{1>>}$ ')	' $t_{1>>}$ '=3.0 (Not in use)
DIP 3-5	ON
DIP 3-6	ON
DIP 3-7	ON
DIP 3-8	ON

Table A.2.5a – Earth fault protection parameters

Earth fault current (' I_E ')	0.4 (x I_s)
DIP 4-1	OFF
DIP 4-2	ON
DIP 4-3	OFF
DIP 4-4	OFF

Table A.2.5b – Earth fault protection parameters

Tripping time for EF (' t_{IE} ')	' t_{IE} '=0.6
DIP 4-5	ON
DIP 4-6	ON
DIP 4-7	OFF
DIP 4-8	OFF

NOTES:

- 1) The WIC1-W2 CTs are to be fitted for the ABB WIC1-2 relay.
- 2) The primary current rating I_s has been selected to allow for cyclic loading of the transformer in accordance with the SANS 60076-7 loading guideline applicable to SABS 780 transformers (i.e. allowing 1.5 x I rated for cyclic loading).
- 3) The earth fault current protection parameters have been selected to prevent spurious earth fault tripping due to a false earth fault detection resulting from the DC component of transformer inrush currents while energizing the transformer.

A.2.3 The relay shall be tested in accordance with the following minimum requirements and a routine test certificate for the relay shall be produced and included with each mini-sub and stored in the documentation holder provided:

- a) A primary current injection test shall be carried out to confirm the correct operation of the relay (i.e. the CTs, the wiring and the relay settings). Primary current injection shall be carried out at 4 x I_s and the tripping time shall be recorded. According to the HV-fuse characteristic this should result in a protection operating time in accordance with the table provided below. A tolerance of $\pm 10\%$ is considered to be acceptable.

Transformer size [kVA]	11 kV			22 kV		
	315 kVA	500 kVA	1000 kVA	315 kVA	500 kVA	1000 kVA
Primary Current Setting (I_s) [A]	20 A	30 A	56 A	16 A	16 A	32 A

Annex A
(continued)

Injected primary current ($I = 4 \times I_s$)	80 A	120 A	224 A	64 A	64 A	128 A
Relay tripping time (s)	78 s	95 s	127 s	12 s	81 s	80 s

- b) A routine check shall be included on the test certificate that confirms that the relay DIP switch settings have been made in accordance with this specification.

Annex B – Protection settings for 1000 kVA mini-sub LV main circuit breakers

(Normative)

B.1 Schneider Merlin Gerin NS1600N, ABB T7S1600 and ABB S7S1600 LV main circuit-breakers used on 1 MVA mini-sub

Type B mini-sub having the VIP 35 relay (supplied with the Merlin Gerin RM6 “IDI” type RMU) shall only be fitted with Merlin Gerin NS1600N LV main circuit-breaker.

NOTES

- 1) It is not possible to provide complete protection co-ordination between the VIP 35 RMU relay and the ABB LV main circuit-breaker options.
- 2) The VIP 35 relay is set to provide the maximum allowable over-load current (i.e. 1,8 x rated transformer current) in accordance with SANS 60076-7. It is not recommended that the VIP 35 relay current settings be increased to allow any over-load currents greater than this.

Type B mini-sub having the WIC 1-2 relay (supplied with the ABB Safering CCV type RMU) shall be fitted with the Merlin Gerin NS1600N, ABB T7S1600 or the ABB S7S1600 LV main circuit-breaker.

B.1.1 Merlin Gerin NS1600N settings

The “Micrologic 2.0” control unit supplied in the Merlin Gerin NS1600N shall be configured in accordance with settings specified in table A.1.

Table B.1 – Micrologic 2.0 protection settings for 1 MVA mini-sub

Protection function	Type A mini-sub	Type B mini-sub
“I _r ” Long time current setting	1 (i.e. 1600 A nominal current setting)	1 (i.e. 1600 A nominal current setting)
“t _r ” Long time delay setting	24 s	1 s
“I _{sd} ” Instantaneous pickup current setting	8 (i.e. 8 x 1600 A = 12,8 kA).	8 (i.e. 8 x 1600 A = 12,8 kA)

B.1.2 ABB T7S1600 settings

The PR231/P electronic trip unit supplied in T7S1600 shall be configured in accordance with settings specified in table A.2.

Table B.2 – PR231/P protection settings for 1 MVA mini-sub

Protection function	Type A mini-sub	Type B mini-sub
“I ₁ ” Function “L” trip threshold current.	1 (i.e. 1600 A nominal current setting)	1 (i.e. 1600 A nominal current setting)
“t ₁ ” Function “L” trip curve	12 s	3 s

“I ₃ ” Function “I” Instantaneous trip threshold	8 (i.e. 8 x 1600 A = 12,8 kA).	8 (i.e. 8 x 1600 A = 12,8 kA)
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Annex b
(continued)

B.1.3 ABB S7S1600 settings

The PR211/P electronic trip unit supplied in the S7S1600 shall be configured in accordance with settings specified in table A.3.

Table B.3 – PR211/P protection settings for 1 MVA mini-sub

Protection function	Type A mini-sub	Type B mini-sub
“I ₁ ” Function “L” trip threshold current.	1 (i.e. 1600 A nominal current setting)	1 (i.e. 1600 A nominal current setting)
“t ₁ ” Function “L” trip curve	Curve D or 18 s	Curve B or 6 s
“I ₃ ” Function “I” Instantaneous trip threshold	8 (i.e. 8 x 1600 A = 12,8 kA).	8 (i.e. 8 x 1600 A = 12,8 kA)

SCHEDULE OF TENDER RETURNABLES

The Technical Schedules B and the Deviation Schedules shall be filled in or completed in full (together with Schedule A) and shall be submitted with the tender document. The tenderers must state compliance with technical specifications and requirements. Failure to do so may invalidate the tender. All documentation (product brochures/catalogues, test reports and certificates, technical data sheets and installation, operation and maintenance manuals) must be attached as required and submitted with the tender document.

The general requirements for ring main units (RMUs) and mini-substations (MSSs) as per NRS 004 / SANS 1029 are attached in Schedule 1, and also specific requirements for Type A and Type B mini-substations, as well, as additional requirements for mini-substations up to 1000kVA, are all attached in Schedule 1 above.

Table: SCHEDULE OF TENDER RETURNABLES

ITEM NO.	LIST OF SCHEDULES	SCHEDULE DESCRIPTION
1.	SCHEDULE 1	Technical Specifications and Requirements for Medium-Voltage (MV) Mini-substations with nominal voltages of 11kV
2.	SCHEDULE 2 SCHEDULE 2.1	Technical Schedules A and B of 11 kV Ring Main Unit (RMU) (for Type B mini substations) Deviation Schedule of 11kV Ring Main Units
3.	SCHEDULE 3 SCHEDULE 3.1	Technical Schedules A and B of 11kV Type A Mini-substations up to 500kVA (without RMU) Deviation Schedule of 11kV Type A Mini-substations up to 500kVA (without RMU)
4.	SCHEDULE 4 SCHEDULE 4.1	Technical Schedules A and B of 11kV Type B Mini-substations up to 500kVA (with RMU) Deviation Schedule of 11kV Type B Mini-substations up to 500kVA (with RMU)

5.	SCHEDULE 5 SCHEDULE 5.1	Technical Schedules A and B of 11kV Type A Mini-substations up to 1 000kVA (without RMU) Deviation Schedule for 11kV Type A Mini-substations up to 1 000kVA (without RMU)
6.	SCHEDULE 6 SCHEDULE 6.1	Technical Schedules A and B for 11kV Type B Mini-substations up to 1 000kVA (with RMU) Deviation Schedule for 11kV Type B Mini-substations up to 1 000kVA (with RMU)
7.	SCHEDULE 7	Place of Manufacture, Testing and Inspection of the Mini-substations
8.	SCHEDULE 8	Quality Management System
9.	SCHEDULE 9	Divergences from Contractual and Technical Specifications
10.	SCHEDULE 10	Similar Equipment Supplied by the Tenderer

SCHEDULE 2

Technical Schedules A and B and Deviation schedule for 11 kV Ring Main Unit (RMU) (for Type B mini-substations) (informative)

Use of the technical schedules is intended to obviate the need for preparing a detailed technical specification for every enquiry. The purchaser need only specify compliance with *DSP 34-1621* and provide the tenderers with the relevant schedules A and B.

Schedule A gives the Municipality's requirements. It lists the requirements to be specified by the purchaser in enquiries and orders. These requirements may include references to the relevant sub-clauses in this document. Where the text of any referenced standard stipulates that the purchaser shall indicate his requirements, these requirements should also be specified in schedule A. The purchaser shall set out his particular requirements and choices in schedule A.

The purchaser shall require the tenderer to fill in schedule B. By doing this, the tenderer will state compliance with this document and provide the information the purchaser has requested. Schedule B shall be completed in full by the supplier.

Deviations/modifications/alterations from the requirements specified in Schedule A shall be well documented in the deviation schedule.

Price schedules shall be so drawn up and the covering letter so worded that the costs of all services such as tests and delivery are declared and allowed for in the tender.

SCHEDULE 2 – Technical Schedules A and B
11 kV Ring Main Unit (RMU) (for Type B mini-substations)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered.

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
1		Ratings		
		Nominal voltage	kV _{rms} _____	_____
1.1	NRS 006 4.2.1	Rated power-frequency voltage	kV _{rms} _____	_____
1.2	NRS 006 4.2.2	System frequency	Hz 50	_____
1.3		Number of phases	3	_____
1.4		System voltage range	Pu 0.9 to 1.1	_____
1.5	DSP 34-1621 4.1.2.1.1 & NRS 006 4.2.3	Rated lightning impulse withstand voltage	kV _{peak} _____	_____
1.6	NRS 006 4.2.3	Rated short-duration power frequency withstand voltage [50Hz: 1 min]	kV _{rms} _____	_____
1.7	NRS 006 4.7.1	Rated normal current of busbars	A 630	_____
1.8	NRS 006 4.4.1.3	Rated normal current of switch disconnecter	A 630	_____
1.9	NRS 006 4.5.1.4	Rated current of switch-fuse combination (if applicable)	A _____	_____
1.10	NRS 006 4.6.1.3	Rated current of circuit breaker (if applicable)	A _____	_____
1.11	NRS 006 4.2.4.1	Rated short time withstand r.m.s. current (3 seconds)	kA _{rms} ___ kA 3 sec	_____
1.12	NRS 006 4.2.4.3	Rated short time withstand r.m.s. current (3 seconds) of earthing switches	kA _{rms} ___ kA 3 sec	_____
1.13	NRS 006 4.2.4.1	Rated peak withstand current	kA _{peak} _____	_____
1.14	NRS 006 4.2.6	Rated short circuit breaking current of the circuit breaker	kA _{rms} _____	_____
1.15	NRS 006 4.2.7	Rated short circuit making current	kA _{peak} _____	_____
2		Design		
2.1	NRS 006 4.3.2	Extensible unit required?	Y/N No	-
2.2	NRS 006 4.3.3.3 SANS 62271200	Degree of protection offered (RMU): a) moving parts	IP 2X	_____

	SANS 62271200 NRS 012	b) live parts		IP 2X	_____
		c) cable boxes		IP 3X	_____
		d) outdoor unit		IP 44	_____
2.3	DSP 34-1621 4.3	Configuration		2R-1B	_____
2.4	DSP 34-1621 4.3.1.1.2 & NRS 006 4.3.5	Type of cable test facilities offered?	Y/N	Yes	_____

1	2	3		4	5
Item	Subclause	Description		Schedule A	Schedule B
2.5	NRS 006 4.3.10.2	Insulating medium		SF ₆	_____
2.6	NRS 006 4.3.10.2	Minimum maintenance free period	yrs	30 yrs	_____
2.7	NRS 006 4.3.10.3	Interrupting technology (switch disconnectors)		-	_____
2.8	NRS 006 4.3.10.3	Interrupting technology (circuit breaker)		-	_____
3	NRS 006 4.4	Switch-disconnectors			
3.1	NRS 006 4.4.1.1	Class of switch-disconnector (min)		E2-M1	_____
3.2	NRS 006 4.3.5.1 & DSP 34-1621 4.3.1.1.2	Cable test facility to be independent of cable termination enclosure?	Y/N	Yes	_____
3.3	NRS 006 4.4.2.2 / 4.9.2	Provision for remote tripping and closing required (i.e. remote control via RTU)?	Y/N	_____	_____
3.4	NRS 006 4.4.2.3	Details of remote tripping and closing offered		-	_____
3.5	NRS 006 4.9.2	Provision for remote indications and alarms required (i.e. via RTU)?	Y/N	_____	_____
3.6	DSP 34-1621 4.3.1.1.3	Provision for hand-held remote-control unit (trip and close) required?	Y/N	_____	_____
3.7	DSP 34-1621 4.3.1.1.3	Type of plug-in connector to be supplied		ITT Cannon type CA 3102 A 14S-2 or equivalent C and D	_____
3.8	DSP 34-1621 4.3.1.1.3	Pins for trip control function		C and D	_____
3.9	DSP 34-1621 4.3.1.1.3	Pins for close control function		A and B	_____

3.10	DSP 34-1621 4.3.1.1.3	Details of provisions offered for handheld remote-control unit	24V/ 110V	_____	_____
3.11	NRS 006 4.9.1.1	Load monitoring (metering) facility required?	Y/N	_____	_____
3.12	NRS 006 4.9.1.4	Accuracy class and burden (VA) of CT offered (if applicable)		_____	_____
3.13	NRS 006 4.9.1.6 / 4.9.2	Provision for communication with an RTU (i.e. remote analogue indication)?	Y/N		_____
3.14	NRS 006 4.9.1.7	Type of electronic ammeter/multi-meter offered		-	_____
4	NRS 006 4.8	Cable termination enclosure			
4.1	DSP 34-1621 4.3.1.1.4	Spacing between bushing centres (min)	mm	_____	_____
4.2	DSP 34-210 4.3.1.1.4	Spacing between outer bushing centres and enclosure side wall (min)	mm	_____	_____
4.3	NRS 006 4.8	Distance from bushing centre line to cable support clamp (min)	mm	800	_____
4.4	NRS 006 4.8	Bushings horizontally positioned?	Y/N	YES	_____

1	2	3		4	5
Item	Subclause	Description		Schedule A	Schedule B
4.5	NRS 006 4.8.4	Type of bushing		EN 50181 Ctype interface	_____
4.6	NRS 006 4.8	Cross sectional area of earthing bar (min)	mm ²	120	_____
4.7	NRS 006 4.8.6	Type of cable support clamp		NRS 012 / D-DT-8019	_____
4.8	DSP 34-1621 4.3.1.1.4	Size (range) of cable support clamp		_____	_____
5	NRS 006 4.6	Circuit-breakers for tee-off			
5.1	NRS 006 4.6.1.1	Class of circuit-breaker (min)		E2-M1	_____
5.2	NRS 006 4.6.1.3	Rated normal current of the circuit breaker	A	200A	_____
5.3	NRS 006 4.3.5.1 & DSP 34- 1621 4.3.1.1.2	Cable test facility to be independent of cable termination enclosure?	Y/N	Not mandatory	_____
5.4	NRS 006 4.6.3.3 / 4.9.2	Provision for remote tripping and closing required (i.e. remote control via RTU)?	Y/N	_____	-

5.5	NRS 006 4.6.3.4	Details of remote tripping and closing offered		-	_____
5.6	NRS 006 4.9.2	Provision for remote indications and alarms required (i.e. via RTU)?	Y/N	_____	_____
5.7	DSP 34-1621 4.3.1.1.3	Provision for hand-held remote-control unit (trip and close) required?	Y/N	_____	_____
5.8	DSP 34-1621 4.3.1.1.3	Type of plug-in connector to be supplied		ITT Cannon type CA 3102 A 14S- 2 or equivalent C and D	_____
5.9	DSP 34-1621 4.3.1.1.3	Pins for trip control function		A and B	_____
5.10	DSP 34-1621 4.3.1.1.3	Pins for close control function			_____
5.11	DSP 34-1621 4.3.1.1.3	Details of provisions offered for handheld remote control unit	24V/ 110V	_____	_____
5.12	NRS 006 4.9.1.1	Load monitoring (metering) facility required?	Y/N	_____	_____
5.13	NRS 006 4.9.1.4	Accuracy class and burden (VA) of CT offered		_____	_____
5.14	NRS 006 4.9.1.6 / 4.9.2	Provision for communication with an RTU (i.e. remote analogue indication)?	Y/N	_____	-
5.15	NRS 006 4.9.1.7 DSP 34-1621 4.3.1.1.6	Type of electronic ammeter/multi-meter offered Protection relay		-	_____
5.16	DSP 34-1621 4.3.1.1.6	CT ratios offered	A	-	_____
5.17	DSP 34-1621 4.3.1.1.6	Protection CT type and class		-	_____
5.18	DSP 34-1621 4.3.1.1.6	Setting ranges and protection element curves (provide technical manual)		-	_____

1	2	3		4	5
Item	Subclause	Description		Schedule A	Schedule B
6	NRS 006 4.8	Cable termination enclosure			
6.1	DSP 34-1621 4.3.1.1.4	Spacing between bushing centres (min)	mm	_____	_____
6.2	DSP 34-1621 4.3.1.1.4	Spacing between outer bushing centres and enclosure side wall (min)	mm	_____	_____
6.3	NRS 006 4.8	Distance from bushing centre line to cable support clamp (min)	mm	-	_____
6.4	NRS 006 4.8	Bushings horizontally positioned?	Y/N	YES	_____

6.5	NRS 006 4.8.4	Type of bushing		EN 50181 C- type or A- type interface	_____
6.6	NRS 006 4.8	Cross sectional area of earthing bar (min)	mm ²	120	_____
6.7	NRS 006 4.8.6	Type of cable support clamp		NRS 012	_____
6.8	DSP 34-1621 4.3.1.1.4	Size (range) of cable support clamps		-	_____
7	NRS 006 4.7	General Busbars			
7.1	NRS 006 4.7.2	Current rating of busbars	A	630	_____
8	NRS 006 4.9	Telecontrol			
8.1	DSP 34-1621 4.3.1.6	RTU to be provided?	Y/N	_____	_____
8.2	NRS 006 4.9.2	Provision for remote status indications and alarms required?	Y/N	_____	_____
8.3	NRS 006 4.9.2	Local indications to be provided?	Y/N	_____	_____
8.4	NRS 006 4.9.2	d.c. voltage required?	110V/24 V	_____	_____
9	NRS 006 4.10	Gas requirements			
9.1	NRS 006 4.10.2	Expected life before replenishment of gas (minimum)	Years	30	_____
9.2	NRS 006 4.10.3 & DSP 34-1621 4.3.1.1.7	Type of gas indication device		Density meter	_____
9.3	NRS 006 4.10.5	Mass of gas: a) Busbar chamber	kg	-	_____
		b) Other	kg	-	_____
9.4	NRS 006 4.10.6	Service offered for replenishment and recovery of gas		-	_____
10	NRS 006 4.11	Earthing			
10.1	NRS 006 4.11.1	Earth fault level and duration	kA-s	2 kA – 3 s	_____
11	NRS 006 4.12	Live circuit indication			

1	2	3	4	5
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Item	Subclause	Description		Schedule A	Schedule B
11.1	NRS 006 4.12.4 & DSP 34-1621 4.3.1.1.5	Type of live circuit indication required		VDS	_____
12	NRS 006 4.13	Earth fault indication			
12.1	NRS 006 4.13.1	Type of earth fault indicator Earth fault indicator details:		LV mains powered	_____
12.2	NRS 006 4.13.6	a) Cable box location for CT		LHS 'R'	_____
12.3	NRS 006 4.13.7	b) Position of 'remote' indicator		Visible from outside, front of RMU	_____
12.4	NRS 006 4.13.7	c) Method of protecting indicator against vandalism		Welded steel tube	_____
12.5	NRS 006 4.13	Make of earth fault indicator		-	_____
12.6	NRS 006 4.13	Type (model) of earth fault indicator		-	_____
13	NRS 006 4.16	Accessories			
13.1	NRS 006 4.16.4	Description of tool set required		-	_____
13.2	DSP 34-1621 7.1	Hand-held push-button remote control unit with a portable power supply to be supplied with the RMU?	Y/N	_____	_____
13.3	DSP 34-1621 7.1	Type of plug-in connector to be supplied		ITT Cannon type CA 3102 A 14S-2 or equivalent	_____
13.4	DSP 34-1621 7.1	Pins for trip control function		C and D	_____
13.5	DSP 34-1621 7.1	Pins for close control function		A and B	_____
13.6	DSP 34-1621 7.1	Length of umbilical cord to be supplied	m	20 m	_____
13.7	DSP 34-1621 7.1	Details of portable power supply		24 V	_____
14	NRS 006 4.17	Rating plate			
14.1	NRS 006 4.17.1	Method of attaching rating plate		-	_____

15	NRS 006 4.18	Marking and labelling			
15.1	NRS 006 4.18.1.1	Method of attaching labels		-	_____
15.2	NRS 006 4.18.2.1	Method of fixing and removal of main circuit designation labels for engraving purposes		-	_____
15.3	NRS 006 4.18.4.4	Mimic indication system required?	Y/N	Yes	-
15.4	NRS 006 4.18.4.4	Description of mimic indication system		-	_____
1	2	3		4	5
Item	Subclause	Description		Schedule A	Schedule B
16	NRS 006 419 & DSP 34-1621 4.1.3.2	Corrosion protection			
16.1	NRS 006 4.19.9	Type of material offered: a) Ring main unit gas enclosure b) Cable termination enclosures and frame c) Operating mechanisms		- - -	_____ _____ _____
17		Testing			
17.1	NRS 006 5.1.3	Origin of design		-	_____
17.2	NRS 006 5.1.3	Place of manufacture		-	_____
17.3	NRS 006 5.1.3	Number of units installed in South Africa		-	_____
17.4	NRS 006 5.2.3	Internal arc test details		-	_____
18		Spares			
18.1	NRS 006 6.1	List of recommended spares		-	_____
19	NRS 006 7.2	Documentation			
19.1	NRS 006 7.2	Tabulated summary of completed type tests required?	Y/N	Yes	_____
19.2	NRS 006 7.2	Full set of type test reports required?	Y/N	Yes	_____
19.3	NRS 006 7.2	Proof of type test laboratory accreditation?	Y/N	Yes	_____
19.4	NRS 006 7.2	Copy of RMU factory routine test certificate?	Y/N	Yes	_____
19.5	NRS 006 7.2	Copy of CT factory routine test certificate?	Y/N	Yes	_____

19.6	NRS 006 7.2	Copies of the latest technical catalogue(s) including protection relay and/or electronic ammeter/multi-meter technical manual (if appl.)?	Y/N	Yes	_____
19.7	NRS 006 7.2	Number of installation, operation and maintenance manuals to be provided with the tender		1	_____

SCHEDULE 2.1. – Deviation Schedule
11 kV Ring Main Unit (RMU) for Type B mini-sub

Any deviations from this specification shall be listed below with reasons for the deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than the method specified.

Item	Clause	Proposed deviation

SCHEDULE 3

Technical Schedules A and B and Deviation schedule for 11kV Type A Mini-substations up to 500kVA (without RMU) (informative)

Use of the technical schedules is intended to obviate the need for preparing a detailed technical specification for every enquiry. The purchaser need only specify compliance with *DSP 34-1621* and provide the tenderers with the relevant schedules A and B.

Schedule A gives the Municipality's requirements. It lists the requirements to be specified by the purchaser in enquiries and orders. These requirements may include references to the relevant sub-clauses in this document. Where the text of any referenced standard stipulates that the purchaser shall indicate his requirements, these requirements should also be specified in schedule A. The purchaser shall set out his particular requirements and choices in schedule A.

The purchaser shall require the tenderer to fill in schedule B. By doing this, the tenderer will state compliance with this document and provide the information the purchaser has requested. Schedule B shall be completed in full by the supplier.

Deviations/modifications/alterations from the requirements specified in Schedule A shall be well documented in the deviation schedule.

Price schedules shall be so drawn up and the covering letter so worded that the costs of all services such as tests and delivery are declared and allowed for in the tender.

SCHEDULE 3 – Technical Schedules A and B
11 kV Type A Miniature substation up to 500kVA (without RMU)

Schedule A: Purchaser's specific requirements
Schedule B: Particulars of equipment to be supplied

1	2	3	4	5	
Item	Subclause	Description	Schedule A	Schedule B	
1	4.1.1	Standard operating conditions			
1.1	NRS 004 4.2.1.3	a) Altitude	m	1800	-
1.2	SANS60694 2.1.2	b) Ambient air temperature	° C	-5 to +40	-
1.3		c) Lightning ground flash density	Flashes/ km ² /year	High	-
1.4	SANS60694 2.1.2	d) Maximum solar radiation	W/m ²	1000	-
1.5		e) Ultraviolet radiation		High	-
1.6	NRS 004 4.2.1.3	f) Relative humidity	%	98	-
1.7	NRS 004 4.2.1.3 & DSP 34-1621 4.1.1	g) Pollution level (inland – lowcorrosive / coastal – corrosive)		“very heavy” for coastal	-
1.8	SANS60694 2.1.2	h) wind pressure	Pa	700	-
1.9	DSP 34-1621 4.1.1	i) Pollution conditions inside mini-sub		Pollution Degree 3	-
2		Ratings			
2.1	DSP 34-1621 4.1.2.2.1	Transformer power rating (200/315/500kVA)	kVA	_____	_____
2.2	DSP 34-1621 4.1.2.2.2	Nominal voltage of system (U _n)	kV _{rms}	11	_____
2.3	NRS 004 4.1.4 & SANS 780 1.3	System frequency	Hz	50	_____
2.4	NRS 004 4.1.4	Number of phases		3	_____
2.5	SANS 780 8.26	Transformer rated no-load secondary voltage	V _{rms}	420	_____
2.6	SANS 1019 5.4.2	Rated power-frequency voltage (U _m)	kV _{rms}	12	_____
2.7	SANS 1019 5.4.2	Rated short-duration power frequency withstand voltage [50Hz: 1 min]	kV _{rms}	28	_____
2.8	DSP 34-1621 4.1.2.1	Rated lightning impulse withstand voltage (SANS 1019 5.4.2 List 3)	kV _{peak}	95	_____
2.9	SANS 780	Transformer induced voltage withstand level (see Table 2 – SANS 780)	kV _{rms}	22	_____

3		Construction design		
3.1	DSP 34-1621 4.1.3.1.1	Layout (Type A/Type B)	Type A	_____
3.2	NRS 004 4.2.2.3.1	Enclosure IP rating	IP35	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
3.3	DSP 34-1621 4.1.3.1.4	Removable base sections adjacent to MV compartment (sections to lap bolted with nuts on the inside of the channel and housing)	YES	_____
3.4	NRS 004 4.4.2.5	Concealed door hinges	YES	_____
3.5	DSP 34-1621 4.1.3.1.5	Compartment fastening/locking (pad lockable)	YES – three point locking with 1 additional 10 mm sunken captive Allen cap screw	_____
3.6	DSP 34-1621 4.1.3.1.6	“Heavy-duty” stainless steel door locks	YES	_____
3.7	DSP 34-1621 4.1.3.1.7	Compartment lock protection facility required?	Y/N Yes	_____
3.8		Total mass of mini-substation	kg -	_____
3.9		Overall dimensions		
		a) MV compartment length	mm -	_____
		b) LV compartment length	mm -	_____
	NRS 004 4.2.2.1.2	c) Overall length	mm 2800	_____
	NRS 004 4.2.2.1.2	d) Overall width	mm 1200	_____
		e) Overall height	mm -	_____
	NRS 004 4.2.2.1.2	f) Base width	mm 800	_____
3.10	NRS 004 4.2.2.5	Provision for lifting of complete mini-sub onto a concrete plinth without need for dismantling (except for roof removal if required)	YES	_____
3.11	NRS 004 4.2.2.4.2	Provision of shear-off lifting lugs on roof for ease of roof removal (where roof removal is required prior to lifting minisub)	YES	_____
3.12	NRS 004 6.1.2	Mini-sub housing sections/doors bonded	YES	_____
4		Transformer unit		

4.1	NRS 004 6.4.1	Electrical requirements		As per SANS 780	_____
4.2	NRS 004 6.4.4	Vector group		Dyn11	_____
4.3		MV system earthing (Effective/Noneffective)		Non- effective	-
4.4		MV system fault level	kA	20	-
4.5	DSP 34-1621 4.1.2.3.6	LV transformer neutral earthing		Solid connection to insulated LV neutral/earth bar	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
4.6	DSP 34- 1621 5.2.1	Temperature rise limits	As per DSP 34-1621 5.2.1	_____
4.7	SANS 780 8.5.2	Secondary voltage regulation (Off-load)	% +5,0, + 2,5, 0, -2,5, -5,0	_____
4.8	SANS 780 5.6.1	No-load losses	W -	_____
4.9	SANS 780 5.6.1	Load losses	W -	_____
4.10	SANS 780 8.27	Impedance voltage (see Table 9 of SANS 780)	% SANS 780	_____
4.11	DSP 34- 1621 4.5	X/R ratio	-	_____
4.12	DSP 34- 1621 4.5	Cost /kW of no-load losses	R/kW _____	-
4.13	DSP 34- 1621 4.5	Cost /kW of load losses	R/kW _____	-
4.14	SANS 780 8.5.3	Audio-sound level – maximum (see table 6 of SANS 780)	dB(A) _____	_____
4.15	DSP 34- 1621 4.1.2.2.4	Sealed transformer unit	NO Bolted unit	_____
4.16	NRS 004 6.4.7	Transformer MV bushings (NB internal screen to be earthed)	EN 50180 Type C with M16x2 thread	_____
4.17	DSP 34- 1621 4.2.1.1.1	MV bushing-centre clearances (minimum)	mm 135	_____

4.18	DSP 34-1621 4.2.1.1.1	Clearances between outer bushingcentres and mini-sub metal enclosure (minimum)	mm	90	_____
4.19	DSP 34-1621 4.2.1.2	Transformer overload protection facility		YES	_____
4.20		Winding material (CU)	MV LV	- -	_____ _____
4.21		Manufacturer		-	_____
4.22	DSP 34-1621 4.2.1.2.2	Top-oil thermoelectric temp-sensing element		YES	_____
5		MV compartment			
5.1	DSP 34-1621 4.2.2.1.1	Equipment in MV compartment		11kV air insulated junction box (D-DT-0853)	_____
5.2		Incoming / outgoing MV cable requirements			
	DSP 34-1621 4.2.2.1.2	a) 3 x single core / 1 x three core		1 x 3 core	_____
	DSP 34-1621 4.2.2.1.2	b) Cable support (clamping) required (NRS 012 & D-DT-8019)		YES (Size 50 – 75 mm OD)	_____

1	2	3	4	5	
Item	Subclause	Description	Schedule A	Schedule B	
	DSP 34-1621 4.2.2.1.2	c) Minimum distance from cable clamp to centreline of post insulators (NRS 012 & D-DT-8053)	mm	800	_____
	DSP 34-1621 4.2.2.1.1	d) Type of connections to post insulators (NRS 012)		Type 1 (Bare)	_____
	DSP 34-1621 4.2.2.1.1	e) Type of connections to transformer bushings (NRS 012) (1-core jumpers from junction box)		Type 3 (unscreened separable connectors)	_____
5.3	DSP 34-1621 4.2.2.1.1	Make (product) of connector used on transf. bushings		-	_____
5.4	NRS 004 6.1.3	Mini-sub (MV) earth bar accessible in MV compartment		YES	_____
5.5	DSP 34-1621 4.1.2.7.6	Make (product) of mains powered earth fault indicator (DSP 34-1080)		-	_____

6		LV Compartment			
6.1	NRS 004 6.3.3.1	LV ASSEMBLY complies with SANS 1973-1		YES	_____
6.2	DSP 34- 1621 4.1.2.5.1	Busbar-rating (see Table 1)	A	Rated at 1.2 transformer secondary rated current	_____
6.3		Busbar-insulation		Air insulated	_____
6.4	DSP 34- 1621 4.1.2.3.1	Busbars	∅	3 + one identical neutral-earth busbar (insulated from frame)	_____
6.5	NRS 004 6.3.3.1	Current density of busbars	A/mm ²	SANS 1973-1	_____
6.6	NRS 004 4.1.2.5	Rated short-time withstand current of main circuit – 1 s	kA _{rms}	-	_____
6.7	NRS 004 6.3.3.2.6	Min clearance to earth and between phases	mm	-	_____
6.8	DSP 34- 1621 4.1.2.3.4	Provision of a LV neutral surge arrester (as per D-DT-3088) fitted between minisub (MV) earth bar and LV neutral-earth busbar		YES	_____
6.9	DSP 34- 1621 4.1.2.3.3	LV neutral-earth busbar to be earthed (via a 70mm ² Cu electrical bridge to the mini-sub earth bar)		YES	_____
6.10	DSP 34- 1621 4.1.2.5.2	Stainless Steel M12 set screws provided		YES	_____
6.11	DSP 34- 1621 4.2.1.2.1	Provision of LV main circuit breaker		YES	_____
6.12	DSP 34- 1621 4.2.1.2.1	Make (product) of circuit breaker		SANS 556-1	_____
6.13	NRS 004 4.1.2.6	Minimum fault current interrupting capacity	kA	-	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
6.14	DSP 34- 1621 4.1.2.4.3	Number of outgoing LV feeder bays to be provided for (drill busbar ∅14mm holes)	5	_____

	NRS 004 6.3.3.2.6	Spacing between LV feeder bays (see Figure 1 of DSP 34-1621)	mm	110	_____
6.15	DSP 34-1621	LV panel designed for vertical fuse bases (FH) or MCCBs (CB)		FH / CB	_____
	4.1.2.4.2				
6.16	NRS 004 6.3.3.2.6	Spacing (vertical): Between phase busbars	mm	185	_____
		Between lowest LV busbar and LV neutral	mm	300	_____
		Between LV neutral and gland plates (see Figure 1 of DSP 34-1621)	mm	200 (min)	_____
6.17	DSP 34-1621	LV maximum demand ammeters		Required on all three phases	_____
	4.1.2.7.1				
6.18	NRS 004 6.3.3.5.1	Ammeter type		Thermal integrating over 15 min period	_____
				YES	
6.19	DSP 34-1621	LV indicating voltmeter (with a selector switch) (YES/NO)		YES	_____
	4.1.2.7.2				
6.20	NRS 004 6.3.3.5.3	Ammeter and voltmeter size and display	mm	96 × 96, 90°	_____
6.21	NRS 004 6.3.3.5.3	Ammeter and voltmeter position		LV compartment (high as practicable)	_____
7		LV outgoing feeder bay gland plates			
7.1	DSP 34-1621	Number of gland plates to be provided (Figure C.9 of NRS 004)		1 per LV feeder bay	_____
	4.1.2.4.3				
	NRS 004 6.3.3.3.10	Number of gland holes per feeder bay		2	_____
	NRS 004 6.3.3.3.10	Size of holes per feeder bay:	mm	1 x 65 mm	_____
			mm	1 x 52 mm	_____
	NRS 004 6.3.3.3.10	Clearances for each hole per feeder bay:	mm	1 x 98 mm	_____
			mm	1 x 65 mm	_____
7.2	NRS 004 6.3.3.3.10	Distance between gland plate centre lines. (Figure C.9 of NRS 004)	mm	110	_____
8		LV auxiliaries			
8.1	DSP 34-1621	Provision of three point socket outlet in LV compartment (with instantaneous-trip earth leakage unit [20 A; 5 kA rupturing capacity; 30 mA sensitivity] and 20 A HRC fuse with neutral fuse link) (YES/NO)		YES	_____
	4.1.2.7.3				

8.2	DSP 34-1621 4.1.2.7.4	Provision of a tamperproof compartment for the installation of a photo-cell (YES/NO)	NO	_____
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1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
8.3	DSP 34-1621 4.1.2.7.4	300 mm x 300 mm blank plate for PECU	YES	_____
8.4	DSP 34-1621 4.1.2.7.5	Numbering ferrules for auxiliary wiring	YES	_____
9		Materials and corrosion protection		
9.1	DSP 34-1621 4.1.3.2.4	Mini-sub enclosure, LV ASSEMBLY and transformer tank: Inland: mild steel	- Coastal : 3CR12	_____
	DSP 34-1621 4.1.3.2.5	Coastal: 3CR12 or zinc sprayed mild steel or stainless steel	-	_____
	DSP 34-1621 4.1.3.2.9	Corrosion protection detailed specification number (DSP 34-1658) offered for inland applications	DS-6 / DS-7 / DS-8	_____
	DSP 34-1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered for coastal applications	DS-11 / DS-12 / (DS-14 + DS-16) / (DS-14 + DS-17) / DS18	_____
9.2	DSP 34-1621 4.1.3.2.6	Transformer radiator: Inland: mild steel Coastal: hot-dipped galvanized / zinc metal sprayed (if corrugated) mild steel	Coastal: hot dipped galvanised	_____
	DSP 34-1621 4.1.3.2.9	Corrosion protection detailed specification number (DSP 34-1658) offered for inland applications	DS-6 / DS-7 / DS-8	_____
	DSP 34-1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered for coastal applications	(DS-13 + DS-16) / (DS-13 + DS-17) / (DS-14 + DS-16) / (DS-14 + DS-17)	_____
9.3	NRS 004 6.3.3.2.2	Tinned copper busbars (YES/NO)	YES	_____
9.4	DSP 34-1621 4.1.3.2.7	Mini-sub base: Material	Steel	_____
	DSP 34-1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered	(DS-13 + DS-16) / (DS-13 + DS-17)	_____

9.5	DSP 34-1621 4.1.3.2.8 NRS 004 6.3.3.3.8 DSP 34-1621 4.1.3.2.9	Gland plates and support structure: Coastal: Material: 3 mm (min) stainless steel Inland Material: 3 mm (min) mild steel / 3CR12 / stainless steel Corrosion protection detailed specification number (DSP 34-1658) offered if mild steel (Hot-dip. galv. to OR zinc sprayed) – for inland only	Coastal material 3mm (minimum) - DS-13 / DS14	_____
1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
9.7	DSP 34-1621 4.1.3.2.11	5 mm cork packing (between ends and tank, base and ends, and base and tank)(YES/NO)	YES	_____
9.8	DSP 34-1621 4.1.3.2.12	Final colour	Avocado C12 (SANS 1091)	_____
10		Notices, signs, and labels		
10.1	NRS 004 8.2.1	Transformer rating plate	YES	_____
10.2	DSP 34-1621 6.1.2	Treatment and Full First Aid Instructions on inside of MV and LV compartment doors	YES	_____
10.3	DSP 34-1621 6.1.2	Elec. warning signs on all doors and barriers	YES	_____
10.4	NRS 004 8.4.11	Transformer phase labels below bushings	YES	_____
10.5	NRS 004 6.3.3.2.5	Colour-coded LV busbars	YES	_____
10.6	DSP 34-1621 6.1.2	Labelling of MV and LV compartment doors (sign – D-DT-3202 sheet 5 and 4)	YES	_____
10.7	NRS 004 8.4.3	Primary voltage, secondary voltage and kVA rating stencilled on the front, centre.	YES	_____
10.8	NRS 004 8.4.4	Mini-sub mass and stock number stencilled on side or rear.	YES	_____
10.9	NRS 004 8.4.6	ID markings linking roof to body per batch	YES	_____
10.10	NRS 004 4.2.2.3.9	Provision for the safe keeping of documents	YES	_____
11		Documentation		
11.1	DSP 34-1621 6.2.3	Type test certificates (provide ref. numbers of reports)	Sets 1	_____
11.2	DSP 34-1621 6.2.3	Routine test certificates	Sets 1	_____

11.3	DSP 34-1621 6.2.2	Drawings (Mini-sub-GA, LV ASSEMBLY, Operating procedure label for RMU teeoff)	Sets	1	_____
11.4	DSP 34-1621 6.2.2	Diagrams (Mini-sub schematic – including the LV ASSEMBLY, Rating Plates)	Sets	1	_____
12		Accessories			
12.1	DSP 34-1621 7.1.2	Type of sealant provided	-		_____

**SCHEDULE 3.1. – Deviation Schedule for
11 kV Type A Mini-substation up to 500kVA (without RMU)**

If there are any deviations from this specification they shall be listed below with the reasons for deviation. In addition, evidence shall be provided that the proposed deviations will at least be more cost-effective than the specification.

Item	Clause	Proposed deviation

SCHEDULE 4 – Technical Schedules A and B
11 kV Type B Miniature substation up to 500kVA (with RMU)

Schedule A: Purchaser's specific requirements

Schedule B: Particulars of equipment to be supplied.

1	2	3	4	5	
Item	Subclause	Description	Schedule A	Schedule B	
1	4.1.1	Standard operating conditions			
1.1	NRS 004 4.2.1.3	a) Altitude	m	1800	-
1.2	SANS60694 2.1.2	b) Ambient air temperature	° C	-5 to +40	-
1.3		c) Lightning ground flash density	Flashes/ km ² /year	High	-
1.4	SANS60694 2.1.2	d) Maximum solar radiation	W/m ²	1000	-
1.5		e) Ultraviolet radiation		High	-
1.6	NRS 004 4.2.1.3	f) Relative humidity	%	98	-
1.7	NRS 004 4.2.1.3 & DSP 34- 1621 4.1.1	g) Pollution level (inland – lowcorrosive / coastal – corrosive)		“very heavy” for coastal	-
1.8	SANS60694 2.1.2	h) wind pressure	Pa	700	-
1.9	DSP 34- 1621 4.1.1	i) Pollution conditions inside mini-sub		Pollution Degree 3	-
2		Ratings			
2.1	DSP 34- 1621 4.1.2.2.1	Transformer power rating (315/500kVA)	kVA	_____	_____
2.2	DSP 34- 1621 4.1.2.2.2	Nominal voltage of system (U _n)	kV _{rms}	11	_____
2.3	NRS 004 4.1.4 & SANS 780 1.3	System frequency	Hz	50	_____
2.4	NRS 004 4.1.4	Number of phases		3	_____
2.5	SANS 780 8.26	Transformer rated no-load secondary voltage	V _{rms}	420	_____
2.6	SANS 1019 5.4.2	Rated power-frequency voltage (U _m)	kV _{rms}	12	_____
2.7	SANS 1019 5.4.2	Rated short-duration power frequency withstand voltage [50Hz: 1 min]	kV _{rms}	28	_____

2.8	DSP 34-1621 4.1.2.1	Rated lightning impulse withstand voltage (SANS 1019 5.4.2 List 3)	kV _{peak}	95	_____
2.9	SANS 780	Transformer induced voltage withstand level (see Table 2 – SANS 780)	kV _{rms}	22	_____
3		Construction design			
3.1	DSP 34-1621 4.1.3.1.3	Layout (Type A/Type B)		Type B	_____
3.2	NRS 004 4.2.2.3.1	Enclosure IP rating		IP35	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
3.3	DSP 34-1621 4.1.3.1.4	Removable base sections adjacent to MV compartment (sections to lap bolted with nuts on the inside of the channel and housing)	YES	_____
3.4	NRS 004 4.4.2.5	Concealed door and roof (if applicable) hinges	YES	_____
3.5	DSP 34-1621 4.1.3.1.5	Compartment fastening/locking (Pad lockable)	YES – three point locking with 1 additional 10 mm sunken captive Allen cap screw	_____
3.6	DSP 34-1621 4.1.3.1.6	“Heavy-duty” stainless steel door locks	YES	_____
3.7	DSP 34-1621 4.1.3.1.7	Compartment lock protection facility required?	Y/N Yes	_____
3.8		Total mass of mini-substation	kg -	_____
3.9		Overall dimensions		
		a) MV compartment length	mm -	_____
		b) LV compartment length	mm -	_____
	NRS 004 4.2.2.1.2	c) Overall length	mm 3000	_____
	NRS 004 4.2.2.1.2	d) Overall width	mm 1650	_____
		e) Overall height	mm -	_____
	NRS 004 4.2.2.1.2	f) Base width	mm 1200	_____
3.10	NRS 004 4.2.2.5	Provision for lifting of complete mini-sub onto a concrete plinth without need for dismantling (except for roof removal if required)	YES	_____

3.11	NRS 004 4.2.2.4.2	Provision of shear-off lifting lugs on roof for ease of roof removal (where roof removal is required prior to lifting minisub)		YES	_____
3.12	NRS 004 6.1.2	Mini-sub housing sections/doors bonded		YES	_____
4		Transformer unit			
4.1	NRS 004 6.4.1	Electrical requirements		As per SANS 780	_____
4.2	NRS 004 6.4.4	Vector group		Dyn11	_____
4.3		MV system earthing (Effective/Noneffective)		Non-effective	-
4.4		MV system fault level	kA	20	-
4.5	DSP 34-1621 4.1.2.3.6	LV transformer neutral earthing		Solid – connection to insulated LV neutral/earth bar	_____

1	2	3	4	5	
Item	Subclause	Description		Schedule A	Schedule B
4.6	DSP 34-1621 5.2.1	Temperature rise limits		As per DSP 34-1621 5.2.1	_____
4.7	SANS 780 8.5.2	Secondary voltage regulation (Off-load)	%	+5,0, + 2,5, 0, -2,5, -5,0	_____
4.8	SANS 780 5.6.1	No-load losses	W	-	_____
4.9	SANS 780 5.6.1	Load losses	W	-	_____
4.10	SANS 780 8.27	Impedance voltage (see Table 9 of SANS 780)	%	SANS 780	_____
4.11	DSP 34-1621 4.5	X/R		-	_____
4.12	DSP 34-1621 4.5	Cost /kW of no-load losses	R/kW	_____	-
4.13	DSP 34-1621 4.5	Cost /kW of load losses	R/kW	_____	-
4.14	SANS 780 8.5.3	Audio-sound level – maximum (see table 6 of SANS 780)	dB(A)	_____	_____
4.15	DSP 34-1621 4.1.2.2.4	Sealed transformer unit		NO bolted unit	_____
4.16	NRS 004 6.4.7	Transformer MV bushings (NB internal screen to be earthed)		EN 50180 Type C with M16x2 thread	_____
4.17	DSP 34 1621 4.3.1.1.4	MV bushing-centre clearances (minimum)	mm	90	_____

4.18	DSP 34-1612 4.3.1.1.4	Clearances between outer bushing centres and mini-sub metal enclosure (minimum)	mm	50	_____
4.19	DSP 34-1621 4.3.1.4	Transformer overload protection facility		YES	_____
4.20		Winding material	MV LV	- -	_____ _____
4.21		Manufacturer		-	_____
4.22	DSP 34-1621 4.3.1.4	Top-oil thermoelectric temp-sensing element		YES	_____
5		MV compartment			
5.1	DSP 34-1621 4.3.1.1	Equipment in MV compartment		RMU	_____
5.2		Ring Main Unit manufacturer		-	_____
5.3		Incoming / outgoing MV cable requirements			
	DSP 34-1621 4.3.1.1.4	a) 3 x single core / 1 x three core		1 x 3 core	_____
	DSP 34-1621 4.3.1.1.4	b) Cable support (clamping) required (NRS 012 & D-DT-8019) all cables except 11 kV paper insulated.		YES (Size 75 – 100 mm OD)	_____
	DSP 34-1621 4.3.1.1.4	11 kV paper insulated cables		YES (Size 50 – 75 mm OD)	_____

1	2	3	4	5	
Item	Subclause	Description	Schedule A	Schedule B	
		c) Minimum distance from cable clamp to centre-line of RMU bushings	mm	800	_____
		d) Type of connection (NRS 012) to RMU		Type 3 (unscreened separable connectors)	_____
		e) Interconnection arrangement between RMU and transformer MV bushings		Single core screened cable	_____
5.4	DSP 34-1621 4.3.1.3	Make (product) connector used on transf. bushings (SSC)		-	_____
5.5	DSP 34-1621 4.3.1.3	Make (product) of connector used on RMU T-off (USC / SSC)		-	_____
5.6	NRS 004 6.1.3	Mini-sub (MV) earth bar (accessible from front of RMU)		YES	_____
5.7	DSP 34-1621 4.1.2.7.6	Make (product) of mains powered earth fault indicator (DSP 34-1080)		-	_____
6		LV Compartment			
6.1	NRS 004 6.3.3.1	LV ASSEMBLY complies with SANS 1973-1		YES	_____

6.2	DSP 34-1621 4.1.2.5.1	Busbar-rating (see Table 1)	A	Rated at 1.2 transformer secondary rated current	_____
6.3		Busbar-insulation		Air insulated	_____
6.4	DSP 34-1621 4.1.2.3.1	Busbars	∅	3 + one neutral-earth	_____
6.5	NRS 004 6.3.3.1	Current density of busbars	A/mm ²	SANS 1973-1	_____
6.6	NRS 004 4.1.2.5	Rated short-time withstand current of main circuit – 1 s	kA _{rms}	-	_____
6.7	NRS 004 6.3.3.2.6	Min clearance to earth and between phases	mm	-	_____
6.8	DSP 34-1621 4.1.2.3.4	Provision of a LV neutral surge arrester (as per D-DT-3088) fitted between minisub (MV) earth bar and LV neutral-earth busbar		YES	_____
6.9	DSP 34-1621 4.1.2.3.3	LV neutral-earth busbar to be earthed (via a 70mm ² Cu electrical bridge to the mini-sub earth bar)		YES	_____
6.10	4.1.2.5.2	Stainless Steel M12 set screws provided		YES	_____
6.11	DSP 34-1621 4.3.1.5	Provision of LV main switch disconnecter		YES	_____
6.12	DSP 34-1621 4.3.1.5	Make (product) of circuit switch disconnecter		SANS 60947-3	_____
6.13	NRS 004 4.1.2.6	Minimum fault current interrupting capacity	kA	-	_____
6.14	DSP 34-1621 4.3.2	Number of outgoing LV feeder bays to be provided for (drill busbar ∅14mm holes)		9	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
6.15	NRS 004 6.3.3.2.6 DSP 34-1621 4.1.2.4.2	Spacing between LV feeder bays (see Figure 1 of DSP 34-1621) LV panel designed for vertical fusebases (FH) or MCCBs (CB)	mm 110 FH / CB	_____
6.16	NRS 004 6.3.3.2.6	Spacing (vertical): Between phase busbars Between lowest LV busbar and LV neutral Between LV neutral and gland plates (see Figure 1 of DSP 34-1621)	mm 185 mm 300 mm 200 (min)	_____
6.17	DSP 34-1621 4.1.2.7.1	LV maximum demand ammeters	Required on all three phases	_____

6.18	NRS 004 6.3.3.5.1	Ammeter type		Thermal integrating over 15 min period YES	_____
6.19	DSP 34- 1621 4.1.2.7.2	LV indicating voltmeter (with a selector switch) (YES/NO)		YES	_____
6.20	NRS 004 6.3.3.5.3	Ammeter and voltmeter size and display	mm	96 × 96, 90°	_____
6.21	NRS 004 6.3.3.5.3	Ammeter and voltmeter position		LV compartment (high as practicable) YES – non flammable	_____
6.22	NRS 004 6.3.1.2	Provision of removable barrier to separate LV end compartment and front LV compartment		YES – non flammable	_____
7		LV outgoing feeder bay gland plates			
7.1	DSP 34- 1621 4.1.2.4.4	Number of gland plates to be provided (Figure C.9 of NRS 004)		6	_____
	NRS 004 6.3.3.3.10	Number of gland holes per feeder bay		2	_____
	NRS 004 6.3.3.3.10	Size of holes per feeder bay:	mm	1 x 65 mm	_____
	NRS 004 6.3.3.3.10	Clearances for each hole per feeder bay:	mm	1 x 52 mm	_____
	NRS 004 6.3.3.3.10		mm	1 x 98 mm	_____
	NRS 004 6.3.3.3.10		mm	1 x 65 mm	_____
7.2	NRS 004 6.3.3.3.10	Distance between gland plate centre lines (Figure C.9 of NRS 004)	mm	110	_____
8		LV auxiliaries			
8.1	DSP 34- 1621 4.1.2.7.3	Provision of three point socket outlet in LV compartment (with instantaneous-trip earth leakage unit [20 A; 5 kA rupturing capacity; 30 mA sensitivity] and 20 A HRC fuse with neutral fuse link) (YES/NO)		YES	_____
8.2	DSP 34- 1621 4.1.2.7.4	Provision of a tamperproof compartment for the installation of a photo-cell (YES/NO)		NO	_____
8.3	DSP 34- 1621 4.1.2.7.4	300mmx300mm blank plate for PECU		YES	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
8.4	DSP 34- 1621 4.1.2.7.5	Numbering ferrules for auxiliary wiring	YES	_____

8.5	DSP 34 1621 4.3.1.1.3	Push-button fitted to shunt trip RMU tee- off	NO	_____
9		Materials and corrosion protection		
9.1	DSP 34- 1621 4.1.3.2.4	Mini-sub enclosure, LV ASSEMBLY and transformer tank: Inland: mild steel	Coastal : 3CR12	_____
	DSP 34- 1621 4.1.3.2.5	Coastal: 3CR12 or zinc sprayed mild steel or stainless steel		_____
	DSP 34- 1621 4.1.3.2.9	Corrosion protection detailed specification number (DSP 34-1658) offered for inland applications	DS-6 / DS-7 / DS-8	_____
	DSP 34- 1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered for coastal applications	DS-11 / DS-12 / (DS-14 + DS-16) / (DS-14 + DS-17) / DS18	_____
9.2	DSP 34- 1621 4.1.3.2.6	Transformer radiator: Inland: mild steel Coastal: hot-dipped galvanized / zinc metal sprayed (if corrugated) mild steel	Coastal : hot – dipped galvanized	_____
	DSP 34- 1621 4.1.3.2.9	Corrosion protection detailed specification number (DSP 34-1658) offered for inland applications	DS-6 / DS-7 / DS-8	_____
	DSP 34- 1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered for coastal applications	(DS-13 + DS-16) / (DS-13 + DS-17) / (DS-14 + DS-16) / (DS-14 + DS-17)	_____
9.3	NRS 004 6.3.3.2.2	Tinned copper busbars (YES/NO)	YES	_____
9.4	DSP 34- 1621 4.1.3.2.7	Mini-sub base: Material	Steel	_____
	DSP 34- 1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered	(DS-13 + DS-16) / (DS-13 + DS-17)	_____
9.5	DSP 34- 1621	Gland plates and support structure: Coastal: Material: 3 mm (min)	Coastal : material	_____

	4.1.3.2.8	stainless steel	3mm (minimum)	
	NRS 004 6.3.3.3.8	Inland Material: 3 mm (min) mild	-	_____
	DSP 34- 1621 4.1.3.2.9	steel / 3CR12 / stainless steel Corrosion protection detailed specification number (DSP 34-1658) offered if mild steel (Hot-dip. galv. to OR zinc sprayed) – for inland only	DS-13 / DS14	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
9.7	DSP 34- 1621 4.1.3.2.11	5 mm cork packing (between ends and tank, base and ends, and base and tank)(YES/NO)	YES	_____
9.8	DSP 34- 1621 4.1.3.2.12	Final colour	Avocado C12 (SANS 1091)	_____
10		Notices, signs and labels		
10.1	NRS 004 8.2.1	Transformer rating plate	YES	_____
10.2	DSP 34- 1621 6.1.2	Treatment and Full First Aid Instructions on inside of MV and LV compartment doors	YES	_____
10.3	DSP 34- 1621 6.1.2	Elec. warning signs on all doors and barriers	YES	_____
10.4	NRS 004 8.4.11	Transformer phase labels below bushings	YES	_____
10.5	NRS 004 6.3.3.2.5	Colour-coded LV busbars	YES	_____
10.6	DSP 34- 1621 6.1.2	Labelling of MV and LV compartment doors (sign – D-DT-3202 sheet 5 and 4)	YES	_____
10.7	NRS 004 8.4.3	Primary voltage, secondary voltage and kVA rating stencilled on the front, centre.	YES	_____
10.8	NRS 004 8.4.4	Mini-sub mass and stock number stencilled on side or rear.	YES	_____
10.9	NRS 004 8.4.6	ID markings linking roof to body per batch	YES	_____
10.10	NRS 004 4.2.2.3.9	Provision for the safe-keeping of documents	YES	_____
11		Documentation		
11.1	DSP 34- 1621 6.2.3	Type test certificates (provide ref. numbers of reports)	Sets 1	_____
11.2	DSP 34- 1621	Routine test certificates	Sets 1	_____

	6.2.3				
11.3	DSP 34-1621	Drawings (Mini-sub GA, LV ASSEMBLY, Operating procedure label for RMU teeoff)	Sets	1	_____
	6.2.2				
11.4	DSP 34-1621	Diagrams (Mini-sub schematic – including the LV ASSEMBLY, Rating Plates)	Sets	1	_____
	6.2.2				
12		Accessories			
12.1	DSP 34-1621	Type of sealant provided	-		_____
	7.1.2				

**SCHEDULE 4.1. – Deviation Schedule for
11 kV Type B Mini-substation up to 500kVA (with RMU)**

If there are any deviations from this specification they shall be listed below with the reasons for deviation. In addition, evidence shall be provided that the proposed deviations will at least be more cost-effective than the specification.

Item	Clause	Proposed deviation

SCHEDULE 5.

Technical Schedules A and B and Deviation Schedule for 11kV Type A 1 000kVA Mini-substations (without RMU) (informative)

Use of the technical schedules is intended to obviate the need for preparing a detailed technical specification for every enquiry. The purchaser need only specify compliance with *DSP 34-1621* and provide the tenderers with the relevant schedules A and B.

Schedule A gives the Municipality's requirements. It lists the requirements to be specified by the purchaser in enquiries and orders. These requirements may include references to the relevant sub-clauses in this document. Where the text of any referenced standard stipulates that the purchaser shall indicate his requirements, these requirements should also be specified in schedule A. The purchaser shall set out his particular requirements and choices in schedule A.

The purchaser shall require the tenderer to fill in schedule B. By doing this, the tenderer will state compliance with this document and provide the information the purchaser has requested. Schedule B shall be completed in full by the supplier.

Deviations/modifications/alterations from the requirements specified in Schedule A shall be well documented in the deviation schedule.

Price schedules shall be so drawn up and the covering letter so worded that the costs of all services such as tests and delivery are declared and allowed for in the tender.

SCHEDULE 5
Technical Schedules A and B for
11 kV Type A 1000kVA Miniature substation (without RMU)

Schedule A: Purchaser's specific requirements

Schedule B: Particulars of equipment to be supplied

1	2	3	4	5	
Item	Subclause	Description	Schedule A	Schedule B	
1	2.1.1	Standard operating conditions			
1.1	NRS 004 4.2.1.3	a) Altitude	m	1800	-
1.2	SANS60694 2.1.2	b) Ambient air temperature	° C	-5 to +40	-
1.3		c) Lightning ground flash density	Flashes/ km ² /year	High	-
1.4	SANS60694 2.1.2	d) Maximum solar radiation	W/m ²	1000	-
1.5		e) Ultraviolet radiation		High	-
1.6	NRS 004 4.2.1.3	f) Relative humidity	%	98	-
1.7	NRS 004 4.2.1.3 & DSP 34- 1621 4.1.1	g) Pollution level (inland – lowcorrosive / coastal – corrosive)		“very heavy” for coastal	-
1.8	SANS60694 2.1.2	h) wind pressure	Pa	700	-
1.9	DSP 34- 1621 4.1.1	i) Pollution conditions inside mini-sub		Pollution Degree 3	-
2		Ratings			
2.1	DSP 34- 1621 4.1.2.2.1	Transformer power rating	kVA	1000	_____
2.2	DSP 34- 1621 4.1.2.2.2	Nominal voltage of system (U _n)	kV _{rms}	11	_____
2.3	NRS 004 4.1.4 & SANS 780 1.3	System frequency	Hz	50	_____
2.4	NRS 004 4.1.4	Number of phases		3	_____
2.5	SANS 780 8.26	Transformer rated no-load secondary voltage	V _{rms}	420	_____
2.6	SANS 1019 5.4.2	Rated power-frequency voltage (U _m)	kV _{rms}	12	_____
2.7	SANS 1019 5.4.2	Rated short-duration power frequency withstand voltage [50Hz: 1 min]	kV _{rms}	28	_____

2.8	DSP 34-1621 4.1.2.1	Rated lightning impulse withstand voltage (SANS 1019 5.4.2 List 3)	kV _{peak}	95	_____
2.9	SANS 780	Transformer induced voltage withstand level (see Table 2 – SANS 780)	kV _{rms}	22	_____
3		Design & construction			
3.1	DSP 34-1621 4.1.3.1.2	Layout (Type A/Type B)		Type B (NRS 004)	_____
3.2	NRS 004 4.2.2.3.1	Enclosure IP rating		IP35	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
3.3	DSP 34-1621 4.1.3.1.4	Removable base sections adjacent to MV compartment (sections to lap bolted with nuts on the inside of the channel and housing)	YES	_____
3.4	NRS 004 4.4.2.5	Concealed door hinges	YES	_____
3.5	DSP 34-1621 4.1.3.1.5	Compartment fastening/locking (pad lockable)	YES – three point locking with 1 additional 10 mm sunken captive Allen cap screw	_____
3.6	DSP 34-1621 4.1.3.1.6	“Heavy-duty” stainless steel door locks	YES	_____
3.7	DSP 34-1621 4.1.3.1.7	Compartment lock protection facility required?	Y/N YES	_____
3.8		Total mass of mini-substation	kg -	_____
3.9		Overall dimensions		
		a) MV compartment length	mm -	_____
		b) LV compartment length	mm -	_____
	NRS 004 4.2.2.1.2	c) Overall length	mm 3000	_____
	NRS 004 4.2.2.1.2	d) Overall width	mm 1650	_____
		e) Overall height	mm -	_____
	NRS 004 4.2.2.1.2	f) Base width	mm 1200	_____
3.10	NRS 004 4.2.2.5	Provision for lifting of complete mini-sub onto a concrete plinth without need for dismantling (except for roof removal if required)	YES	_____

3.11	NRS 004 4.2.2.4.2	Provision of shear-off lifting lugs on roof for ease of roof removal (where roof removal is required prior to lifting minisub)		YES	_____
3.12	NRS 004 6.1.2	Mini-sub housing sections/doors bonded		YES	_____
4		Transformer unit			
4.1	NRS 004 6.4.1	Electrical requirements		As per SANS 780	_____
4.2	NRS 004 6.4.4	Vector group		Dyn11	_____
4.3		MV system earthing (Effective/Noneffective)		Non-effective	-
4.4		MV system fault level	kA	20	-
4.5	DSP 34-1621 4.1.2.3.6	LV transformer neutral earthing		Solid – connection to insulated LV neutral bar	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
4.6	DSP 34-1621 5.2.1	Temperature rise limits	As per DSP 34-1621 5.2.1	_____
4.7	SANS 780 8.5.2	Secondary voltage regulation (Off-load)	% +5,0, + 2,5, 0, -2,5, -5,0	_____
4.8	SANS 780 5.6.1	No-load losses	W -	_____
4.9	SANS 780 5.6.1	Load losses	W -	_____
4.10	SANS 780 8.27	Impedance voltage (see Table 9 of SANS 780)	% SANS 780	_____
4.11	DSP 34-1621 4.5	X/R ratio	-	_____
4.12	DSP 34-1621 4.5	Cost /kW of no-load losses	R/kW _____	-
4.13	DSP 34-1621 4.5	Cost /kW of load losses	R/kW _____	-
4.14	SANS 780 8.5.3	Audio-sound level – maximum (see table 6 of SANS 780)	dB(A) 56	_____
4.15	DSP 34-1621 4.1.2.2.4	Sealed transformer unit	NO – bolted unit	_____

4.16	NRS 004 6.4.7	Transformer MV bushings (NB internal screen to be earthed)		EN 50180 Type C with M16x2 thread	_____
4.17	DSP 34- 1621 4.2.1.1.1	MV bushing-centre clearances (minimum)	mm	135	_____
4.18	DSP 34- 1621 4.2.1.1.1	Clearances between outer bushingcentres and mini-sub metal enclosure (minimum)	mm	90	_____
4.19	DSP 34- 1621 4.2.1.2	Transformer overload protection facility		YES	_____
4.20		Winding material (CU)	MV LV	- -	_____ _____
4.21		Manufacturer		-	_____
4.22	DSP 34- 1621 4.2.1.2.2	Top-oil thermoelectric temp-sensing element		YES	_____
5		MV compartment			
5.1	DSP 34- 1621 4.2.2.1.1	Equipment in MV compartment		11kV airinsulated junction box (D-DT-0853)	_____
5.2		Incoming / outgoing MV cable requirements			
	DSP 34- 1621 4.2.2.1.2	a) 3 x single core / 1 x three core		1 x 3 core	_____
	DSP 34- 1621 4.2.2.1.2	b) Cable support (clamping) required (NRS 012 & D-DT-8019)		YES (Size 50 – 75 mm OD)	_____

1	2	3	4	5	
Item	Subclause	Description	Schedule A	Schedule B	
	DSP 34- 1621 4.2.2.1.2	c) Minimum distance from cable clamp to centre-line of post insulators (NRS 012 & D-DT- 8053)	mm	800	_____
	DSP 34- 1621 4.2.2.1.1	d) Type of connections to post insulators (NRS 012)		Type 1 (Bare)	_____
	DSP 34- 1621 4.2.2.1.1	e) Type of connections to transformer bushings (NRS 012) (1-core jumpers from junction box)		Type 3 (unscreened separable connectors)	_____
5.3	DSP 34- 1621	Make (product) of connector used on transf. bushings		-	_____

	4.2.2.1.1				
5.4	NRS 004 6.1.3	Mini-sub (MV) earth bar accessible in MV compartment		YES	_____
5.5	DSP 34-1621 4.1.2.7.6	Make (product) of mains powered earth fault indicator (DSP 34-1080)		-	_____
6		LV Compartment			
6.1	NRS 004 6.3.3.1	LV ASSEMBLY complies with SANS 1973-1		YES	_____
6.2	DSP 34-1621 4.1.2.5.1	Busbar-rating (see Table 1)	A	Rated at 1.2 transformer secondary rated current	_____
6.3		Busbar-insulation		Air insulated	_____
6.4	DSP 34-1621 4.1.2.3.2	Busbars	∅	3 + one identical neutral busbar + earth busbar (insulated from frame)	_____
6.5	NRS 004 6.3.3.1	Current density of busbars	A/mm ²	SANS 1973-1	_____
6.6	NRS 004 4.1.2.5	Rated short-time withstand current of main circuit – 1 s	kA _{rms}	-	_____
6.7	NRS 004 6.3.3.2.6	Min clearance to earth and between phases	mm	-	_____
6.8	DSP 34-1621 4.1.2.3.4	Provision of a LV neutral surge arrester (as per D-DT-3088) fitted between minisub earth bar and LV earth busbar		YES	_____
6.9	DSP 34-1621 4.1.2.3.3	LV earth busbar to be earthed (via a 70mm ² Cu electrical bridge to the minisub earth bar)		YES	_____
		LV neutral busbar to be bridged to the LV earth bar (see Figure 2)		YES	_____
6.10	DSP 34-1621 4.1.2.5.2	Stainless Steel M12 set screws provided		YES	_____
6.11	DSP 34-1621 4.2.1.2.1	Provision of LV main circuit breaker		YES	_____
6.12	DSP 34-1621 4.2.1.2.1	Make (product) of circuit breaker		SANS 556-1	_____

6.13	NRS 004 4.1.2.6	Minimum fault current interrupting capacity	kA	-	_____
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1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
6.14	DSP 34-1621 4.1.2.4.5 NRS 004 6.3.3.2.6	Number of outgoing LV feeder bays to be provided for (drill busbar Ø14mm holes) Spacing between LV feeder bays (see Figure 1 of DSP 34-1621)	6 mm 110	_____
6.15	DSP 34-1621 4.1.2.4.2	LV panel designed for vertical fusebases (FH) or MCCBs (CB)	FH / CB	_____
6.16	NRS 004 6.3.3.2.6 and DSP 34-1621 4.1.2.3.2	Spacing (vertical): Between phase busbars Between lowest LV busbar and LV neutral Between LV neutral and LV earth Between LV earth and gland plates (see Figure 2 of DSP 34-1621)	Mm 185 mm 300 mm 200 (min) mm 200 (min)	_____
6.17	DSP 34-1621 4.1.2.7.1	LV maximum demand ammeters	Required on all three phases	_____
6.18	NRS 004 6.3.3.5.1	Ammeter type	Thermal integrating over 15 min period	_____
6.19	DSP 34-1621 4.1.2.7.2	LV indicating voltmeter (with a selector switch) (YES/NO)	YES	_____
6.20	NRS 004 6.3.3.5.3	Ammeter and voltmeter size and display	mm 96 × 96, 90°	_____
6.21	NRS 004 6.3.3.5.3	Ammeter and voltmeter position	LV compartment (high as practicable)	_____
7		LV outgoing feeder bay gland plates		
7.1	DSP 34-1621 4.1.2.4.5 NRS 004 6.3.3.3.10 NRS 004 6.3.3.3.10 NRS 004 6.3.3.3.10 NRS 004 6.3.3.3.10	Number of gland plates to be provided (Figure C.9 of NRS 004) Number of gland holes per feeder bay Size of holes per feeder bay: Clearances for each hole per feeder bay:	6 2 mm 1 x 65 mm mm 1 x 52 mm mm 1 x 98 mm mm 1 x 65 mm	_____
7.2	NRS 004 6.3.3.3.10	Distance between gland plate centre lines. (Figure C.9 of NRS 004)	mm 110	_____

8				
8.1	DSP 34-1621 4.1.2.7.3	LV auxiliaries Provision of three point socket outlet in LV compartment (with instantaneous-trip earth leakage unit [20 A; 5 kA rupturing capacity; 30 mA sensitivity] and 20 A HRC fuse with neutral fuse link) (YES/NO)	YES	_____
8.2	DSP 34-1621 4.1.2.7.4	Provision of a tamperproof compartment for the installation of a photo-cell (YES/NO)	NO	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
8.3	DSP 34-1621 4.1.2.7.4	300 mm x 300 mm blank plate for PECU	YES	_____
8.4	DSP 34-1621 4.1.2.7.5	Numbering ferrules for auxiliary wiring	YES	_____
9		Materials and corrosion protection		
9.1	DSP 34-1621 4.1.3.2.4	Mini-sub enclosure, LV ASSEMBLY and transformer tank: Inland: mild steel	Coastal : 3CR12	_____
	DSP 34-1621 4.1.3.2.5	Coastal: 3CR12 or zinc sprayed mild steel or stainless steel		_____
	DSP 34-1621 4.1.3.2.9	Corrosion protection detailed specification number (DSP 34-1658) offered for inland applications	DS-6 / DS-7 / DS-8	_____
	DSP 34-1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered for coastal applications	DS-11 / DS-12 / (DS-14 + DS-16) / (DS-14 + DS-17) / DS18	_____
9.2	DSP 34-1621 4.1.3.2.6	Transformer radiator: Inland: mild steel Coastal: hot-dipped galvanized / zinc metal sprayed (if corrugated) mild steel	Coastal : hot – dipped galvanized	_____
	DSP 34-1621	Corrosion protection detailed	DS-6 / DS-7 / DS-8	_____

	4.1.3.2.9	specification number (DSP 34-1658) offered for inland applications		
	DSP 34-1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered for coastal applications	(DS-13 + DS-16) / (DS-13 + DS-17) / (DS-14 + DS-16) / (DS-14 + DS-17)	_____
9.3	NRS 004 6.3.3.2.2	Tinned copper busbars (YES/NO)	YES	_____
9.4	DSP 34-1621 4.1.3.2.7	Mini-sub base: Material	Steel	_____
	DSP 34-1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered	(DS-13 + DS-16) / (DS-13 + DS-17)	_____
9.5	DSP 34-1621 4.1.3.2.8 NRS 004 6.3.3.3.8	Gland plates and support structure: Coastal: Material: 3 mm (min) stainless steel Inland Material: 3 mm (min) mild steel / 3CR12 / stainless steel	Coastal : material 3mm (minimum) -	_____
	DSP 34-1621 4.1.3.2.9	Corrosion protection detailed specification number (DSP 34-1658) offered if mild steel (Hot-dip. galv. to OR zinc sprayed) – for inland only	DS-13 / DS14	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
9.7	DSP 34-1621 4.1.3.2.11	5 mm cork packing (between ends and tank, base and ends, and base and tank)(YES/NO)	YES	_____
9.8	DSP 34-1621 4.1.3.2.12	Final colour	Avocado C12 (SANS 1091)	_____
10		Notices, signs and labels		
10.1	NRS 004 8.2.1	Transformer rating plate	YES	_____
10.2	DSP 34-1621 6.1.2	Treatment and Full First Aid Instructions on inside of MV and LV compartment doors	YES	_____

10.3	DSP 34-1621	Elec. warning signs on all doors and barriers		YES	_____
	6.1.2				
10.4	NRS 004	Transformer phase labels below bushings		YES	_____
	8.4.11				
10.5	NRS 004	Colour-coded LV busbars		YES	_____
	6.3.3.2.5				
10.6	DSP 34-1621	Labelling of MV and LV compartment doors (sign – D-DT-3202 sheet 5 and 4)		YES	_____
	6.1.2				
10.7	NRS 004	Primary voltage, secondary voltage and kVA rating stencilled on the front, centre.		YES	_____
	8.4.3				
10.8	NRS 004	Mini-sub mass and stock number stencilled on side or rear.		YES	_____
	8.4.4				
10.9	NRS 004	ID markings linking roof to body per batch		YES	_____
	8.4.6				
10.10	NRS 004	Provision for the safe-keeping of documents		YES	_____
	4.2.2.3.9				
11		Documentation			
11.1	DSP 34-1621	Type test certificates (provide ref. numbers of reports)	Sets	1	_____
	6.2.3				
11.2	DSP 34-1621	Routine test certificates	Sets	1	_____
	6.2.3				
11.3	DSP 34-1621	Drawings (Mini-sub GA, LV ASSEMBLY, Operating procedure label for RMU teeoff)	Sets	1	_____
	6.2.2				
11.4	DSP 34-1621	Diagrams (Mini-sub schematic – including the LV ASSEMBLY, Rating Plates)	Sets	1	_____
	6.2.2				
12		Accessories			
12.1	DSP 34-1621	Type of sealant provided		-	_____
	7.1.2				

**SCHEDULE 5.1. – Deviation Schedule for
11 kV Type A 1 000kVA Mini-substation (without RMU)**

If there are any deviations from this specification they shall be listed below with the reasons for deviation. In addition, evidence shall be provided that the proposed deviations will at least be more cost-effective than the specification.

Item	Clause	Proposed deviation

SCHEDULE 6 – Technical Schedules A and B
11 kV Type B 1 000kVA Miniature substation (with RMU)

Schedule A: Purchaser's specific requirements

Schedule B: Particulars of equipment to be supplied.

1	2	3	4	5	
Item	Subclause	Description	Schedule A	Schedule B	
1	2.1.1	Standard operating conditions			
1.1	NRS 004 4.2.1.3	b) Altitude	m	1800	-
1.2	SANS60694 2.1.2	b) Ambient air temperature	° C	-5 to +40	-
1.3		c) Lightning ground flash density	Flashes/ km ² /year	High	-
1.4	SANS60694 2.1.2	d) Maximum solar radiation	W/m ²	1000	-
1.5		e) Ultraviolet radiation		High	-
1.6	NRS 004 4.2.1.3	f) Relative humidity	%	98	-
1.7	NRS 004 4.2.1.3 & DSP 34- 1621 4.1.1	g) Pollution level (inland – lowcorrosive / coastal – corrosive)		“very heavy” for coastal	-
1.8	SANS60694 2.1.2	h) wind pressure	Pa	700	-
1.9	DSP 34- 1621 4.1.1	i) Pollution conditions inside mini-sub		Pollution Degree 3	-
2		Ratings			
2.1	DSP 34- 1621 4.1.2.2.1	Transformer power rating	kVA	1000	_____
2.2	DSP 34- 1621 4.1.2.2.2	Nominal voltage of system (U _n)	kV _{rms}	11	_____
2.3	NRS 004 4.1.4 & SANS 780 1.3	System frequency	Hz	50	_____
2.4	NRS 004 4.1.4	Number of phases		3	_____
2.5	SANS 780 8.26	Transformer rated no-load secondary voltage	V _{rms}	420	_____
2.6	SANS 1019 5.4.2	Rated power-frequency voltage (U _m)	kV _{rms}	12	_____
2.7	SANS 1019 5.4.2	Rated short-duration power frequency withstand voltage [50Hz: 1 min]	kV _{rms}	28	_____

2.8	DSP 34-1621 4.1.2.1	Rated lightning impulse withstand voltage (SANS 1019 5.4.2 List 3)	kV _{peak}	95	_____
2.9	SANS 780	Transformer induced voltage withstand level (see Table 2 – SANS 780)	kV _{rms}	22	_____
3		Design & construction			
3.1	DSP 34-1621 4.1.3.1.3	Layout (Type A/Type B)		Type B	_____
3.2	NRS 004 4.2.2.3.1	Enclosure IP rating		IP35	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
3.3	DSP 34-1621 4.1.3.1.4	Removable base sections adjacent to MV compartment (sections to lap bolted with nuts on the inside of the channel and housing)	YES	_____
3.4	NRS 004 4.4.2.5	Concealed door hinges	YES	_____
3.5	DSP 34-1621 4.1.3.1.5	Compartment fastening/locking (pad lockable)	YES – three point locking with 1 additional 10 mm sunken captive Allen cap screw	_____
3.6	DSP 34-1621 4.1.3.1.6	“Heavy-duty” stainless steel door locks	YES	_____
3.7	DSP 34-1621 4.1.3.1.7	Compartment lock protection facility required?	Y/N YES	_____
3.8		Total mass of mini-substation	kg -	_____
3.9		Overall dimensions		
		a) MV compartment length	mm -	_____
		b) LV compartment length	mm -	_____
	NRS 004 4.2.2.1.2	c) Overall length	mm 3000	_____
	NRS 004 4.2.2.1.2	d) Overall width	mm 1650	_____
		e) Overall height	mm -	_____
	NRS 004 4.2.2.1.2	f) Base width	mm 1200	_____
3.10	NRS 004 4.2.2.5	Provision for lifting of complete mini-sub onto a concrete plinth without need for dismantling (except for roof removal if required)	YES	_____

3.11	NRS 004 4.2.2.4.2	Provision of shear-off lifting lugs on roof for ease of roof removal (where roof removal is required prior to lifting minisub)		YES	_____
3.12	NRS 004 6.1.2	Mini-sub housing sections/doors bonded		YES	_____
4		Transformer unit			
4.1	NRS 004 6.4.1	Electrical requirements		As per SANS 780	_____
4.2	NRS 004 6.4.4	Vector group		Dyn11	_____
4.3		MV system earthing (Effective/Noneffective)		Non-effective	-
4.4		MV system fault level	kA	20	-
4.5	DSP 34-1621 4.1.2.3.6	LV transformer neutral earthing		Solid – connection to insulated LV neutral bar	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
4.6	DSP 34-1621 5.2.1	Temperature rise limits	As per DSP 34-1621 5.2.1	_____
4.7	SANS 780 8.5.2	Secondary voltage regulation (Off-load)	% +5,0, + 2,5, 0, -2,5, -5,0	_____
4.8	SANS 780 5.6.1	No-load losses	W -	_____
4.9	SANS 780 5.6.1	Load losses	W -	_____
4.10	SANS 780 8.27	Impedance voltage (see Table 9 of SANS 780)	% SANS 780	_____
4.11	DSP 34-1621 4.5	X/R ratio	-	_____
4.12	DSP 34-1621 4.5	Cost /kW of no-load losses	R/kW _____	-
4.13	DSP 34-1621 4.5	Cost /kW of load losses	R/kW _____	-
4.14	SANS 780 8.5.3	Audio-sound level – maximum (see table 6 of SANS 780)	dB(A) 56	_____
4.15	DSP 34-1621 4.1.2.2.4	Sealed transformer unit	NO – bolted unit	_____

4.16	NRS 004 6.4.7	Transformer MV bushings (NB internal screen to be earthed)		EN 50180 Type C with M16x2 thread	_____
4.17	DSP 34- 1621 4.3.1.1.4	MV bushing-centre clearances (minimum)	mm	90	_____
4.18	DSP 34- 1621 4.3.1.1.4	Clearances between outer bushingcentres and mini-sub metal enclosure (minimum)	mm	50	_____
4.19	DSP 34- 1621 4.2.1.2	Transformer overload protection facility		YES	_____
4.20		Winding material (CU)	MV LV	- -	_____ _____
4.21		Manufacturer		-	_____
4.22	DSP 34- 1621 4.2.1.2.2	Top-oil thermoelectric temp-sensing element		YES	_____
5		MV compartment			
5.1	DSP 34- 1621 4.3.1.1	Equipment in MV compartment		RMU	_____
5.2		Ring Main Unit manufacturer		-	_____
5.3		Incoming / outgoing MV cable requirements			
	DSP 34- 1621 4.3.1.1.4	a) 3 x single core / 1 x three core		1 x 3 core	_____
	DSP 34- 1621 4.3.1.1.4	b) Cable support (clamping) required (NRS 012 & D-DT-8019) all cables expect 11 kV paper insulated.		YES (Size 75 – 100 mm OD)	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
	DSP 34- 1621 4.3.1.1.4	11 kV paper insulated cables	YES (Size 50 – 75 mm OD)	
		c) Minimum distance from cable clamp to centreline of RMU bushings	mm 800	_____
		d) Type of connection (NRS 012) to RMU	Type 3 (unscreened separable connectors)	_____
		e) Interconnection arrangement between RMU and transformer MV bushings	Single core screened cable	

5.4	DSP 34-1621 4.3.1.3	Make (product) connector used on transf. bushings (SSC)	-	_____
5.5	DSP 34-1621 4.3.1.3	Make (product) of connector used on RMU T-off (USC/SSC)	-	_____
5.6	NRS 004 6.1.3	Mini-sub (MV) earth bar (accessible in front of RMU)	YES	_____
5.7	DSP 34-1621 4.1.2.7.6	Make (product) of mains powered earth fault indicator (DSP 34-1080)	-	_____
6		LV Compartment		
6.1	NRS 004 6.3.3.1	LV ASSEMBLY complies with SANS 1973-1	YES	_____
6.2	DSP 34-1621 4.1.2.5.1	Busbar-rating (see Table 1)	A	Rated at 1.2 transformer secondary rated current
6.3		Busbar-insulation	Air insulated	_____
6.4	DSP 34-1621 4.1.2.3.2	Busbars	∅	3 + one identical neutral busbar + earth busbar (insulated from frame)
6.5	NRS 004 6.3.3.1	Current density of busbars	A/mm ²	SANS 1973-1
6.6	NRS 004 4.1.2.5	Rated short-time withstand current of main circuit – 1 s	kA _{rms}	-
6.7	NRS 004 6.3.3.2.6	Min clearance to earth and between phases	mm	-
6.8	DSP 34-1621 4.1.2.3.4	Provision of a LV neutral surge arrester (as per D-DT-3088) fitted between minisub (MV) earth bar and LV neutral-earth busbar	YES	_____
6.9	DSP 34-1621 4.1.2.3.3	LV neutral-earth busbar to be earthed (via a 70mm ² Cu electrical bridge to the mini-sub earth bar)	YES	_____
		LV neutral busbar to be bridged to the LV earth bar (see Figure 2)	YES	_____
6.10	4.1.2.5.2	Stainless Steel M12 set screws provided	YES	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B

6.11	DSP 34-1621 4.3.1.5	Provision of main LV circuit-breaker		YES	_____
6.12	DSP 34-1621 4.3.1.5	Make (product) of circuit breaker		SANS 556-1	_____
6.13	NRS 004 4.1.2.6	Minimum fault current interrupting capacity	kA	-	_____
6.14	DSP 34-1621 4.3.2	Number of outgoing LV feeder bays to be provided for (drill busbar Ø14mm holes)		9	_____
	NRS 004 6.3.3.2.6	Spacing between LV feeder bays (see Figure 1 of DSP 34-1621)	mm	110	_____
6.15	DSP 34-1621 4.1.2.4.2	LV panel designed for vertical fusebases (FH) or MCCBs (CB)		FH / CB	_____
6.16	NRS 004 6.3.3.2.6	Spacing (vertical): Between phase busbars	Mm	185	_____
	and DSP 34-1621	Between lowest LV busbar and LV neutral	mm	300	_____
	4.1.2.3.2	Between LV neutral and LV earth	mm	200 (min)	_____
		Between LV earth and gland plates	mm	200 (min)	_____
		(see Figure 2 of DSP 34-1621)			
6.17	DSP 34-1621 4.1.2.7.1	LV maximum demand ammeters		Required on all three phases	_____
6.18	NRS 004 6.3.3.5.1	Ammeter type		Thermal integrating over 15 min period	_____
				YES	_____
6.19	DSP 34-1621 4.1.2.7.2	LV indicating voltmeter (with a selector switch) (YES/NO)		YES	_____
6.20	NRS 004 6.3.3.5.3	Ammeter and voltmeter size and display	mm	96 × 96, 90°	_____
6.21	NRS 004 6.3.3.5.3	Ammeter and voltmeter position		LV compartment (high as practicable)	_____
6.22	NRS 004 6.3.1.2	Provision of removable barrier to separate LV end compartment and front LV compartment		YES – non flammable	_____
7		LV outgoing feeder bay gland plates			
7.1	DSP 34-1621 4.1.2.4.5	Number of gland plates to be provided (Figure C.9 of NRS 004)		6	_____
	NRS 004 6.3.3.3.10	Number of gland holes per feeder bay		2	_____

7.2	NRS 004 6.3.3.3.10	Size of holes per feeder bay:	mm	1 x 65 mm	_____
	NRS 004 6.3.3.3.10	Clearances for each hole per feeder bay:	mm	1 x 52 mm	_____
	NRS 004 6.3.3.3.10	Distance between gland plate centre lines. (Figure C.9 of NRS 004)	mm	1 x 98 mm	_____
			mm	1 x 65 mm	_____
			mm	110	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
8		LV auxiliaries		
8.1	DSP 34-1621 4.1.2.7.3	Provision of three-point socket outlet in LV compartment (with instantaneous-trip earth leakage unit [20 A; 5 kA rupturing capacity; 30 mA sensitivity] and 20 A HRC fuse with neutral fuse link) (YES/NO)	YES	_____
8.2	DSP 34-1621 4.1.2.7.4	Provision of a tamperproof compartment for the installation of a photocell (YES/NO)	NO	_____
8.3	DSP 34-1621 4.1.2.7.4	300 mm x 300 mm blank plate for PECU	YES	_____
8.4	DSP 34-1621 4.1.2.7.5	Numbering ferrules for auxiliary wiring	YES	_____
9		Materials and corrosion protection		
9.1	DSP 34-1621 4.1.3.2.4	Mini-sub enclosure, LV ASSEMBLY and transformer tank: Inland: mild steel	Coastal : 3CR12	_____
	DSP 34-1621 4.1.3.2.5	Coastal: 3CR12 or zinc sprayed mild steel or stainless steel		_____
	DSP 34-1621 4.1.3.2.9	Corrosion protection detailed specification number (DSP 34-1658) offered for inland applications	DS-6 / DS-7 / DS-8	_____
	DSP 34-1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered for coastal applications	DS-11 / DS-12 / (DS-14 + DS-16) / (DS-14 + DS-17) / DS18	_____
9.2	DSP 34-1621 4.1.3.2.6	Transformer radiator: Inland: mild steel Coastal: hot-dipped galvanized / zinc metal sprayed (if corrugated) mild steel	Coastal : hot-dipped galvanized	_____

	DSP 34-1621 4.1.3.2.9	Corrosion protection detailed specification number (DSP 34-1658) offered for inland applications	DS-6 / DS-7 / DS-8	_____
	DSP 34-1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered for coastal applications	(DS-13 + DS-16) / (DS-13 + DS-17) / (DS-14 + DS-16) / (DS-14 + DS-17)	_____
9.3	NRS 004 6.3.3.2.2	Tinned copper busbars (YES/NO)	YES	_____
9.4	DSP 34-1621 4.1.3.2.7	Mini-sub base: Material	Steel	_____
	DSP 34-1621 4.1.3.2.10	Corrosion protection detailed specification number (DSP 34-1658) offered	(DS-13 + DS-16) / (DS-13 + DS-17)	_____

1	2	3	4	5
Item	Subclause	Description	Schedule A	Schedule B
9.5	DSP 34-1621 4.1.3.2.8	Gland plates and support structure: Coastal: Material: 3 mm (min) stainless steel	Coastal : material 3mm (minimum)	_____
	NRS 004 6.3.3.3.8	Inland Material: 3 mm (min) mild steel / 3CR12 / stainless steel	-	_____
	DSP 34-1621 4.1.3.2.9	Corrosion protection detailed specification number (DSP 34-1658) offered if mild steel (Hot dip. galv. to OR zinc sprayed) – for inland only	DS-13 / DS14	_____
9.7	DSP 34-1621 4.1.3.2.11	5 mm cork packing (between ends and tank, base and ends, and base and tank) (YES/NO)	YES	_____
9.8	DSP 34-1621 4.1.3.2.12	Final colour	Avocado C12 (SANS 1091)	_____
10		Notices, signs and labels		
10.1	NRS 004 8.2.1	Transformer rating plate	YES	_____
10.2	DSP 34-1621 6.1.2	Treatment and Full First Aid Instructions on inside of MV and LV compartment doors	YES	_____
10.3	DSP 34-1621	Elec. warning signs on all doors and barriers	YES	_____

	6.1.2				
10.4	NRS 004 8.4.11	Transformer phase labels below bushings		YES	_____
10.5	NRS 004 6.3.3.2.5	Colour-coded LV busbars		YES	_____
10.6	DSP 34- 1621 6.1.2	Labelling of MV and LV compartment doors (sign – D-DT-3202 sheet 5 and 4)		YES	_____
10.7	NRS 004 8.4.3	Primary voltage, secondary voltage and kVA rating stencilled on the front, centre.		YES	_____
10.8	NRS 004 8.4.4	Mini-sub mass and stock number stencilled on side or rear.		YES	_____
10.9	NRS 004 8.4.6	ID markings linking roof to body per batch		YES	_____
10.10	NRS 004 4.2.2.3.9	Provision for the safe keeping of documents		YES	_____
11		Documentation			
11.1	DSP 34- 1621 6.2.3	Type test certificates (provide ref. numbers of reports)	Sets	1	_____
11.2	DSP 34- 1621 6.2.3	Routine test certificates	Sets	1	_____
11.3	DSP 34- 1621 6.2.2	Drawings (Mini-sub-GA, LV ASSEMBLY, Operating procedure label for RMU teeoff)	Sets	1	_____
11.4	DSP 34- 1621 6.2.2	Diagrams (Mini-sub schematic – including the LV ASSEMBLY, Rating Plates)	Sets	1	_____
12		Accessories			

**SCHEDULE 6.1. – Deviation Schedule for
11 kV Type B 1000kVA Mini-substation (with RMU)**

If there are any deviations from this specification they shall be listed below with the reasons for deviation. In addition, evidence shall be provided that the proposed deviations will at least be more cost-effective than the specification.

Item	Clause	Proposed deviation

SCHEDULE 7 – PLACE OF MANUFACTURE, TESTING AND INSPECTION

This schedule shall be completed in full and signed and returned with the tender document.

Item No.	Description of Mini-Substations	Manufacturer	Place of Manufacture	Place of Testing	Place of Inspection

NAME OF TENDERER: _____

DATE: _____

SIGNED: _____

NAME OF SIGNATORY: _____

SCHEDULE 8 – QUALITY MANAGEMENT SYSTEM

QUALITY ASSURANCE

A quality management system shall be set up in order to assure the quality of the mini-substations and ring main units during Design, Development, Production, Installation and Servicing. Guidance on the requirements for a quality management system may be found in the following standards: SANS 9000, SANS 9001 and SANS 9002.

NAME OF TENDERER: _____

DATE: _____

SIGNED: _____

NAME OF SIGNATORY: _____

SCHEDULE 9 – DIVERGENCES FROM CONTRACTUAL AND TECHNICAL SPECIFICATIONS

1. CONTRACTUAL DIVERGENCES:

If the tender does not comply contractually with the specification or with the Council's General Conditions of Contract, Standard Conditions of Tender (Goods/Services) and general Conditions of Contract attached, in any respect, such divergence's shall be detailed below in addition to any other reference thereto contained elsewhere in the tender or accompanying letter.

2. TECHNICAL DIVERGENCES:

If the technical specification of the Cables offered does NOT comply with this specification or with the relevant Standard Specification referred to by the specification, in any respect, such divergence/s shall be reflected below in addition to any other reference thereto contained elsewhere in the tender or accompanying letter.

NAME OF TENDERER: _____

DATE: _____

SIGNED: _____

NAME OF SIGNATORY: _____

SCHEDULE 10 – SIMILAR EQUIPMENT SUPPLIED BY THE TENDERER

This schedule 10 shall be completed in full and signed and returned with the tender document.

The tenderer must insert in the spaces provided below; a list of similar products supplied during the past five (5) years.

CUSTOMER NAME	MINI-SUBSTATIONS SUPPLIED	QUANTITY SUPPLIED	YEAR SUPPLIED

NAME OF TENDERER: _____

DATE: _____

SIGNED: _____

NAME OF SIGNATORY: _____

**PRICING SCHEDULE – NON-FIRM PRICES
(PURCHASES)**

NOTE: PRICE ADJUSTMENTS WILL BE ALLOWED AT THE PERIODS AND TIMES SPECIFIED IN THE BIDDING DOCUMENTS.

IN CASES WHERE DIFFERENT DELIVERY POINTS INFLUENCE THE PRICING, A SEPARATE PRICING SCHEDULE MUST BE SUBMITTED FOR EACH DELIVERY POINT

Name of Bidder.....	Bid number: 8/2/RNM0494.
Closing Time: 12h00	Closing Date: 28 May 2024

The quote/tender is valid for a period of 120 days.

Escalation will be made annually based on the average CPI for each completed year of the award.

All products supplied must comply with SANS standards and be SABS approved.

**TENDER NO.8/2/RNM494 PANEL FOR SUPPLY, DELIVERY AND OFF-LOADING OF 11kV
MINI-SUBSTATIONS (UP TO 1000 kVA) TO RAY NKONYENI MUNICIPALITY FOR A THREE-
YEAR PERIOD – RATES ONLY**

ITEM NO.	ITEM DESCRIPTION	QUANTITY	BID PRICE IN RSA CURRENCY (INCLUDING 15% VAT)
1.	11kV Type A 200kVA Mini-Substation (without RMU) Coastal specification including enclosure and Plinth Complete	01	
2.	11kV Type A 315kVA Mini-Substation (without RMU) Coastal Specification including Enclosure and Plinth Complete	01	
3.	11kV Type B 315kVA Mini-Substation with 3-Way SF ₆ RMU (CB+SD+SD), Coastal Specification including Enclosure and Plinth Complete	01	
4.	11kV Type B 315kVA Mini-Substation with 4-Way SF ₆ RMU (CB+CB+SD+SD), Coastal Specification including Enclosure and Plinth Complete	01	
5.	11kV Type A 500kVA Mini-Substation (without RMU) Coastal Specification including Enclosure and Plinth Complete	01	
6.	11kV Type B 500kVA Mini-Substation with 3-Way SF ₆ RMU (CB+SD+SD)	01	

	Coastal Specification including Enclosure and Plinth Complete		
7.	11kV Type B 500kVA Mini-Substation with 4-Way SF ₆ RMU (CB+CB+SD+SD) Coastal Specification including Enclosure and Plinth Complete	01	
8.	11kV Type A 630kVA Mini-Substation (without RMU) Coastal Specification including Enclosure and Plinth Complete	01	
9.	11kV Type B 630kVA Mini-Substation with 3-Way SF ₆ RMU (CB+SD+SD) Coastal Specification including Enclosure and Plinth Complete	01	
10.	11kV Type B 630kVA Mini-Substation with 4-Way SF ₆ RMU (CB+CB+SD+SD) Coastal Specification including Enclosure and Plinth Complete	01	
11.	11kV Type A 800kVA Mini-Substation (without RMU) Coastal Specification including Enclosure and Plinth Complete	01	
12.	11kV Type B 800kVA Mini-Substation with 3-Way SF ₆ RMU (CB+SD+SD) Coastal Specification including Enclosure and Plinth Complete	01	
13.	11kV Type B 800kVA Mini-Substation with 4-Way SF ₆ RMU (CB+SD+SD) Coastal Specification including Enclosure and Plinth Complete	01	
14.	11kV Type A 1000kVA Mini-Substation (without RMU) Coastal Specification including Enclosure and Plinth Complete	01	
15.	11kV Type B 1000kVA Mini-Substation with 3-way SF ₆ RMU (CB+SD+SD) Coastal Specification including Enclosure and Plinth Complete	01	
16.	11kV Type B 1000kVA Mini-Substation with 4-Way SF ₆ RMU (CB+CB+SD+SD) Coastal Specification including Enclosure and Plinth Complete	01	
17.	Training on Installation, Operations and Maintenance of Mini-Substations	10	

- Required by:
.....

- At:
.....

- Brand and model
.....

- Country of origin
.....

- Does the offer comply with the specification(s)? *YES/NO

- If not to specification, indicate deviation(s)
.....

- Period required for delivery
.....

- Delivery: *Firm/Not firm

** "all applicable taxes" includes value- added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies.

*Delete if not applicable

PRICE ADJUSTMENTS

A NON-FIRM PRICES SUBJECT TO ESCALATION

1. IN CASES OF PERIOD CONTRACTS, NON FIRM PRICES WILL BE ADJUSTED (LOADED) WITH THE ASSESSED CONTRACT PRICE ADJUSTMENTS IMPLICIT IN NON FIRM PRICES WHEN CALCULATING THE COMPARATIVE PRICES
2. IN THIS CATEGORY PRICE ESCALATIONS WILL ONLY BE CONSIDERED IN TERMS OF THE FOLLOWING FORMULA:

$$Pa = (1 - V)Pt \left(D1 \frac{R1t}{R1o} + D2 \frac{R2t}{R2o} + D3 \frac{R3t}{R3o} + D4 \frac{R4t}{R4o} \right) + VPt$$

Where:

- Pa = The new escalated price to be calculated.
- (1-V) Pt = 85% of the original bid price. **Note that Pt must always be the original bid price and not an escalated price.**
- D1, D2 ... = Each factor of the bid price eg. labour, transport, clothing, footwear, etc. The total of the various factors D1, D2...etc. must add up to 100%.
- R1t, R2t = Index figure obtained from new index (depends on the number of factors used).
- R1o, R2o = Index figure at time of bidding.
- VPt = 15% of the original bid price. This portion of the bid price remains firm i.e. it is not subject to any price escalations.

3. The following index/indices must be used to calculate your bid price:

Index..... Dated..... Index..... Dated..... Index..... Dated.....
 Index..... Dated..... Index..... Dated..... Index..... Dated.....

4. FURNISH A BREAKDOWN OF YOUR PRICE IN TERMS OF ABOVE-MENTIONED FORMULA. THE TOTAL OF THE VARIOUS FACTORS MUST ADD UP TO 100%.

FACTOR (D1, D2 etc. eg. Labour, transport etc.)	PERCENTAGE OF BID PRICE

B PRICES SUBJECT TO RATE OF EXCHANGE VARIATIONS

1. Please furnish full particulars of your financial institution, state the currencies used in the conversion of the prices of the items to South African currency, which portion of the price is subject to rate of exchange variations and the amounts remitted abroad.

PARTICULARS OF FINANCIAL INSTITUTION	ITEM NO	PRICE	CURR ENCY	RATE	PORTI ON OF PRICE SUBJ ECT TO ROE	AMOU NT IN FOREI GN CURR ENCY REMIT TED ABRO AD
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		

2. Adjustments for rate of exchange variations during the contract period will be calculated by using the average monthly exchange rates as issued by your commercial bank for the periods indicated hereunder: (Proof from bank required)

AVERAGE MONTHLY EXCHANGE RATES FOR THE PERIOD:	DATE DOCUMENTATION MUST BE SUBMITTED TO THIS OFFICE	DATE FROM WHICH NEW CALCULATED PRICES WILL BECOME EFFECTIVE	DATE UNTIL WHICH NEW CALCULATED PRICE WILL BE EFFECTIVE

DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state¹.
2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority.

3 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

3.1 Full Name of bidder or his or her representative:.....

3.2 Identity Number:

3.3 Position occupied in the Company (director, trustee, shareholder²):.....

3.4 Company Registration Number:

3.5 Tax Reference Number:.....

3.6 VAT Registration Number:

3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.

3.8 Are you presently in the service of the state? **YES / NO**

3.8.1 If yes, furnish particulars.

¹MSCM Regulations: "in the service of the state" means to be –

- (a) a member of –
 - (i) any municipal council;
 - (ii) any provincial legislature; or
 - (iii) the national Assembly or the national Council of provinces;
- (b) a member of the board of directors of any municipal entity;
- (c) an official of any municipality or municipal entity;
- (d) an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);
- (e) a member of the accounting authority of any national or provincial public entity; or
- (f) an employee of Parliament or a provincial legislature.

² Shareholder" means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.

3.9 Have you been in the service of the state for the past twelve months? **YES / NO**

3.9.1 If yes, furnish particulars.....

.....
3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.10.1 If yes, furnish particulars.

.....
.....

3.11 Are you, aware of any relationship (family, friend, other) between any other bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.11.1 If yes, furnish particulars

.....
.....

3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.12.1 If yes, furnish particulars.

.....
.....

3.13 Are any spouse, child or parent of the company's directors trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.13.1 If yes, furnish particulars.

.....
.....

3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract. **YES / NO**

3.14.1 If yes, furnish particulars:

.....
.....

4. Full details of directors / trustees / members / shareholders.

Full Name	Identity Number	State Employee Number

CERTIFICATION

I, _____ THE UNDERSIGNED CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT.

ACCEPT THAT THE COUNCIL MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

.....
Signature

.....
Date

.....
Capacity

.....
Name of Bidder

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for specific goals.

NB: BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF THE TENDER AND PREFERENTIAL PROCUREMENT REGULATIONS, 2022

1 GENERAL CONDITIONS

12.2 The following preference point systems are applicable to invitations to tender:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

12.3 To be completed by the organ of state

The applicable preference point system for this tender is the 80/20 preference point system.

12.4 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

- (c) Price; and
- (d) Specific Goals.

12.5 To be completed by the organ of state:

The maximum points for this tender are allocated as follows:

	POINTS
PRICE	
SPECIFIC GOALS	
Total points for Price and SPECIFIC GOALS	100

12.6 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.

12.7 The organ of state reserves the right to require of a tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

13 DEFINITIONS

- (a) **“tender”** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;
- (b) **“price”** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;
- (c) **“rand value”** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;
- (d) **“tender for income-generating contracts”** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and
- (e) **“the Act”** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

14 FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

3.1.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

A maximum of 80 or 90 points is allocated for price on the following basis:

$$Ps = 80 \left(1 - \frac{Pt - P_{min}}{P_{min}} \right) \quad \text{or} \quad Ps = 90 \left(1 - \frac{Pt - P_{min}}{P_{min}} \right)$$

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmin = Price of lowest acceptable tender

3.2. FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME GENERATING PROCUREMENT

3.2.1. POINTS AWARDED FOR PRICE

A maximum of 80 or 90 points is allocated for price on the following basis:

$$Ps = 80 \left(1 + \frac{Pt - P_{max}}{P_{max}} \right) \quad \text{or} \quad Ps = 90 \left(1 + \frac{Pt - P_{max}}{P_{max}} \right)$$

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:

4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

(a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or

(b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,

then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

Table 1: Specific goals for the tender and points claimed are indicated per the table below.

(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.

Note to tenderers: The tenderer must indicate how they claim points for each preference point system.)

The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (80/20 system) (To be completed by the tenderer)
Companies within Ray Nkonyeni Municipality	20	
Companies within Ugu District Municipality	15	
Companies within KwaZulu Natal	10	
Other	5	

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3. Name of company/firm.....

4.4. Company registration number:

4.5. TYPE OF COMPANY/ FIRM

- Partnership/Joint Venture / Consortium
- One-person business/sole propriety
- Close corporation
- Public Company
- Personal Liability Company
- (Pty) Limited
- Non-Profit Company
- State Owned Company

[TICK APPLICABLE BOX]

4.6. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;
- iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –
 - (a) disqualify the person from the tendering process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
 - (e) forward the matter for criminal prosecution, if deemed necessary.

..... SIGNATURE(S) OF TENDERER(S)	
SURNAME AND NAME:
DATE:
ADDRESS:

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

- 1 This Municipal Bidding Document must form part of all bids invited.
- 2 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
- 3 The bid of any bidder may be rejected if that bidder, or any of its directors have:
 - a. abused the municipality's / municipal entity's supply chain management system or committed any improper conduct in relation to such system;
 - b. been convicted for fraud or corruption during the past five years;
 - c. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
 - d. been listed in the Register for Bid Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).
- 4 **In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.**

Item	Question	Yes	No
4.1	<p>Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector?</p> <p>(Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer/Authority of the institution that imposed the restriction after the <i>audi alteram partem</i> rule was applied).</p> <p>The Database of Restricted Suppliers now resides on the National Treasury's website(www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.</p>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4.1.1	If so, furnish particulars:		
4.2	<p>Is the bidder or any of its directors listed on the Register for Bid Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)?</p> <p>The Register for Bid Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.</p>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4.2.1	If so, furnish particulars:		

4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4.3.1	If so, furnish particulars:		
Item	Question	Yes	No
4.4	Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4.7.1	If so, furnish particulars:		

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME)

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM TRUE AND CORRECT.

I ACCEPT THAT, IN ADDITION TO CANCELLATION OF A CONTRACT, ACTION MAY BE TAKEN AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

.....
Signature

.....
Date

.....
Position

.....
Name of Bidder

CERTIFICATE OF INDEPENDENT BID DETERMINATION

1. This Municipal Bidding Document (MBD) must form part of all bids¹ invited.
2. Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).² Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.
3. Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:
 - (a) take all reasonable steps to prevent such abuse;
 - (b) reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
 - (c) cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.
4. This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.
5. In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid:

¹Includes price quotations, advertised competitive bids, limited bids and proposals.

² Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

_____ (Bid Number and Description)

in response to the invitation for the bid made by:

_____ (Name of Municipality / Municipal Entity)

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of: _____ that:
(Name of Bidder)

1. I have read and I understand the contents of this Certificate;
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;
5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
 - (a) has been requested to submit a bid in response to this bid invitation;
 - (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
 - (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder.
6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium³ will not be construed as collusive bidding.
7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - (a) prices;

- (b) geographical area where product or service will be rendered (market allocation);
 - (c) methods, factors or formulas used to calculate prices;
 - (d) the intention or decision to submit or not to submit, a bid;
 - (e) the submission of a bid which does not meet the specifications and conditions of the bid; or
 - (f) bidding with the intention not to win the bid.
8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.
 9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
 10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No. 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No. 12 of 2004 or any other applicable legislation.

SIGNATURE

DATE

POSITION

NAME OF BIDDER

³ Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.