LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
AGRICULTURE AND RURAL DEVELOPMENT

TENDER NO ACDP 21/05
TENDER DOCUMENT

FOR

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

NAME OF TENDERER	
TOTAL TENDERED AMOUNT	
TOTAL TENDERED AMOUNT IN WORDS	
VAT NUMBER (if registered for VAT)	
SUPPLIER CSD REGISTRATION NUMBER	
TAX COMPLIANCE STATUS PIN (to verify bidder's tax compliance status)	
COMPLETION PERIOD	
TEL NUMBER	
FAX NUMBER	

PREPARED FOR:

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
AGRICULTURE AND RURAL DEVELOPMENT

HEAD OF DEPARTMENT
LIMPOPO DEPT OF AGRICULTURE
PRIVATE BAG X 9487
POLOKWANE
0700

PREPARED BY

ENGINEERING SERVICES SEKHUKHUEN DISTRICT
LIMPOPO DEPT OF AGRICULTURE
PRIVATE BAG X28
CHUENESPOORT
0745

CLOSING DATE: 7 July 2021
TENDER No: ACDP 21/05

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

TENDERER'S DETAILS

NAME OF TENDERER ……

……

……

PHYSICAL ADDRESS ……

……

……

POSTAL ADDRESS ……

……

……

CONTACT PERSON (NAME)……

(SURNAME)……

(PHONE No)……

(CELL No)……

(FAX No)……

(E-MAIL)……

LIMPOPO DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE.

Contents

Drawings

SCHEDULE OF TENDER DRAWINGS

The following drawings, which are bound in, form part of this Contract in terms of Clause 1(i) (j) of the General Conditions of Contract:

DRAWING NO:	DESCRIPTION:
J1410_401_A1	Existing Processing plant layout

The Tenderer shall satisfy himself that the sets of drawings are complete in accordance with the above schedule, and if any are found to be missing or duplicated, or the writing or figures indistinct, he shall apply to the Engineer immediately and have the discrepancy rectified. No liability whatsoever will be admitted by the Employer in respect of errors in Tenders attributed to any such discrepancy.

PART T1: TENDERING PROCEDURES

TABLE OF CONTENTS

T1.1: TENDER NOTICE AND INVITATION TO TENDER

LIMPOPO PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT

TENDER NO ACDP…21/05…..

PROJECT NAME**: THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE**

T1.1 Tender Notice and Invitation to Tender

Tenders are hereby invited to bid for the Design, Supply, Delivery, Installation and Commissioning of a grain oil refinery plant at the existing crude oil plant to process 200l/h raw sunflower oil and 60 l/h raw soya oil into edible oil at Tompi Seleka Agricultural College in Ephraim Mogale Municipality in Sekhukhune District of the Limpopo Province. **Tenderers must have a CIDB contractor grading of 6ME or Higher and must be Qualified Small Enterprises (QSE).**

Tender documents will be obtainable from the departmental website: www.ldard.gov.za , from the **4th of June 2021**. Bid documents must be printed and bound in the order/sequence/numbering provided. No omissions of pages/documents will be allowed.

Duly completed tenders enclosed in a sealed envelope marked "TENDER: **THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE TENDER NO. ACDP..21/05..... CLOSING DATE: …7th July 2021…"** with the name of the Tenderer, shall be deposited in the clearly marked tender box provided at Limpopo Department of Agriculture, 67 Biccard Street, Temo Towers Ground Floor, Polokwane before 11h00 on the closing date. The tenders will be opened in public.

No site briefing will be conducted. Those not familiar with the project and location may request access to the site during working hours.

The GPS coordinates of the site are as follows: S-24.7928 and E29.4527.

A preferential point systems shall apply whereby a contract will be allocated to a tenderer in accordance with the Preferential Procurement Policy Framework Act, Act No 5 of 2000 and as defined in the Conditions of Tender in the tender document, read in conjunction with the Preferential Procurement Policy of Limpopo Department of Agriculture & Rural Development where 80 points will be allocated in respect of price and 20 points in respect of targeted goals. Tenderers must have the necessary skills, experience and capacity to perform the required work.

Bidding Procedure:	**Technical Information:**
Ms. S Matodzi **Limpopo Department of Agriculture & Rural Development** Private Bag X9487 Polokwane 0700 **Tel: 015 294 3351** **Fax: 015 294 4540**	**Mr DE Sibuyi** **Limpopo Department of Agriculture & Rural Development** Private Bag X01 Chuenespoort 0745 **Tel: 015 632 7000** **Email: sibuyide@gmail.com** **Cell: 079 8954 313**

T1.2. TENDER DATA

The Conditions of Tender in the Standard Conditions of Tender as contained in Annex F of CIDB Standard Uniformity in Construction Procurement. (See www.cidb.org.za) which are reproduced without amendment or alteration for the convenience of Tenderers in this Tender in the section T1.3 of the Tender Data.

The Standard Conditions of Tender make several references to the Tender Data for details that apply specifically to this Tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender. Each item of Tender Data given below is cross-referenced to the relevant clause in the standard Conditions of Tender.

F.1.1 The Employer for this Contract is: **Limpopo Department of Agriculture and Rural Development**

F.1.2 Tender Documents

The Tender Document consists of the following:

TENDER

T1: Tendering Procedures
- T1.1: Tender Notice and Invitation to Tender
- T1.2: Tender Data

T2: Returnable Documents
- T2.1: List of Returnable Documents
- T2.2: Returnable schedules

CONTRACT

Part 1: Agreements and Contract Data
- C1.1: Form of Offer and Acceptance
- C1.2: Contract Data
- C1.3: Form of Guarantee
- C1.4: Agreement with Adjudicator
- C1.5: Agreement in terms of Section 37(2) of the Occupational Health and Safety Act (No 85, 1993)

Part 2: Pricing Data
- C2.1: Pricing Instructions
- C2.2: Bill of Quantities

Part 3: Scope of Work
- C3.1: Standard Specifications
- C3.2: Project Specifications
- C3.3: Particular Specifications

Part 4: Site Information
- C4.1: Locality Plan
- C4.2: Construction Notice Board

DRAWINGS

Drawings are bound in this document.

The Tender Document and the drawings shall be obtained from the Employer or his authorized representative at the physical addresses stated in the Tender Notice, upon payment of the deposit stated in the Tender Notice.

F.1.4 The Employer's agent is:

Name	:	SEKHUKHUNE DISTRICT ENGINEERING SERVICES
Address	:	PUBLIC WORKS BUILDING ZONE A
		PRIVATE BAG X01
		CHUENESPOORT
		0745
Telephone	:	015 632 7000
Cell	:	079 8954 313
E-Mail Address	:	

F.1.5 The Employer's right to accept or reject any Tender Offer

The Employer may accept or reject any variation, deviation, Tender Offer, or alternative Offer, and may cancel the Tender process and reject all Tender Offers at any time before the formation of a Contract. The Employer shall not accept or incur any liability to a Tenderer for such cancellation and rejection, but will give written reasons for such action upon written request to do so. The Employer will reserve the right to appoint more than one (1) bidder.

F.2.1 Eligibility

A Tenderer will not be eligible to submit a Tender if:

(a) The Contractor submitting the Tender is under restrictions or has principals who are under restriction to participate in the Employer's procurement due to corrupt of fraudulent practices;
(b) The Tenderer does not have the legal capacity to enter into the Contract;
(c) The Contractor submitting the Tender is insolvent, in receivership, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of the foregoing;
(d) The Tenderer does not comply with the legal requirements stated in the Employer's procurement policy;
(e) The Tenderer cannot demonstrate that he possesses the necessary professional and technical qualifications and competent, financial resources, equipment and other physical facilities, managerial capability, personnel, experience and reputation to perform the Contract;
(f) The Tenderer cannot provide proof that he is in good standing with respect to duties, taxes, levies and contributions required in terms of legislation applicable to the work in the Contract.
(g) Only those Tenderers who have in their employ management and supervisory staff satisfying the requirements of the Scope of Work for Labour Intensive Competencies for supervisory and management staff are eligible to submit Tenders.
(h) Only those Tenderers who are registered with the CIDB as defined in the Regulations 09 June 2004 and 22 July 2005), in terms of the CIDB Act No 38 of 2000, or are capable of being so prior to the evaluation of submissions, in a Contractor grading designation equal to or higher than a Contractor grading designation determined in accordance with the Sum Tendered for a **6ME** class of construction work, are eligible to submit Tenders.
(i) The Contractor submitting the Tender is not registered on the Employer's Supplier Database

Joint Ventures are eligible to submit Tenders provided that:

1. every member of the Joint Venture is registered with the CIDB;
2. the lead partner has a Contractor grading designation in the **6ME or Higher** class of construction work; and
3. the combined Contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a Contractor grading designation determined in accordance with the Sum Tendered for a **6ME or Higher** class of construction work.
4. Each party to a Joint Venture/ Consortium must submit an original valid Tax Clearance Certificate together with the bid before the closing date and time of bid.

5. The joint venture or consortium must submit a formal agreement that outlines the roles and responsibilities of each member of the joint venture or consortium, nomination of an authorised person to represent the joint venture or consortium in all matters relating to this bid and the details of the bank account for payments to be effected.
6. In terms of the Preferential Procurement Regulations, 2017 pertaining to the Preferential Procurement Policy Framework Act 5 of 2000, a trust, consortium or joint venture must submit a consolidated B-BBEE Status Level Verification Certificate for every separate bid.

F.2.7 Site visit and clarification meeting

No site briefing will be conducted. Those not familiar with the project and location may request access to the site during working hours.

The GPS coordinates of the site are as follows: S-24.7928 and E29.4527.

F.2.10 Pricing the Tender Offer

(a) Value Added Tax

- The Valued Added Tax (VAT) rate shall be 15% or as otherwise provided for by Legislation.
- The successful Tenderer shall be required to produce a VAT invoice that shall only be prepared once measurements and valuations for work done in Terms of Contract Offer have been agreed with the Employers agent and a Certificate of Payment issued.

F.2.11 Alterations to document

A Tender Offer shall not be considered if alterations have been made to the Forms of Tender data or Contract data (unless such alterations have been duly authenticated by the Tenderer) or if any particulars required therein have not been completed in all respects.

F.2.12 Alternative Tender Offers

No alternative Offers will be considered.

F2.13 Submitting a Tender Offer

F.2.13.3 Tender Offers shall be submitted as an original only.
Under no circumstances, whatsoever may the Tender forms be retyped or redrafted.
Photocopies of the original Tender documentation may be used, but an original signature must appear on such photocopies.

F.2.13.5 The Employer's address for delivery of Tender Offers and identification details to be shown on such Tender Offer package are:

Location of Tender box:	Limpopo Department of Agriculture and Rural Development
Physical address:	69 Biccard Street, Temo Towers Ground Floor Polokwane, 0700

Identification details: **Tender for THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE**

Tender No: **ACDP 21/05…**

Closing Date**: …7th July 2021 at 11:00**

F.2.15 Closing Time

The closing time for submission of Tender Offers is: 11h00 on …7th July ……. 2021 as stated in the Tender Notice and Invitation to Tender
Telephonic, telegraphic, telex, facsimile, electronic or e-mailed Tenders will not be accepted.

F.2.16 Tender Offer validity

The Tender Offer validity period is 120 days from the closing time for submission of Tenders.

F.2.18 Provide other material

The Tenderer shall, when requested by the Employer to do so, submit the names of all management and supervisory staff that will be employed to supervise the labour-intensive portion of the works together with satisfactory evidence that such staff members satisfy the eligibility requirements

F.2.19 Access

Access shall be provided for inspections and testing by personnel acting on behalf of the Employer.

F.2.20 BID EVALUATION CRITERIA

The LDARD has set minimum standards (Gates) that a bidder needs to meet in order to be evaluated and selected as a successful bidder. The minimum Standards consist of the following:

Pre-qualification Criteria (Gate 0)	Technical Evaluation Criteria (Gate1)	Price and B-BBEE Evaluation (Gate 2)
Bidders must submit all documents as outlined in paragraph 8.1 (Table) below. Bidders who are QSEs and have 6ME or higher CIDB grading are targeted. Must submit an original sworn affidavit/ or certified BBBEE certificate with the bid document. Only bidders that comply with ALL the pre-qualification criteria will proceed to Gate 1.	Bidder(s) are required to achieve a minimum of 70 points out of 100 points to proceed to Gate 2 (Price and BEE)	Bidder(s) will be evaluated on price and B-BBEE claimed points

F2.20.1 Gate 0: Pre-qualification Criteria

F2.20.1.1 Without limiting the generality of LDARD's other critical requirements for this Bid, bidder(s) must submit the documents listed in Table below. All documents must be completed and signed by the duly authorized representative of the prospective bidder(s). During this phase Bidders` responses will be evaluated based on compliance with the listed administration and mandatory bid requirements. The bidder(s) proposal may be disqualified for non-submission of any of the documents.

Documents that must be submitted	Non-submission will result in disqualification	Requirement
Invitation to Bid – SBD 1	YES	Must be fully completed, signed by the authorized person and submitted with the bid by the closing date and time
Bill of Quantity (BOQ) / Specifications	YES	All items of the BOQs must be fully completed and submitted with the bid by the closing date and time.
Compulsory Enterprise Questionnaire	YES	Must be fully completed, signed by the authorized person/s in case of joint ventures and submitted with the bid by the closing date and time
Declaration of Interest – SBD 4	YES	Complete and sign the supplied pro forma document

Preference Point Claim Form – SBD 6.1	YES	Non-claiming of points on this form will lead to zero (0) even if a B-BBEE certificate or Original Sworn Affidavit is attached
B-BBEE Certificate/ Sworn Affidavit	**YES**	Bidders should submit valid B-BBEE status level verification certificates **Accredited by SANAS or original sworn affidavit or certificate issued by Companies and intellectual Property Commission (DTI)** thereof together with their tenders to substantiate their B-BBEE rating claims. Failure to submit will lead to zero (0) score on BBBEE points
Declaration of Bidder's Past Supply Chain Management Practices – SBD 8	YES	Complete and sign the supplied pro forma document
Certificate of Independent Bid Determination – SBD 9	YES	Complete and sign the supplied pro forma document
Form of intent by a bank/financier or insurance company to provide a performance guarantee and insurance of the works	YES	Must be submitted with the tender y the closing date and time of the bid
Joint Ventures (J/V) Agreement/ Power of Attorney incase of Joint Ventures	YES	Must submit Joint Venture Agreement or Power of Attorney in case of Joint Ventures
Certified copy of valid good standing with Workman Compensation Fund	NO	The successful bidder will be required to comply with the requirements of Occupational Health and Safety Act, 85 of 1993.
CIDB grading certificate of 6 ME or higher	YES	Bidder must submit CIDB grading certificate of 6ME or higher. In case of Joint Ventures, a CIDB Joint Venture Grading Designation Calculator will be used to determine the required grading. Non-submission will lead to disqualification.

F2.20.1.2 During this phase bid responses are registered and to ascertain the number of bid responses received before the closing date and time. Only price bids from bidders registered on the central supplier database (CSD) will be considered.

F2.20.1.3 The following key information of bidders will be verified on the CSD in line with Public Finance Management Act and regulatory requirements to qualify for further evaluation processes:

a) Business registration including details of directorship and membership
b) In the service of the state status
c) Tax compliance status
d) Identity number (s)
e) Tender defaulting and restriction status, and
f) Any additional and supplementary verification information communicated by National Treasury

Bidders must ensure that they meet the following requirements before the bid can be awarded:

Criteria	Requirement
Tax compliance status	Bidder must be tax compliant before the bid is awarded, i.e. *Where the recommended bidder is not tax compliant, the bidder will be notified of their non-compliant status and the bidder must be requested to submit written proof from SARS of their tax compliance status or proof that they have made an arrangement to meet their outstanding tax obligations within 7 working days. The bidder should thereafter provide the accounting officer or accounting authority with proof of their tax compliance status which should be verified via the Central Supplier Database or eFiling"*
Business registration	The Company must be in business
Company registration with central supplier database (CSD)	Company must be registered on central supplier database (CSD)
In the service of the state status	Shareholders or directors must not be employed by state departments, municipalities, municipal entities, public entities
Tender defaulting and restriction status	Bidders Must not be listed as defaulters and/or restricted

Criteria	Requirement
Workmen's Compensation Registration Certificate	Must submit Valid copy of COIDA certificate or Confirmation Letter from the Department of Labour or proof of payment thereof

F2.20.2 Gate 1: Technical Evaluation Criteria = 100 Points

All bidders are required to respond to the technical evaluation criteria.

Only Bidders that have met the Pre-Qualification Criteria in (Gate 0) will be evaluated in Gate 1 for functionality.

Functionality will be evaluated:

i. In accordance with the Evaluation criteria for Technical Evaluation listed in Annexure A;

ii. Out of 100 points and Bidders are required to achieve minimum threshold of 60 points in order to proceed to Gate 2 for Price and BBBEE evaluations.

As part of due diligence, LDARD may conduct a sites visit at a client of the Bidder (reference) for validation of the services rendered. The choice of the sites will be at the LDARD`s sole discretion.

8.2.1 Functionality Evaluation Criteria = 100 points

The minimum score required for functionality is 70 points in order to qualify for further evaluation. A bidder who scores less than 70 points

on functionality will be disqualified.

CRITERIA	EVIDENCE	VALUE	WEIGHTING
1.Physical Facilities	No Land line/cell phone or no information provided	0	10
	Land line, cell phone and fax line only	1	
	Land line, cell phone , fax line and email	2	
	Physical address without proof, Land line, cell phone, fax line and e-mail address.	3	
	Physical address with proof of lease agreement , land line, cell phone, fax line, e-mail address	4	
	Physical address with proof of ownership, land line, cell phone, fax line, e-mail address.	5	
2.Plant and Equipment available owned or leased by the Bidder	<u>Own or Hire any of the following plant and equipment variables are worth a point:</u> • Hand tools and welding machine, • Truck and trailer, • TLB/Excavator/loader and grader, • Compactor, and • Welding machine		15
	No information / none of the variables	0	
	1 variable	1	
	2 variables	2	
	3 variables	3	
	4 variables	4	
	5 variables	5	
4.Program of Works (Execution Plan with cash flow)	No information = Form not completed/ not attached	0	15
	Gantt chart without applicable activities	1	
	Gantt chart without applicable activities, time frame outside the contract period	2	
	Clear applicable activities, Gantt chart and within contract period	3	
	Clear applicable activities, Gantt chart and within contract period, with non - realistic cash flow	4	
	Clear applicable activities, Gantt charts and completion is within contract duration and realistic cash flow	5	
5.Key Personnel available for this contract	No information	0	20
	Site agent	1	
	Site agent and Foreman	2	

	Site agent, Foreman, safety officer & mechanical technicians	3	
	Site agent, Foreman, safety officer, mechanical technicians, welders & surveyor	4	
	Site agent, Foreman, safety officer, mechanical technicians, welders, surveyors & operators	5	
6.Experience in similar works (Company profile and Proof indicating that the organisation is experienced in Food processing plants development/service. (Proof such as orders, completion certificates, appointment letters, etc must be included, with contactable references indicating type of work done and value) must be submitted with the tender	No information	0	30
	1 relevant project completed	1	
	2 relevant projects completed	2	
	3 relevant projects completed	3	
	4 relevant projects completed	4	
	5 relevant projects completed	5	
7. Experience in contracts of similar value, (Proof such as orders, completion certificates and appointment letters must be included)	Up to 10% of this Bid Offer	0	10
	11% to 30% of this Bid Offer	1	
	31% to 60% of this Bid Offer	2	
	61% to 100% of this Bid Offer	3	
	101% to 150% of this Bid Offer	4	
	Above 150% of this Bid Offer	5	
Total			100

F2.20.3 Gate 2: Price and B-BBEE Evaluation [Evaluation in terms of the 80/20 preference point systems]

Step 1: Calculation of points for price

(a) The PPPFA prescribes that the lowest acceptable bid will score 80 or 90 points for price. Bidders that quoted higher prices will score lower points for price on a pro-rata basis.

(b) The formulae to be utilized in calculating points scored for price are as follows:

80/20 Preference point system [(for acquisition of services, works or goods up to a Rand value of R50 million) (all applicable taxes included)]

$$Ps = 80\left(1 - \frac{Pt - P\,min}{P\,min}\right)$$

Where
Ps = Points scored for comparative price of bid or offer under consideration
Pt = Comparative price of bid or offer under consideration
Pmin = Comparative price of lowest acceptable bid or offer.

Step 2: Calculation of points for B-BBEE status level of contributor
Points will be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (80/20 system)
1	20
2	18
3	14
4	12
5	8
6	6
7	4
8	2
Non-compliant contributor	0

Step 3: Calculation of total points scored for price and B-BBEE status level of contributor

The points scored for price will be added to the points scored for B-BBEE status level of contributor to obtain the bidder's total points scored out of 100. The Bidder may be physically inspected for capability and resources to perform the contract. Bidders must be available at the time of inspection; failure for non-availability will lead to disqualification.

Inspection of bidders

Bidder(s) may be inspected on the following:

a) Physical structure or business where business activities take place with proper signage

b) Main business activities

c) Track record will be verified

d) Relatedness of the main business activities to the bid under review

e) Machinery/equipment (manufacturing or construction facilities) used to produce the required product

f) Registration documents and accredited certificates

g) Audited Financial annual statements to verify financial position

F.3.4 Opening of Tender Submissions

Tender will be opened immediately after the closing time for Tenders. The time and location for opening of the Tender Offers are:
Time: 11h00 Date: ...7 July 2021

Venue: Limpopo Department of Agriculture and Rural Development, Tender Room

F.3.5 The two envelope system will not apply to this Tender.

F.3.13 Acceptance of Tender Offer

F.3.13.1 Tender Offers will only be accepted on condition that:

(a) the Tender Offer is signed by a person authorised to sign on behalf of the Tenderer;

(b) the Tenderer's declaration of compliance with the Occupational Health and Safety Act No. 85 of 1993 and the Construction Regulations 2003, is included with his Tender submission;

(c) Tenderer who submitted a Tender as a Joint Venture has included an acceptable Joint Venture Agreement or Power of Attorney with his Tender;

(d) the Tenderer or a competent authorised representative of the Contractor who submitted the Tender has attended the compulsory clarification meeting or site inspection;

(e) the Contractor who submits the Tender has been registered with the Construction Industry Development Board in accordance with the Construction Industry Development Board Act No. 38 of 2000 and the CIDB Regulations 2003 promulgated in terms of the Act, or if the Contractor can submit proof or evidence that he will be able to register within 10 days of the closing date for submission of Tenders;

(f) the Tenderer or any of its principals is not listed on the register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the Public Sector;

(g) the Tenderer has not abused the Employer's Supply Chain Management System or has failed to perform on any previous Contract and has been given a written notice to this effect;

(h) the Tenderer or any of its Principals, Directors or Managers is not employed in the service of the State or any Municipality. In the event that such Principals are involved, official approval from the Executing Authority regarding carrying out remunerative work outside of the Public Service must be included in the Tender Submission.

(i) the Employer is satisfied that the Tenderer or any of his Principals have not influenced the Tender Offer and acceptance by the following criteria:

a. having Offered, promised or given a bribe or other gift or remuneration to any person in connection with the obtaining or execution of this Contract;

b. having acted in a fraudulent or corrupt manner in obtaining or executing this Contract;

c. having approached an Officer or employee of the Employer or the Employer's Agent with the objective of influencing the award of a Contract in the Tenderer's favour;

d. having entered into any agreement or arrangement, whether legally binding or not, with any other Person, Firm or Company to refrain from Tendering for this Contract or as to the amount of the Tender to be submitted by either party;

e. having disclosed to any other Person, Firm or Company other than the Employer, the exact or approximate amount of his proposed Tender;

f. the Employer may, in addition to using any other legal remedies, repudiate the Tender Offer and acceptance and declare the Contract invalid should it have been concluded already.

Negotiations

Bidders should note that the department might subject the successful bidder to negotiations for fair market related prices.

F.3.18 Copies of Contract

The number of paper copies of the signed Contract to be provided by the Employer is ONE.

T1.3: Annex F: Standard Conditions of Tender

(As contained in Annexure F of South African National Standard: Construction procurement processes, Methods and procedures: SANS 294: 2004 Edition)

F.1 General

F.1.1 Actions

The employer and each tenderer submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in F.2 and F.3, timeously and with integrity, and behave equitably, honestly and transparently.

F.1.2 Tender Documents

The documents issued by the employer for the purpose of a tender offer are listed in the tender data.

F.1.3 Interpretation

F.1.3.1 The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these conditions of tender.

F.1.3.2 These conditions of tender, the tender data and tender schedules which are only required for tender evaluation purposes, shall not form part of any contract arising from the invitation to tender.

F.1.3.3 For the purposes of these conditions for the calling for expressions of interest, the following definitions apply:

a) **Comparative offer** means the tenderer's financial offer after the factors of non-firm prices, all unconditional discounts and any other tendered parameters that will affect the value of the financial offer have been taken into consideration

b) **corrupt practice** means the offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process; and

c) **Fraudulent practice** means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels

d) **Quality (functionality)** means the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs

F.1.4 Communication and employer's agent

Each communication between the employer and a tenderer shall be to or from the employer's agent only, and in a form that can be read, copied and recorded. Writing shall be in the English language. The employer shall not take any responsibility for non-receipt of communications from or by a tenderer. The name and contact details of the employer's agent are stated in the tender data.

F.1.5 The employer's right to accept or reject any tender offer

F.1.5.1 The employer may accept or reject any variation, deviation, tender offer, or alternative tender offer, and may cancel the tender process and reject all tender offers at any time before the formation of a contract. The employer shall not accept or incur any liability to a tenderer for such cancellation and rejection, but will give written reasons for such action.

F.1.5.2 After the cancellation of a tender process or the rejection of all tender offers the employer may abandon the proposed procurement and re-issue a similar tender notice and invitation to tender not less than three months after the closing dated for tender offers or have it performed in another manner at any time.

F.2 Bidder's obligations

The Bidder shall comply with the following obligations:

F.2.1 Eligibility

Submit a Bid offer only if the Bidder complies with the criteria stated in the Bid data and the tenderer, or any of his principals, is not under any restriction to do business with employer.

F.2.2 Cost of tendering

Accept that the employer will not compensate the tenderer for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer satisfy requirements.

F.2.3 Check documents

Check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission.

F.2.4 Confidentiality and copyright of documents

Treat as confidential all matters arising in connection with the tender. Use and copy the documents issued by the employer only for the purpose of preparing and submitting a tender offer in response to the invitation.

F.2.5 Reference documents

Obtain, as necessary for submitting a tender offer, copies of the latest versions of standards, specifications, conditions of contract and other publications, which are not attached but which are incorporated into the tender documents by reference.

F.2.6 Acknowledge addenda

Acknowledge receipt of addenda to the tender documents, which the employer may issue, and if necessary apply for an extension to the closing time stated in the tender data, in order to take the addenda into account.

F.2.7 Clarification meeting

Attend, where required, a clarification meeting at which tenderers may familiarize themselves with aspects of the proposed work, services or supply and raise questions. Details of the meeting(s) are stated in the tender data.

F.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the employer at least five working days before the closing time stated in the tender data.

F.2.9 Insurance

Be aware that the extent of insurance to be provided by the employer (if any) may not be for the full cover required in terms of the conditions of contract identified in the contract data. The tenderer is advised to seek qualified advice regarding insurance.

F.2.10 Pricing the tender offer

F.2.10.1 Include in the rates, prices, and the tendered total of the prices (if any) all duties, taxes (except Value Added Tax (VAT)), and other levies payable by the successful tenderer, such duties, taxes and levies being those applicable 14 days before the closing time stated in the tender data.

F2.10.2 Show VAT payable by the employer separately as an addition to the tendered total of the prices.

F.2.10.3 Provide rates and prices that are fixed for the duration of the contract and not subject to adjustment except as provided for in the conditions of contract identified in the contract data.

F.2.10.4 State the rates and prices in Rand unless instructed otherwise in the tender data. The conditions of contract identified in the contract data may provide for part payment in other currencies.

F.2.11 Alterations to documents

Not make any alterations or additions to the tender documents, except to comply with instructions issued by the employer, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such

alterations. Erasures and the use of masking fluid are prohibited.

F.2.12 Alternative tender offers

F.2.12.1 Submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted. The alternative tender offer is to be submitted with the main tender offer together with a schedule that compares the requirements of the tender documents with the alternative requirements the tenderer proposes.

F.2.12.2 Accept that an alternative tender offer may be based only on the criteria stated in the tender data or criteria otherwise acceptable to the employer.

F.2.13 Submitting a tender offer

F.2.13.1 Submit a tender offer to provide the whole of the works, services or supply identified in the contract data and described in the scope of works, unless stated otherwise in the tender data.

F.2.13.2 Return all returnable documents to the employer after completing them in their entirety, either electronically (if they were issued in electronic format) or by writing in black ink.

F.2.13.3 Submit the parts of the tender offer communicated on paper as an original plus the number of copies stated in the tender data, with an English translation of any documentation in a language other than English, and the parts communicated electronically in the same format as they were issued by the employer.

F.2.13.4 Sign the original and all copies of the tender offer where required in terms of the tender data. The employer will hold all authorized signatories liable on behalf of the tenderer. Signatories for tenderers proposing to contract as joint ventures shall state which of the signatories is the lead partner whom the employer shall hold liable for the purpose of the tender offer.

F.2.13.5 Seal the original and each copy of the tender offer as separate packages marking the packages as "ORIGINAL" and "COPY". Each package shall state on the outside the employer's address and identification details stated in the tender data, as well as the tenderer's name and contact address.

F.2.13.6 Where a two-envelope system is required in terms of the tender data, place and seal the returnable documents listed in the tender data in an envelope marked “financial proposal” and place the remaining returnable documents in an envelope marked “technical proposal”. Each envelope shall state on the outside the employer’s address and identification details stated in the tender data, as well as the tenderer's name and contact address.

F.2.13.7 Seal the original tender offer and copy packages together in an outer package that states on the outside only the employer's address and identification details as stated in the tender data.

F.2.13.8 Accept that the employer shall not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.

F.2.14 Information and data to be completed in all respects

Accept that tender offers, which do not provide all the data or information requested completely and in the form required, may be regarded by the employer as non-responsive.

F.2.15 Closing time

F.2.15.1 Ensure that the employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Proof of posting shall not be accepted as proof of delivery. The employer shall not accept tender offers submitted by telegraph, telex, facsimile or e-mail, unless stated otherwise in the tender data.

F.2.15.2 Accept that, if the employer extends the closing time stated in the tender data for any reason, the requirements of these conditions of tender apply equally to the extended deadline.

F.2.16 Tender offer validity

F.2.16.1 Hold the tender offer(s) valid for acceptance by the employer at any time during the validity period stated in the tender data after the closing time stated in the tender data.

F.2.16.2 If requested by the employer, consider extending the validity period stated in the tender data for an agreed additional period.

F.2.17 Clarification of tender offer after submission

Provide clarification of a tender offer in response to a request to do so from the employer during the evaluation of tender offers. This may include providing a breakdown of rates or prices and correction of arithmetical errors by the adjustment of certain rates or item prices (or both). No change in the total of the prices or substance of the tender offer is sought, offered, or permitted. The total of the prices stated by the tenderer shall be binding upon the tenderer.

Note: Sub-clause F.2.17 does not preclude the negotiation of the final terms of the contract with a preferred tenderer following a competitive selection process, should the Employer elect to do so.

F.2.18 Provide other material

F.2.18.1 Provide, on request by the employer, any other material that has a bearing on the tender offer, the tenderer's commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the employer for the purpose of a full and fair risk assessment. Should the tenderer not provide the material, or a satisfactory reason as to why it cannot be provided, by the time for submission stated in the employer's request, the employer may regard the tender offer as non-responsive.

F.2.18.2 Dispose of samples of materials provided for evaluation by the employer, where required.

F.2.19 Inspections, tests and analysis

Provide access during working hours to premises for inspections, tests and analysis as provided for in the tender data.

F.2.20 Submit securities, bonds, policies, etc.

If requested, submit for the employer's acceptance before formation of the contract, all securities, bonds, guarantees, policies and certificates of insurance required in terms of the conditions of contract identified in the contract data.

F.2.21 Check final draft

Check the final draft of the contract provided by the employer within the time available for the employer to issue the contract.

F.2.22 Return of other tender documents

If so instructed by the employer, return all retained tender documents within 28 days after the expiry of the validity period stated in the tender data.

F.2.23 Certificates

Include in the tender submission or provide the employer with any certificates as stated in the tender data.

NOTE: Failure to submit any of the above documents will result in disqualification

F.3 The employer's undertakings

The employer undertakes to:

F.3.1 Respond to clarification

Respond to a request for clarification received up to five working days prior to the tender closing time stated in the Tender Data and notify all tenderers who drew procurement documents.

F.3.2 Issue Addenda

If necessary, issue addenda that may amend or amplify the tender documents to each tenderer during the period from the date of the Tender Notice until seven days before the tender closing time stated in the Tender Data. If, as a result a tenderer applies for an extension to the closing time stated in the Tender Data, the Employer may grant such extension and, will then notify it to all tenderers who drew documents.

F.3.3 Return late tender offers

Return tender offers received after the closing time stated in the Tender Data, unopened, (unless it is necessary to open a tender submission to obtain a forwarding address), to the tenderer concerned.

F.3.4 Opening of tender submissions

F.3.4.1 Unless the two-envelope system is to be followed, open valid tender submissions in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data. Tender submissions for which acceptable reasons for withdrawal have been submitted will not be opened.

F.3.4.2 Announce at the opening held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each tenderer whose tender offer is opened, the total of his prices, preferences claimed and time for completion, if any, for the main tender offer only.

F.3.4.3 Make available the record outlined in F.3.4.2 to all interested persons upon request.

F.3.5 Two-envelope system

F.3.5.1 Where stated in the tender data that a two-envelope system is to be followed, open only the technical proposal of valid tenders in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data and announce the name of each tenderer whose technical proposal is opened.

F.3.5.2 Evaluate the quality of the technical proposals offered by tenderers, then advise tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who score in the quality evaluation above the minimum number of points for quality stated in the tender data, and announce the score obtained for the technical proposals and the total price and any preferences claimed. Return unopened financial proposals to tenderers whose technical proposals failed to achieve the minimum number of points for quality.

F.3.6 Non-disclosure

Not disclose to tenderers, or to any other person not officially concerned with such processes, information relating to the evaluation and comparison of tender offers, the final evaluation price and recommendations for the award of a contract, until after the award of the contract to the successful tenderer.

F.3.7 Grounds for rejection and disqualification

Determine whether there has been any effort by a tenderer to influence the processing of tender offers and instantly disqualify a tenderer (and his tender offer) if it is established that he engaged in corrupt or fraudulent practices.

F.3.8 Test for responsiveness

Determine, on opening and before detailed evaluation, whether each tender offer properly received:

a) Meets the requirements of these Conditions of Tender,
b) Has been properly and fully completed and signed, and
c) is responsive to the other requirements of the tender documents.

A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification. A material deviation or qualification is one which, in the Employer's opinion, would:

- Detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work,
- change the Employer's or the tenderer's risks and responsibilities under the contract, or
- affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified.

Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of the non-conforming deviation or reservation.

F.3.9 Arithmetical errors

Check responsive tender offers for arithmetical errors, correcting them in the following manner:

- Where there is a discrepancy between the amounts in figures and in words, the amount in words shall govern.

- If a bill of quantities (or schedule of quantities or schedule of rates) applies and there is an error in the line item resulting from the product of the unit rate and the quantity, the rate shall be binding and the error of extension as entered in the bid offer will be corrected by the Employer in determining the Contract Price.

- Where there is an error in addition, either as a result of other corrections required by this checking process or in the Bidder's addition of prices, such error will be corrected by the Employer in determining the Contract Price.

- The Contract Price for the completed Contract shall be computed from the actual quantities of authorized work done and compliant with the Contract Data, valued at rates contracted against the respective items in the Bill of Quantities,

Schedule of Quantities or Schedule of Rates and shall include such authorized Provincial Sums and items of extra work as have become payable in terms of the Contract Data.

F.3.10 Clarification of a tender offer

Obtain clarification from a tenderer on any matter that could give rise to ambiguity in a contract arising from the tender offer.

F.3.11 Evaluation of tender offers

F.3.11.1 General

Appoint an evaluation panel of not less than three persons. Reduce each responsive tender offer to a comparative offer and evaluate it using the tender evaluation method that is indicated in the Tender Data and described below:

Method 1: Financial offer	1) Rank tender offers from the most favorable to the least favorable comparative offer. 2) Recommend highest ranked tenderer for the award of the contract, unless there are compelling and justifiable reasons not to do so.
Method 2: Financial offer and preferences	1) Score tender evaluation points for financial offer. 2) Confirm that tenderers are eligible for the preferences claimed and if so, score tender evaluation points for preferencing. 3) Calculate total tender evaluation points. 4) Rank tender offers from the highest number of tender evaluation points to the lowest. 5) Recommend tenderer with the highest number of tender evaluation points for the award of the contract, unless there are compelling and justifiable reasons not to do so.
Method 3: Financial offer and quality	1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the Tender data. 2) Score tender evaluation points for financial offer. 3) Calculate total tender evaluation points. 4) Rank tender offers from the highest number of tender evaluation points to the lowest. 5) Recommend tenderer with the highest number of tender evaluation points for the award of the contract, unless there are compelling and justifiable reasons not to do so.
Method 4: Financial offer, quality and preferences	1) Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the Tender data. 2) Score tender evaluation points for financial offer. 3) Confirm that tenderers are eligible for the preferences claimed, and if so, score tender evaluation points for preferencing. 4) Calculate total tender evaluation points. 5) Rank tender offers from the highest number of tender evaluation points to the lowest. 6) Recommend tenderer with the highest number of tender evaluation points for the award of the contract, unless there are compelling and justifiable reasons not to do so.

Score financial offers, preferences and quality, as relevant, to two decimal places.

F.3.11.2 Scoring Financial Offers

Score the financial offers of remaining responsive tender offers using the following formula:

N_{FO} = W_1 x A where:

N_{FO} = the number of tender evaluation points awarded for the financial offer.

W_1 = the maximum possible number of tender evaluation points awarded for the financial offer as stated in the Tender Data.

A = a number calculated using either formulas 1 or 2 below as stated in the Tender Data.

Formula	Comparison aimed at achieving	Option 1	Option 2
1	Highest price or discount	$A = (1+ \frac{(P - Pm)}{Pm})$	A = P / Pm
2	Lowest price or percentage commission / fee	$A = (1 - \frac{(P - Pm)}{Pm})$	A = Pm / P

Where:
Pm = the comparative offer of the most favorable tender offer.
P = the comparative offer of tender offer under consideration.

F.3.11.3 Scoring quality (functionality)

Score quality in each of the categories stated in the Tender Data and calculate total score for quality.

F.3.12 Insurance provided by the employer

If requested by the proposed successful tenderer, submit for the tenderer's information the policies and / or certificates of insurance which the conditions of contract identified in the contract data, require the employer to provide.

F.3.13 Acceptance of tender offer

F.3.13.1 Accept tender offer only if the tenderer satisfies the legal requirements stated in Clause F.2.1 of the Tender Data.

F.3.13.2 Notify the successful tenderer of the employer's acceptance of his tender offer by completing and returning one copy of the form of offer and acceptance before the expiry of the validity period stated in the tender data, or agreed additional period. Providing the form of offer and acceptance does not contain any qualifying statements, it will constitute the formation of a contract between the employer and the successful tenderer as described in the form of offer and acceptance.

F.3.14 Notice to unsuccessful tenderers

After the successful tenderer has acknowledged the employer’s notice of acceptance, notify other tenderers that their tender offers have not been accepted.

F.3.15. Prepare contract documents

If necessary, revise documents that shall form part of the contract and that were issued by the employer as part of the tender documents to take account of:

a) Addenda issued during the tender period,
b) Inclusion of some of the returnable documents,
c) Other revisions agreed between the employer and the successful tenderer, and
d) The schedule of deviations attached to the form of offer and acceptance, if any.

F.3.16 Issue final contract

Prepare and issue the final draft of contract documents to the successful tenderer for acceptance as soon as possible after the date of the employer's signing of the form of offer and acceptance (including the schedule of deviations, if any). Only those documents that the conditions of tender require the tenderer to submit, after acceptance by the employer, shall be included.

F.3.17 Complete adjudicator's contract

Unless alternative arrangements have been agreed or otherwise provided for in the contract, arrange for both parties to complete formalities for appointing the selected adjudicator at the same time as the main contract is signed.

F.3.18 Provide copies of the contracts

Provide to the successful tenderer the number of copies stated in the Tender Data of the signed copy of the contract as soon as possible after completion and signing of the form of offer and acceptance.

PART T2: RETURNABLE SCHEDULES

TABLE OF CONTENTS **Page** **Colour**

T2.1 List of Returnable Documents

The Tenderer must complete the following Returnable Documents:

1 Returnable Schedules required only for Tender Evaluation purposes

A: Certificate of Attendance at a Tender Site Meeting
B: Record of Addenda to Tender Documents
C: Certificate of Authority for Joint Ventures / Close Corporation/ Partnership/ Company/ Sole Proprietor (Certified copies of Identity Documents for all members of Joint Ventures / Close Corporation / Partnership / Company / Sole Proprietor)
D: Registration Certificates of entities – Joint Ventures / Close Corporation/ Partnership/ Company/ Sole Proprietor
E: Compulsory Enterprise Questionnaire
F: Schedule of the Tenderer's Experience
G: Schedule of Key Personnel
H: Format of Curriculum Vitae
I: Proposed Amendments, Qualifications and Alternatives
J: Schedule of Subcontractors
K: Schedule of Plant and Equipment available for this contract
L: Copy of the Workmen's Compensation Registration Certificate (or proof of payment of contributions in terms of the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993)
M: Company profile, including track record
N: Construction Industries Development Board (CIBD) Registration – **6ME or higher**.

2 Other Documents required only for Tender Evaluation purposes

O: BBBEE Status Level Verification Certificate
P: Tax Compliance Status - Attach Tax Clearance Certificate
Q: Financial Standing – Attach Letter of Intent
R: Central Supplier Database(CSD) summary report (attach proof)

3 Returnable Schedules that will be incorporated into the Contract

S: **SBD Forms:**

SBD1 - Invitation to Bid (Revised 2017)
SBD4 – Declaration of Interest by bidders.
SBD6.1 - Preference Point Claim will be dictated by the B-BBEE Status level of Contribution
SBD8: Declaration of Bidder's Past SCM Practices
SBD9: Certificate of independent bid determination

T: Execution Programme / Program of Works
U: Detailed Method Statement
V: Contractor's Health and Safety Declaration
W: Contractor's Safety Plan

4 Other Documents that will be incorporated into the Contract

X: Proforma Notification form in terms of the Occupational Health and Safety Act 1993, Construction Regulations, 2003
Y: Monthly Labour Report

5 The Offer portion

Part C1 Agreement and Contract Data
Part C2 Pricing Data
Part C3 Scope of Work
Part C4 Site Information

T2.2 Returnable Schedules to be completed by Tenderer

A. CERTIFICATE OF ATTENDANCE AT A TENDER SITE MEETING

This is to certify that *(Tenderer)* ……..…

Of (*address)*.....

.....……..... was represented by the person(s) named below at the compulsory meeting held for all Tenderers **for THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE TENDER**

for Tender No **ACDP……..** on ……..**2021** at **….:….**

I / We acknowledge that the purpose of the meeting was to acquaint myself / ourselves with the Site of the Works and / or matters incidental to doing the Work specified in the Tender Documents in order for me / us to take account of everything necessary when compiling our rates and prices included in the Tender.

Particulars of person(s) attending the meeting:

Name: .....……..... Signature: .....….....

Capacity: .....

Name: ….....…… Signature: .....….....

Capacity: .....

Attendance of the above person(s) at the meeting is confirmed by the Employer's representative, namely:

Name: .....……..……..... Signature: .....

Capacity: .....…… Date and Time: .....…….....

B. RECORD OF ADDENDA TO TENDER DOCUMENTS

We confirm that the following communications received from the Employer before the submission of this Tender Offer, amending the Tender Documents, have been taken into account in this Tender Offer:

1.		
1.		
2.		
3.		
4.		
5.		

Attach additional pages if more space is required.

Signed..... Date.....

Name..... Position.....

Tenderer.....

C. CERTIFICATE OF AUTHORITY OF AN ENTITY

Indicate the status of the Tenderer by ticking the appropriate box hereunder. The Tenderer must complete the Certificate set out below for the relevant category.

(I) Company	(II) Close Corporation	(III) Partnership	(IV) Joint Venture	(V) Sole Proprietor

(I) CERTIFICATE FOR COMPANY

I ....., chairperson of the Board of Directors of ....., hereby confirm that by resolution of the Board (copy attached) taken on ..... 20....., Mr/Ms ....., acting in the capacity of ....., was authorised to sign all Documents in connection with this Tender and any Contract resulting from it on behalf of the Company.

Signature of Chairman: .....

Signature of Signatory: .....

As Witnesses:

1..... Name in Block Letters.....

2..... Name in Block Letters.....

Date: .....

(II) CERTIFICATE FOR CLOSE CORPORATION

We, the undersigned, being the key Members in the business trading as.....

..... Hereby authorise Mr/Ms .....,

Acting in the capacity of ....., to sign all Documents

In connection with the Tender for Contract No and any Contract resulting from it on our behalf.

Signature of Signatory: .....

As Witnesses:

1..... Name in Block Letters.....

2..... Name in Block Letters.....

Date: .....

NAME	ADDRESS	SIGNATURE	DATE

Note: This Certificate is to be completed and signed by all of the key Members upon whom rests the Direction of the Affairs of the Close Corporation as a whole.

(III) CERTIFICATE FOR PARTNERSHIP

We, the undersigned, being the key Partners in the business trading as,

.....hereby authorise Mr/Ms…..

acting in the capacity of ..... , to sign all Documents in connection

with the Tender for Contract No and any Contract resulting from it on our behalf.

Signature of Signatory: .....

As Witnesses:

1..... Name in Block Letters.....

2..... Name in Block Letters.....

Date: .....

NAME	ADDRESS	SIGNATURE	DATE

Note: This Certificate is to be completed and signed by all of the key Partners upon who rests the Direction of the Affairs of the Partnership as a whole.

(IV) CERTIFICATE FOR JOINT VENTURE

We, the undersigned, are submitting this Tender Offer in Joint Venture and hereby authorize Mr/Ms

....., authorized signatory of the Company, ……..……

…….....acting in the capacity of Lead Partner, to sign all Documents in connection with the

Tender Offer for Contract No and any Contract resulting from it on our behalf.

This authorization is evidenced by the attached power of attorney signed by legally authorized signatories of all the Partners to the Joint Venture.

Signature of Signatory: .....

As Witnesses:

1..... Name in Block Letters.....

2..... Name in Block Letters.....

Date: .....

NAME OF FIRM	ADDRESS	AUTHORISING SIGNATURE, NAME AND CAPACITY
Lead Partner		

Note: This Certificate is to be completed and signed by all of the key Partners upon who rests the Direction of the Affairs of the Partnership as a whole.

V) CERTIFICATE FOR SOLE PROPRIETOR

I....., hereby confirm that I am the Sole Owner of the

Business trading as:……..

Signature of Sole Owner: .....

As Witnesses:

1..... Name in Block Letters.....

2..... Name in Block Letters.....

Date: .....

D. REGISTRATION CERTIFICATE OF AN ENTITY

[Important note to Tenderer: Registration Certificates for Companies, Close Corporations, Partnerships and ID Documents for Sole Proprietors must be inserted here. In the case of a Joint Venture, a copy of a duly signed Joint Venture Agreement must be included]

E. COMPULSORY ENTERPRISE QUESTIONNAIRE

The following particulars must be furnished. In the case of a Joint Venture, **separate** Enterprise questionnaires in respect of each Partner must be completed and submitted.

Section 1: Name of Enterprise: . . . . . .

Section 2: VAT registration number, if any: . . . . . .

Section 3: CIDB registration number, if any: . . . . . .

Section 4: Particulars of Sole Proprietors and Partners in Partnerships

Name*	Identity number*	Personal income tax number*

***** Complete only if Sole Proprietor or Partnership and attach separate page if more than 3 Partners

Section 5: Particulars of Companies and Close Corporations

Company registration number . . . . . .

Close Corporation number . . . . . .

Tax reference number . . . . . .

Section 6: Record in the service of the State

Indicate by marking the relevant boxes with a cross, if any Sole Proprietor, Partner in a Partnership or Director, Manager, Principal Shareholder or Stakeholder in a Company or Close Corporation is currently or has been within the last 12 months in the service of any of the following:

- ☐ a Member of any Municipal Council
- ☐ a Member of any Provincial Legislature
- ☐ a Member of the National Assembly or the National Council of Province
- ☐ a Member of the Board of Directors of any Municipal entity
- ☐ an Official of any Municipality or Municipal entity
- ☐ an employee of any Provincial Department, National or Provincial Public entity or Constitutional Institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999)
- ☐ a Member of an Accounting Authority of any National or Provincial Public Entity
- ☐ an employee of Parliament or a Provincial Legislature

If any of the above boxes are marked, disclose the following:

Name of Sole Proprietor, Partner, Director, Manager, Principal Shareholder or Stakeholder	Name of Institution, Public Office, board or organ of State and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

*insert separate page if necessary

Section 7: Record of spouses, children and parents in the service of the State

Indicate by marking the relevant boxes with a cross, if any spouse, child or parent of a Sole Proprietor, Partner in a Partnership or Director, Manager, Principal Shareholder or Stakeholder in a Company or Close Corporation is currently or has been within the last 12 months been in the service of any of the following:

- ☐ a Member of any Municipal Council
- ☐ a Member of any Provincial Legislature
- ☐ a Member of the National Assembly or the National Council of Province
- ☐ a Member of the Board of Directors of any Municipal Entity
- ☐ an Official of any Municipality or Municipal entity
- ☐ an employee of any Provincial Department, National or Provincial Public Entity or Constitutional Institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999)
- ☐ a Member of an Accounting Authority of any National or Provincial Public entity
- ☐ an employee of Parliament or a Provincial Legislature

Name of spouse, child or parent	**Name of Institution, Public Office, Board or Organ of State and position held**	**Status of service (tick appropriate column)**	
		Current	**Within last 12 months**

*insert separate page if necessary

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the Enterprise:

i) authorizes the Employer to obtain a tax clearance Certificate from the South African Revenue Services that my / our tax matters are in order;

ii) confirms that the neither the name of the Enterprise or the name of any Partner, Manager, Director or other Person, who wholly or partly exercises, or may exercise, control over the Enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;

iii) confirms that no Partner, Member, Director or other Person, who wholly or partly exercises, or may exercise, control over the Enterprise appears, has within the last five years been convicted of fraud or corruption;

iv) confirms that I / we are not associated, linked or involved with any other Tendering entities submitting Tender Offers and have no other relationship with any of the Tenderers or those responsible for compiling the Scope of Work that could cause or be interpreted as a conflict of interest; and

iv) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Signed ---------- Date _____

Name ---------- Position _____

Enterprise Name _____

F. SCHEDULE OF THE TENDERER'S EXPERIENCE

[Attach documents such as orders, completion certificates and appointment letters.]

The following is a Statement of Work of similar nature recently successfully executed by myself / ourselves (attach completion certificate for all completed projects as proof):

Employer: Contact Person and Telephone Number	Consulting Engineer: Contact Person and Telephone Number	Nature of Work	Value of Work (inclusive of VAT)	Date Completed or Expected to be Completed

SIGNATURE: .....…….. DATE: .....
(of person authorised to sign on behalf of the Tenderer)

G. KEY PERSONNEL

In terms of the Project Specification and the Conditions of Tender, unskilled Workers may only be brought in from outside the Local Community if such personnel are not available locally.

Professional artisans with applicable experience must do all technical works

The Tenderer shall list below the personnel which he intends to utilize on the Works, including key personnel which may have to be brought in from outside if not available locally.

Category of Employee	Number of Persons		
	Key Personnel, Part of the Contractors Organisation	Key Personnel to be imported if not locally available	Unskilled Personnel to be recruited from the local community
Professional Engineer: 6 years' experience & qualified in Food processing equipment design and installation			
Site Agent: 5 years' experience in sorting, food processing and packaging plant			
Foreman 2 years' experience in sorting, food processing and packaging plant			
Welder/Boiler Maker: 2 years' experienced welders / boiler makers			
Technicians: 2 years' Qualified and/or Experienced mechanical technicians			
Health and Safety: 2 years' experience & qualified Health & Safety Officer			
Electricians: 2 years' experience & qualified electrician			
Plant Operators: 1 year experience in Plant Operation			
Quality Control: 1 year experienced of Qualified and or Experienced Quality Control officer			
Unskilled Workers			
Others:			

SIGNATURE: ..... DATE: .....
(of person authorised to sign on behalf of the Tenderer)

H. CURRICULUM VITAE FORMAT OF KEY PERSONNEL

[Include CV's of staff that will work on the project. Supplied information of proposed site staff will be verified on site if the bidder is appointed.]

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

....
Signature of person named in the Schedule *Date*

[Include CV's of staff that will work on the project. Supplied information of proposed site staff will be verified on site if the bidder is appointed.]

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

....
Signature of person named in the Schedule *Date*

[Include CV's of staff that will work on the project. Supplied information of proposed site staff will be verified on site if the bidder is appointed.]

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

....
Signature of person named in the Schedule *Date*

[Include CV's of staff that will work on the project. Supplied information of proposed site staff will be verified on site if the bidder is appointed.]

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

....
Signature of person named in the Schedule *Date*

[Include CV's of staff that will work on the project. Supplied information of proposed site staff will be verified on site if the bidder is appointed.]

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

....
Signature of person named in the Schedule *Date*

[Include CV's of staff that will work on the project. Supplied information of proposed site staff will be verified on site if the bidder is appointed.]

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

....
Signature of person named in the Schedule *Date*

[Include CV's of staff that will work on the project. Supplied information of proposed site staff will be verified on site if the bidder is appointed.]

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

....
Signature of person named in the Schedule *Date*

[Include CV's of staff that will work on the project. Supplied information of proposed site staff will be verified on site if the bidder is appointed.]

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

....
Signature of person named in the Schedule *Date*

[Include CV's of staff that will work on the project. Supplied information of proposed site staff will be verified on site if the bidder is appointed.]

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

....
Signature of person named in the Schedule *Date*

I. AMENDMENTS, QUALIFICATIONS AND ALTERNATIVES

(***This is not an invitation for amendments, deviations or alternatives,*** *but should the Tenderer desire to make any departures from the Provisions of this Contract he shall set out his proposals clearly hereunder. The Employer will not consider any amendment, unless form (a), has been completed to the satisfaction of the Employer*). *The Tenderer is referred to Tender Data paragraph F.2.12, where it is clearly stated that no Alternative Offers will be accepted.*

I / We herewith propose the amendments, as set out in the table below:

(a) AMENDMENTS

PAGE, CLAUSE OR ITEM NO	PROPOSED AMENDMENT

Notes: (1) Amendments to the General and Special Conditions of Contract are not acceptable;

(2) The Tenderer must give full details of all the financial implications of the amendments and qualifications in a covering letter attached to his Tender.

J. SCHEDULE OF PROPOSED SUB-CONTRACTORS

We notify you that it is our intention to employ the following Subcontractors for Work in this Contract.

If we are awarded a Contract we agree that this notification does not change the requirement for us to submit the names of proposed Subcontractors in accordance with requirements in the Contract for such appointments. If there are no such requirements in the Contract, then your written acceptance of this list shall be binding between us.

We confirm that all Subcontractors who are Contracted to construct a house are registered as Home Builders with the National Home Builders Registration Council.

	Name and address of proposed Subcontractor	**Nature and extent of Work**	**Previous experience with Subcontractor.**
1.			
2.			
3.			
4.			
5.			

Signed ..... Date .....

Name ..... Position .....

Tenderer .....

K. SCHEDULE OF PLANT AND EQUIPMENT

The works under this contract requires plant and equipment like basic mechanic and civil contractor's equipment, Transport (truck), TLB/ Excavator, Soil compactors, Concrete mixer, LDVs, Road Grader, Hand tools, Scaffolding, Working tools/ machines such drillers, welding machines, and other necessary tools to complete the project. Where applicable work must preferably be labour based and not machine based.

The following are lists of major items of relevant equipment that I / we presently own or lease and will have available for this Contract or will acquire or hire for this Contract if my / our Tender is accepted.

(a) Details of major equipment that is owned by and immediately available for this Contract.

Quantity	Description, size, capacity, etc.

Attach additional pages if more space is required.

(b) Details of major equipment that will be hired, or acquired for this Contract if my / our Tender is acceptable.

Quantity	Description, size, capacity, etc.

Attach additional pages if more space is required.

Signed ---------- Date _____

Name ---------- Position _____

Tenderer _____

Proof of ownership and/or rental agreement should form part of tender document.

L. COPY OF WORKMEN'S COMPENSATION REGISTRATION CERTIFICATE (OR PROOF OF PAYMENT OF CONTRIBUTIONS IN TERMS OF THE COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT NO. 130 OF 1993)

[Certified Copy of the Certificate or Proof of Payment thereof obtained from the Workmen's Compensation Commissioner to be inserted here]

M. COMPANY PROFILE, INCLUDING TRACK RECORD

[Abbreviated company profile, giving history, status, activities, staff and track record of the tendering entity, to be inserted here. In case of a Joint Venture, a separate profile for each partner must be submitted]

[Attach documents such as orders, completion certificates and appointment letters.]

N. CONSTRUCTION INDUSTRIES DEVELOPMENT BOARD (CIDB) REGISTRATION

[Certified copy of the Tenderer's CIDB registration indicating the Contractor grading designation, to be inserted here. For a Joint Venture, each partner's CIDB certificate is to be included, as applicable]

O. BBBEE STATUS LEVEL VERIFICATION CERTIFICATE

[Certified copy of the Tenderer's* BBBEE STATUS LEVEL VERIFICATION CERTIFICATE *to be inserted here]

P. TAX COMPLIANCE STATUS

IMPORTANT NOTES:

1. The Central Supplier Database and tax compliance status PIN are approved methods that will be used to verify tax compliance as SARS does not issue tax clearance certificate any more but has made an online provision available via eFiling for bidders to print their own tax clearance certificates which can be submitted with this bid.

2. Tax Clearance submitted by bidders will be verified on eFiling and/or Central Supplier database.

3. Bidders must provide a tax compliance status PIN and Central Supplier Database Number to access their records and verify tax compliance status

Q. TENDERER'S FINANCIAL STANDING

In terms of Clause F.2.18.1 of the Contract-specific Tender Data the Tenderer shall provide information about his commercial position, which includes information necessary for the Employer to evaluate the Tenderer's financial standing.

To that end the Tenderer must provide with his tender a bank rating, certified by his banker, to the effect that he will be able to successfully complete the contract at the tendered amount within the specified time for completion.

However, should the Tenderer be unable to provide a bank rating with his tender, he shall state the reasons as to why he is unable to do so, and in addition provide the following details of his banker and bank account that he intends to use for project:

Name of account holder: ……

Name of Bank: …….. Branch: ……..

Account number: …… Type of account: ……..

Telephone number: …… Facsimile number: ……..

Name of contact person (at bank): ……

Failure to provide either the required bank details or a certified bank rating with his tender, will lead to the conclusion that the Tenderer does not have the necessary financial resources at his disposal to complete the contract successfully within the specified time for completion.

The Employer undertakes to treat the information thus obtained as confidential, strictly for the use of evaluation of the tender submitted by the Tenderer.

SIGNATURE: …….. DATE: ……
(of person authorised to sign on behalf of the Tenderer)

Q1. FINANCIAL INFORMATION OF TENDERER

This information sheet has to be filled in by the financier of the Tenderer, duly signed and stamped on behalf of the financial institution he represents.

Tenderer / Tender Details

Tender Description: ……

Contract Period: ……..

Name of Tenderer: ……..

Bank Account Number: ……...

Tender Amount: ……

State amount of Demand Guarantee: R……

Attach Letter of Intent from Financial Institution

Financial Institution

Name of Commercial Bank: ……

Branch: ……

Name of Bank Manager: ……...

Telephone Number: ……...

We acting on behalf of the above Commercial Bank confirm that

…… (Tenderer)

has operated an account with us for the last …….. years.

We have been requested to provide a bank rating based in relation to the financial capability of the Tenderer, taking into account directives set out in the following two tables.

FINANCIAL CAPABILITY

Maximum value of contract that the Tenderer is considered capable of	Value on which Bank Rating must be used
Up to R300 000	R24 000
R1 000 000	R78 000
R3 000 000	R240 000
R5 000 000	R480 000
R10 000 000	R900 000
R30 000 000	R2 400 000
R100 000 000	R7 800 000

BANK RATING

Bank Code	Description of Bank Code
A	Undoubted for the amount of enquiry
B	Good for the amount of enquiry
C	Good for the amount quoted if strictly in the way of business
D	Fair trade risk for amount of enquiry
E	Figures considered too high
F	Financial position unknown
G	Occasional dishonours
H	Frequent dishonours

The value on which our Bank Rating of the Tenderer is based is R…….

In words …….. only)

The Bank Rating is code: …….

…… …… ……

Signature: Manager Financial Institution Print Name Date

RUBBER STAMP OF INSTITUTION

R: CENTRAL SUPPLIER DATABASE (CSD) SUMMARY REPORT

[Tenderer's* CENTRAL SUPPLIER DATABASE (CSD) SUMMARY REPORT *to be attached here]

S. SBD FORMS REQUIRED TO BE COMPLETED

SBD1 - Invitation to Bid (Revised 2017)

SBD4 – Declaration of Interest by bidders.

SBD5 – Declaration of Procurement above R10 million must be accompanied by Audited Financial Statements.

SBD6.1 - Preference Point Claim will be dictated by the B-BBEE Status level of Contribution

SBD8: Declaration of Bidder's Past SCM Practices

SBD9: Certificate of independent bid determination

PART A
INVITATION TO BID SBD1

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (*NAME OF DEPARTMENT/ PUBLIC ENTITY*)					
BID NUMBER:	ACDP 21/05	CLOSING DATE: 07 JULY 2021		CLOSING TIME:	11H00
DESCRIPTION	THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE				

BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX SITUATED AT *(STREET ADDRESS)*
67/69 BICCARD STREET DEPARTMENT
DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT
POLOKWANE
0699

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO		TECHNICAL ENQUIRIES MAY BE DIRECTED TO:	
CONTACT PERSON	Shikwambana NR	CONTACT PERSON	Sibuyi DE
TELEPHONE NUMBER	015 294 3616	TELEPHONE NUMBER	015 632 7000/079 895 4313
FACSIMILE NUMBER		FACSIMILE NUMBER	
E-MAIL ADDRESS	shikwambananr@agric.limpopo.gov.za	E-MAIL ADDRESS	sibuyide@gmail.com

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				
SUPPLIER COMPLIANCE STATUS	TAX COMPLIANCE SYSTEM PIN:		OR	CENTRAL SUPPLIER DATABASE No: MAAA
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE	TICK APPLICABLE BOX] ☐ Yes ☐ No		B-BBEE STATUS LEVEL SWORN AFFIDAVIT	[TICK APPLICABLE BOX] ☐ Yes ☐ No

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]

ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐Yes ☐No [IF YES ENCLOSE PROOF]	ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?	☐Yes ☐No [IF YES, ANSWER THE QUESTIONNAIRE BELOW]

QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS	
IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?	☐ YES ☐ NO
DOES THE ENTITY HAVE A BRANCH IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	☐ YES ☐ NO

IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION? ☐ YES ☐ NO

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 BELOW.

PART B
TERMS AND CONDITIONS FOR BIDDING

1.	BID SUBMISSION:
1.1.	BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
1.2.	ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED–(NOT TO BE RE-TYPED) OR IN THE MANNER PRESCRIBED IN THE BID DOCUMENT.
1.3.	THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT, 2000 AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
1.4.	THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (SBD7).
2.	TAX COMPLIANCE REQUIREMENTS
2.1	BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
2.2	BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VERIFY THE TAXPAYER'S PROFILE AND TAX STATUS.
2.3	APPLICATION FOR TAX COMPLIANCE STATUS (TCS) PIN MAY BE MADE VIA E-FILING THROUGH THE SARS WEBSITE WWW.SARS.GOV.ZA.
2.4	BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
2.5	IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
2.6	WHERE NO TCS PIN IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.
2.7	NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE, COMPANIES WITH DIRECTORS WHO ARE PERSONS IN THE SERVICE OF THE STATE, OR CLOSE CORPORATIONS WITH MEMBERS PERSONS IN THE SERVICE OF THE STATE."

NB: FAILURE TO PROVIDE / OR COMPLY WITH ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.

SIGNATURE OF BIDDER: ……

CAPACITY UNDER WHICH THIS BID IS SIGNED: ……
(Proof of authority must be submitted e.g. company resolution)

DATE: ……..

SBD 4

DECLARATION OF INTEREST

1. Any legal person, including persons employed by the state[1], or persons having a kinship with persons employed by the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid (includes an advertised competitive bid, a limited bid, a proposal or written price quotation). In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons employed by the state, or to persons connected with or related to them, it is required that the bidder or his/her authorised representative declare his/her position in relation to the evaluating/adjudicating authority where-

   - The bidder is employed by the state; and/or

   - the legal person on whose behalf the bidding document is signed, has a relationship with persons/a person who are/is involved in the evaluation and or adjudication of the bid(s), or where it is known that such a relationship exists between the person or persons for or on whose behalf the declarant acts and persons who are involved with the evaluation and or adjudication of the bid.

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

2.1 Full Name of bidder or his or her representative: ……

2.2 Identity Number:……..

2.3 Position occupied in the Company (director, trustee, shareholder[2], member):
……..

2.4 Registration number of company, enterprise, close corporation, partnership agreement or trust:
……

2.5 Tax Reference Number: ……

2.6 VAT Registration Number: ……....

2.6.1 The names of all directors / trustees / shareholders / members, their individual identity numbers, tax reference numbers and, if applicable, employee / PERSAL numbers must be indicated in paragraph 3 below.

[1]"State" means –
(a) 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);
(b) any municipality or municipal entity;
(c) provincial legislature;
(d) national Assembly or the national Council of provinces; or
(e) Parliament.

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

2.7 Are you or any person connected with the bidder presently employed by the state? YES / NO

2.7.1 If so, furnish the following particulars:

Name of person / director / trustee / shareholder/ member: ……
Name of state institution at which you or the person connected to the bidder is employed : ……
Position occupied in the state institution: ……

Any other particulars:
……
……
……

2.7.2 If you are presently employed by the state, did you obtain the appropriate authority to undertake remunerative work outside employment in the public sector? YES / NO

2.7.2.1 If yes, did you attach proof of such authority to the bid document? YES / NO

(Note: Failure to submit proof of such authority, where applicable, may result in the disqualification of the bid.

2.7.2.2 If no, furnish reasons for non-submission of such proof:

……
……
……

2.8 Did you or your spouse, or any of the company's directors / trustees / shareholders / members or their spouses conduct business with the state in the previous twelve months? YES / NO

2.8.1 If so, furnish particulars:
……
……
……

2.9 Do you, or any person connected with the bidder, have any relationship (family, friend, other) with a person employed by the state and who may be involved with the evaluation and or adjudication of this bid? YES / NO

2.9.1 If so, furnish particulars.
……
……
……

2.10 Are you, or any person connected with the bidder, aware of any relationship (family, friend, other) between any other bidder and any person employed by the state who may be involved with the evaluation and or adjudication of this bid? YES/NO

2.10.1 If so, furnish particulars.
……
……
……

2.11 Do you or any of the directors / trustees / shareholders / members of the company have any interest in any other related companies whether or not they are bidding for this contract? YES/NO

2.11.1 If so, furnish particulars:
……
……
……

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

Full Name	Identity Number	Personal Income Tax Reference Number	State Employee Number / Persal Number

4 DECLARATION

I, THE UNDERSIGNED (NAME)……

CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 2 and 3 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

…….. ……..
Signature Date

…….. ……..
Position Name of bidder

SBD 6.1

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2017

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution

NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017.

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

- 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).

1.2

a) The value of this bid is estimated to not exceed R50 000 000 (all applicable taxes included) and therefore the 80/20 preference point system shall be applicable; or

b) The 80/20 preference point system will be applicable to this tender (*delete whichever is not applicable for this tender*).

1.3 Points for this bid shall be awarded for:

(a) Price; and

(b) B-BBEE Status Level of Contributor.

1.4 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	80
B-BBEE STATUS LEVEL OF CONTRIBUTOR	20
Total points for Price and B-BBEE must not exceed	**100**

1.5 Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.6 The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser.

2. DEFINITIONS

(a) **"B-BBEE"** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;

(b) "**B-BBEE status level of contributor"** means the B-BBEE status of an entity in terms of a code of good practice on black economic empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;

(c) **"bid"** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of goods or services, through price quotations, advertised competitive bidding processes or proposals;

(d) **"Broad-Based Black Economic Empowerment Act"** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

(e) **"EME"** means an Exempted Micro Enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

(f) **"functionality"** means the ability of a tenderer to provide goods or services in accordance with specifications as set out in the tender documents.

(g) **"prices"** includes all applicable taxes less all unconditional discounts;

(h) **"proof of B-BBEE status level of contributor"** means:

1) B-BBEE Status level certificate issued by an authorized body or person;

2) A sworn affidavit as prescribed by the B-BBEE Codes of Good Practice;

3) Any other requirement prescribed in terms of the B-BBEE Act;

(i) **"QSE"** means a qualifying small business enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

(j) **"rand value"** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;

3. POINTS AWARDED FOR PRICE

3.1 THE 80/20 PREFERENCE POINT SYSTEMS

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

80/20

$$Ps = 80\left(1 - \frac{Pt - P\min}{P\min}\right)$$

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmin = Price of lowest acceptable bid

4. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

4.1 In terms of Regulation 6 (2) and 7 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (80/20 system)
1	20
2	18
3	14
4	12
5	8
6	6
7	4
8	2
Non-compliant contributor	0

5. BID DECLARATION

5.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

6. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1

6.1 B-BBEE Status Level of Contributor: . = ……(maximum of 10 or 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 4.1 and must be substantiated by relevant proof of B-BBEE status level of contributor.

7. SUB-CONTRACTING

7.1 Will any portion of the contract be sub-contracted?

(***Tick applicable box***)

YES		NO	

7.1.1 If yes, indicate:

i) What percentage of the contract will be subcontracted.....……%
ii) The name of the sub-contractor……..
iii) The B-BBEE status level of the sub-contractor.....……..
iv) Whether the sub-contractor is an EME or QSE
(Tick applicable box)

YES		NO	

v) Specify, by ticking the appropriate box, if subcontracting with an enterprise in terms of Preferential Procurement Regulations,2017:

Designated Group: An EME or QSE which is at last 51% owned by:	**EME** √	**QSE** √
Black people		
Black people who are youth		
Black people who are women		
Black people with disabilities		
Black people living in rural or underdeveloped areas or townships		
Cooperative owned by black people		
Black people who are military veterans		
OR		
Any EME		
Any QSE		

8. **DECLARATION WITH REGARD TO COMPANY/FIRM**

8.1 Name of company/firm:……..

8.2 VAT registration number:…….

8.3 Company registration number:……

8.4 TYPE OF COMPANY/ FIRM

- Partnership/Joint Venture / Consortium
- One person business/sole propriety
- Close corporation
- Company
- (Pty) Limited

[TICK APPLICABLE BOX]

8.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

……
……
……
……..

8.6 COMPANY CLASSIFICATION

- Manufacturer
- Supplier
- Professional service provider
- Other service providers, e.g. transporter, etc.

[*TICK APPLICABLE BOX*]

8.7 Total number of years the company/firm has been in business:…….

8.8 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we 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 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;

iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –

(a) disqualify the person from the bidding 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 bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury 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.

WITNESSES 1. …….. 2. ……	…… SIGNATURE(S) OF BIDDERS(S) DATE: …….. ADDRESS …….. …….. ……..

SBD 8

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

1 This Standard Bidding Document must form part of all bids invited.

2 It serves as a declaration to be used by institutions 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 disregarded if that bidder, or any of its directors have-

a. abused the institution's supply chain management system;
b. committed fraud or any other improper conduct in relation to such system; or
c. failed to perform on any previous contract.

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	Is the bidder or any of its directors listed on the National Treasury's database as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this database were informed in writing of this restriction by the National Treasury after the *audi alteram partem* rule was applied).	Yes ☐	No ☐
4.1.1	If so, furnish particulars:		
4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? **To access this Register enter the National Treasury's website, www.treasury.gov.za, click on the icon "Register for Tender Defaulters" or submit your written request for a hard copy of the Register to facsimile number (012) 3265445.**	Yes ☐	No ☐
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 outside of the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
4.3.1	If so, furnish particulars:		
4.4	Was any contract between the bidder and any organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐

4.4.1	If so, furnish particulars:	

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME)……

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS 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**

SBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

1 This Standard Bidding Document (SBD) must form part of all bids[1] 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 Treasury Regulation 16A9 prescribes that accounting officers and accounting authorities must take all reasonable steps to prevent abuse of the supply chain management system and authorizes accounting officers and accounting authorities to:

a. disregard the bid of any bidder if that bidder, or any of its directors have abused the institution's supply chain management system and or committed fraud or any other improper conduct in relation to such system.

b. cancel a contract awarded to a supplier of goods and services if the supplier committed any corrupt or fraudulent act during the bidding process or the execution of that contract.

4 This SBD 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 (SBD 9) must be completed and submitted with the bid:

[1] Includes 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.

SBD 9

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 Institution)

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

SBD 9

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 consortium[3] 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.

[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.

SBD 9

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

T. EXECUTION PROGRAMME / PROGRAM OF WORKS

The Tenderer shall detail below or attach a preliminary programme reflecting the proposed sequence and tempo of execution of the various activities comprising the Work for this Contract. The programme shall be in accordance with the information supplied in the Contract, requirements of the Project Specifications and with all other aspects of his Tender.

The Execution Programme must be based on the completion time as specified in the Contract Data. The activities identified and filled in below, are specifically to be carried forward to Schedule T, the contractor's Method Statement.

PLEASE NOTE: the cash flow projections from the Contractor (to be submitted before commencement of the execution of the Contract) must be in accordance with this execution plan in order to ensure proper Cash flow management by the Department and to minimise delayed payments.

PROGRAMME										
ACTIVITY	**WEEKS**									

U. DETAILED METHOD STATEMENT

[The adjudication of the responsiveness of a bid also relies on the extent to which a tenderer can prove an understanding of the scope of works. The tenderer should describe below the methods and procedures he will employ to successfully complete the various activities as identified for the foregoing Schedule S, the Execution Programme]

ACTIVITY	DESCRIPTION
……	……
……	……
……	……
……	……
……	……
……	……
……	……
……	……
……	……
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……	……
……	……
……	……
……	……

[Add more pages as required]

V. CONTRACTOR'S HEALTH AND SAFETY DECLARATION

In terms of Clause 4(4) of the OHSA 1993 Construction Regulations 2003 (referred to as "the Regulations" hereafter), a Contractor may only be appointed to perform construction Work if the Employer is satisfied that the Contractor has the necessary competencies and resources to carry out the Work safely in accordance with the Occupational Health and Safety Act No 85 of 1993 and the OHSA 1993 Construction Regulations 2003.

To that effect a person duly authorised by the Tenderer must complete and sign the declaration hereafter in detail.

Declaration by Tenderer

1. I the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the OHSA 1993 Construction Regulations 2003.

2. I hereby declare that my Company has the competence and the necessary resources to safely carry out the construction Work under this Contract in compliance with the Construction Regulations and the Employer's Health and Safety Specifications.

3. I propose to achieve compliance with the Regulations by one of the following:

   (a) From my own competent resources as detailed in 4(a) hereafter: ..... ***Yes / No**

   (b) From my own resources still to be appointed or trained until competency is achieved, as detailed in 4(b) hereafter: ..... ***Yes / No**

   (c) From outside sources by appointment of competent specialist Subcontractors as detailed in 4(c) hereafter: ..... ***Yes / No**

   (***** = *delete whatever is not applicable*)

4. Details of resources I propose:

   (Note: Competent resources shall include safety personnel such as a construction supervisor and Construction Safety Officer as defined in Regulation 6, and Competent Persons as defined in Regulations 7, 8, 10, 11, 12, 14, 15, 18, 21(1), 22, 26 and 27, as applicable to this Contract)

(a) Details of the competent and qualified key persons from my Company's own resources, who will form part of the Contract team:

NAMES OF COMPETENT PERSONS	POSITIONS TO BE FILLED BY COMPETENT PERSONS

(b) Details of training of persons from my Company's own resources (or to be hired) who still have to be trained to achieve the necessary competency:

   (i) By whom will training be provided? .....

(ii) When will training be undertaken? .....

(iii) List the positions to be filled by persons to be trained or hired: .....

.....

.....

.....

(c) Details of competent resources to be appointed as Subcontractors if Competent Persons cannot be supplied from own Company:

Name of proposed Subcontractor: .....

Qualifications or details of competency of the Subcontractor: .....

.....

.....

.....

5. I hereby undertake, if my Tender is accepted, to provide, before commencement of the Works under the Contract, a suitable and sufficiently Documented Health and Safety Plan in accordance with Regulation 5(1) of the Construction Regulations, which plan shall be subject to approval by the Employer.

6. I confirm that copies of my Company's approved Health and Safety Plan, the Employer's Safety Specifications as well as the OHSA 1993 Construction Regulations 2003 will be provided on Site and will at all times be available for inspection by the Contractor's personnel, the Employer's personnel, the Engineer, visitors, and Officials and Inspectors of the Department of Labour.

7. I hereby confirm that adequate provision has been made in my Tendered rates and prices in the Schedule of Quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHSA 1993 Construction Regulations 2003, and that I will be liable for any penalties that may be applied by the Employer in terms of the said Regulations (Regulation 30) for failure on the Contractor's part to comply with the Provisions of the Act and the Regulations.

8. I agree that my failure to complete and execute this declaration to the satisfaction of the Employer will mean that I am unable to comply with the requirements of the OHSA 1993 Construction Regulations 2003, and accept that my Tender will be prejudiced and may be rejected at the discretion of the Employer.

SIGNATURE: ..... DATE: .....….....

(of person authorised to sign on behalf of the Tenderer)

W. CONTRACTOR'S SAFETY PLAN

[The Contractor shall submit the Contractor's <u>Health and Safety Plan</u> as required in terms of Regulation 5 of the Occupational Health and Safety Act 1993 Construction Regulations 2003, and referred to in T2.1, before commencement of the Works.]

X. PRO FORMA NOTIFICATION FORM IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT 1993, CONSTRUCTION REGULATIONS 2003

[This form must be completed and forwarded, prior to commencement of Work on Site, by all Contractors that qualify in terms of Regulation 3 of the Construction Regulations 2003, to the Office of the Department of Labour]

1. (a) Name and postal address of Contractor:……..
   .....
   (b) Name of Contractor's contact person: .....
   Telephone number: .....
2. Contractor's Workman's compensation registration number: .....
3. (a) Name and postal address of Client: .....
   .....
   .....
   (b) Name of Client's contact person or Agent:.....
   Telephone number .....
4. (a) Name and postal address of designer(s) for the Project: .....
   .....
   (b) Name of Designer's contact person: .....
   Telephone number .....
5. Name of Contractor's Construction Supervisor on Site appointed in terms of Regulation 6(1): ..... Telephone number: .....
6. Name/s of Contractor's sub-ordinate supervisors on Site appointed in terms of Regulation 6(2).
   …… .....
7. Exact physical address of the construction Site or Site Office: .....
   .....
8. Nature of the construction Work: .....
   …….. .....
9. Expected Commencement Date: .....
10. Expected Completion Date: .....
11. Estimated maximum number of persons on the construction Site: .....
12. Planned number of Subcontractors on the construction Site accountable to Contractor: .....
13. Name(s) of Subcontractors already chosen: .....
    .....
    .....
    ……..
    ……..

SIGNED BY:

CONTRACTOR: ..... DATE: .....

CLIENT: ..... DATE: .....

Y. MONTHLY LABOUR REPORT

MONTHLY LABOUR REPORT FOR CERTIFICATE OF PAYMENT NO. ……

JOBS CREATED……..

AS PER BUSINESS PLAN

A	B	C	D	E	F	G	H	I	J
Category	Number of persons employed in category	Rate (R/d)	Local P-days	Non-local P-Days	Total P-days (D+E)	Amount expended on labour (C x F)	P-days by women	P-days by youth	P-days by disabled
Clerical									
Managerial									
Supervisory									
Skilled									
Semi-skilled									
Unskilled									
All operations									

ACTUAL TO DATE

A	B	C	D	E	F	G	H	I	J
Category	Number of persons employed in category	Rate (R/d)	Local P-days	Non-local P-Days	Total P-days (D+E)	Amount expended on labour (C x F)	P-days by women	P-days by youth	P-days by disabled
Clerical									
Managerial									
Supervisory									
Skilled									
Semi-skilled									
Unskilled									
All operations									

SUMMARY

Planned person-days target
Tendered construction period (months):
Overall person-days target per month:
Months represented by this report:
Person-day target for this month:
Achieved person-days to date:
Person-days ahead/behind target:

THE CONTRACT

LIMPOPO DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

TABLE OF CONTENTS

PART C1: AGREEMENTS AND CONTRACT DATA

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.2: CONTRACT DATA

C1.2.1: CONDITIONS OF CONTRACT

C1.2.2: PART A: CONTRACT DATA PROVIDED BY THE EMPLOYER

PART B: CONTRACT DATA PROVIDED BY THE CONTRACTOR

C1.3: FORM OF GUARANTEE

C1.4: AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT (No 85 OF 1993)

LIMPOPO DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

C1.1 Form of Offer and Acceptance

Offer

The Employer, identified in the Acceptance Signature block, has solicited Offers to enter into a Contract for the procurement of:

Contract No **ACDP 21/05… THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE**
The Tenderer, identified in the Offer Signature block, has examined the Documents listed in the Tender Data and addenda thereto as listed in the Returnable Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the Tenderer, deemed to be duly authorized, signing this part of this Form of Offer and Acceptance, the Tenderer Offers to perform all of the obligations and liabilities of the Contractor under the Contract including compliance with all its Terms and Conditions according to their true intent and meaning for an amount to be determined in accordance with the Conditions of Contract identified in the Contract Data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VALUE ADDED TAX IS:

……

…….. Rand (in words);

R …….. (in figures)

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this Document to the Tenderer before the end of the period of validity stated in the Tender Data, whereupon the Tenderer becomes the Party named as the Contractor in the Conditions of Contract identified in the Contract Data.

Signature Block: Tenderer
Signature . . . . . Date . . . . .
Name . . . . .
Capacity . . . . .
Name of organization. . . . .
Address of organization . . . . .
. . . . .
Signature of witness . . . . . Date . . . . .
Name of witness . . . . .

Acceptance

By signing this part of this Form of Offer and Acceptance, the Employer identified below accepts the Tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the conditions of Contract identified in the Contract Data. Acceptance of the Tenderer's Offer shall Form an Agreement between the Employer and the Tenderer upon the Terms and Conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the Contract, are contained in:

Part C1: Agreements and Contract Data, (which includes this Agreement)
Part C2: Pricing Data
Part C3: Scope of work.
Part C4: Site Information and Drawings and Documents or parts thereof, which may be incorporated by reference into Parts C1 to C4 above.

Deviations from and amendments to the Documents listed in the Tender Data and any addenda thereto as listed in the Tender Schedules as well as any changes to the Terms of the Offer agreed by the Tenderer and the Employer during this process of Offer and Acceptance, are contained in the Schedule of Deviations attached to and Forming part of this Agreement. No amendments to or deviations from said Documents are valid unless contained in this schedule.

The Tenderer shall within two weeks after receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) for delivery of any Bonds, Guarantees, proof of Insurance and any other Documentation to be provided in terms of the Conditions of Contract Identified in the Contract Data. Failure to fulfil any of these Obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Tenderer receives one fully completed original copy of this Document, including the Schedule of Deviations (if any). Unless the Tenderer (now Contractor**)** within five working days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the Contents of this Agreement, this Agreement shall constitute a binding Contract between the Parties.

Signature Block: Employer	
Signature	Date . . . . .
Name	
Capacity	
for the Employer Limpopo Department of Agriculture & Rural Development	
Signature of witness	Date . . . . .
Name of witness	

Schedule of Deviations

1 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

2 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

3 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

4 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

5 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

By the duly Authorised Representatives signing this Agreement, the Employer and the Tenderer agree to and accept the foregoing Schedule of Deviations as the only deviations from and amendments to the Documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, as well as any confirmation, clarification or changes to the terms of the Offer agreed by the Tenderer and the Employer during this process of Offer and Acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the Tender Documents and the receipt by the Tenderer of a completed signed copy of this Agreement shall have any meaning or effect in the Contract between the parties arising from this Agreement.

For the Tenderer:

Signature(s) _____ _____

Name(s) _____ _____

Capacity _____ _____

_____
(Name and address of organisation)

Name &
Signature of
Witness _____ Date _____

For the Employer:

Signature(s) _____ _____

Name(s) _____ _____

Capacity _____ _____

_____
(Name and address of organisation)

LIMPOPO DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

C1.2 CONTRACT DATA

Section 1.01 The General Conditions of Contract for Construction Works (2010) published by the South African Institution of Civil Engineering, is applicable to this Contract. Copies of these Conditions of Contract may be obtained from the South African Institution of Civil Engineering (Tel: 011-805 5947).

The General Conditions of Contract for Construction Works make several references to the Contract Data for Specific Data, which together with these Conditions collectively describe the risks, liabilities and obligations of the Contracting parties and the procedures for the administration of the Contract. The Contract Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the General Conditions of Contract.

Each item of Data given below is cross-referenced to the clause in the General Conditions of Contract for Construction Works to which it mainly applies.

LIMPOPO DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

C1.2.1: CONDITIONS OF CONTRACT

GENERAL CONDITIONS OF CONTRACT

SPECIAL CONDITIONS OF CONTRACT

1. GENERAL

2. AMENDMENTS TO THE GENERAL CONDITIONS OF CONTRACT

3. TRANSFER OF RIGHTS

C1.2.1 CONDITIONS OF CONTRACT

GENERAL CONDITIONS OF CONTRACT

This Contract will be based on the "General Conditions of Contract for Construction Works – 2nd Edition 2010", issued by the South African Institution of Civil Engineering (Short title: **"General Conditions of Contract 2010**") and can be obtained from:

SAICE
Waterfall Park
Howick Gardens
Vorna Valley Half way House
Becker Street
MIDRAND
1685
Gauteng Province
Tel: (011) 805-5947/8
Fax: (011) 805-5971.

It is agreed that the only variations from the General Conditions of Contract 2010 are those set out hereafter under "Special Conditions of Contract".

SPECIAL CONDITIONS OF CONTRACT

1. GENERAL

These Special Conditions of Contract (SCC) form an integral part of the Contract. The Special Conditions shall amplify, modify or supersede, as the case may be, the General Conditions of Contract 2010 to the extent specified below, and shall take precedence and shall govern.

The clauses of the Special Conditions hereafter are numbered "SCC" followed in each case by the number of the applicable clause or sub clause in the General Conditions of Conditions 2010, and the applicable heading, or (where a new special condition that has no relation to the existing clauses is introduced) by a number that follows after the last clause number in the General Conditions, and an appropriate heading.

2. AMENDMENTS TO THE GENERAL CONDITIONS OF CONTRACT

Clause no.	Description
SCC 4.5.2	Replace the term "Safety" with "Occupational Health and Safety"
SCC 42.2	Add the following to the sub-clause: Extension of time in respect of abnormal rainfall shall be calculated using the rainfall (Formula 1) for each calendar month or part thereof.
SCC 49.6.1 to 4.9.6.3	Replace the term "Bank" with "Bank or Insurance Company"
SCC 55.1.8	Replace sub-clause with: The Contractor or anyone on his behalf or in his employ would pay, offer or offer as payment to any person in the employ of the Employer, or in the employ of the Engineer, a gratuity or reward or commission.
SCC 50	Replace the Heading with "**VARIATIONS EXCEEDING 20 PERCENT**"
SCC 50.1	Replace the wording:" *greater than 15 percent"* with *"greater than 20 percent".* **The following additional clauses to the General Conditions of Contract shall apply:**

SCC 59	**LABOUR INTENSIVE WORKS**
SCC 59.1	**Payment for the labour-intensive component of the works** Payment for works identified in the Scope of Work as being labour-intensive shall only be made in accordance with the provisions of the Contract if the works are constructed strictly in accordance with the provisions of the scope of work. Any non-payment for such works shall not relieve the Contractor in any way from his obligations either in Contract or in delict.
SCC 59.2	**Applicable labour laws** The Ministerial Determination, Special Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of Labour in Government Notice No R63 of 25 January 2002, as reproduced below, shall apply to work which are undertaken by unskilled or semi-skilled workers.
SCC 59.3.1	**Introduction** (a) This document contains the Standard Terms and Conditions for workers employed in elementary occupations on a Special Public Works Programme (SPWP). These terms and Conditions do NOT apply to persons employed in the supervision and management of a SPWP. (b) In this document – (i) "Department" means any department of State, implementing Agent or Contractor; (ii) "Employer" means any Municipality, implementing Agency or Contractor that hires workers to work in elementary occupations on a SPWP; (iii) "Worker" means any person working in an elementary occupation on a SPWP.; (iv) "elementary occupation" means any occupation involving unskilled or semi-skilled work; (v) "Management" means any person employed by a Municipality or implementing Agency to administer or execute an SPWP.; (vi) "task" means a fixed quantity of work; (vii) "task-based work" means work in which a worker is paid a fixed rate for performing a task; (viii) "task-rated worker" means a worker paid on the basis of the number of tasks completed; (ix) "time-rated worker" means a worker paid on the basis of the length of time worked.
SCC 59.3.2	**Terms of Work** (a) Workers on a SPWP are employed on a temporary basis. (b) A worker may NOT be employed for longer than 24 months in any five year cycle on a SPWP. (c) Employment on a SPWP does not qualify as employment as a contributor for the purpose of the Unemployment Insurance Act 30 of 1966.

SCC 59.3.3	**Normal Hours of Work** (a) An Employer may not set tasks or hours of work that require a worker to work– (i) more than forty hours in any week (ii) on more than five days in any week; and (iii) For more than eight hours on any day. (b) An Employer and worker may agree that a worker will work four days per week. The worker may then work up to ten hours per day. (c) A task-rated worker may not work more than a total of 55 hours in any week to complete the tasks allocated (based on a 40-hour week) to that worker.
SCC 59.3.4	**Meal Breaks** **(a) A worker may not work for more than five hours without taking a meal break of at least thirty minutes' duration.** (b) An Employer and worker may agree on longer meal breaks. (c) A worker may not work during a meal break. However, an Employer may require a worker to perform duties during a meal break if those duties cannot be left unattended and cannot be performed by another worker. An Employer must take reasonable steps to ensure that a worker is relieved of his or her duties during the meal break. (d) A worker is not entitled to payment for the period of a meal break. However, a worker who is paid on the basis of time worked must be paid if the worker is required to work or to be available for work during the meal break.
SCC 59.3.5	**Special Conditions for Security Guards** (a) A security guard may work up to 55 hours per week and up to eleven hours per day. (b) A security guard who works more than ten hours per day must have a meal break of at least one hour or two breaks of at least 30 minutes each.
SCC 59.3.6	**Daily Rest Period** Every worker is entitled to a daily rest period of at least eight consecutive hours. The daily rest period is measured from the time the worker ends work on one day until the time the worker starts work on the next day.
SCC 59.3.7	**Weekly Rest Period** Every worker must have two days off every week. A worker may only work on their day off to perform work which must be done without delay and cannot be performed by workers during their ordinary hours of work ("emergency work").
SCC 59.3.8	**Work on Sundays and Public Holidays** (a) A worker may only work on a Sunday or Public holiday to perform emergency or security work. (b) Work on Sundays is paid at the ordinary rate of pay.

	(c) A task-rated worker who works on a public holiday must be paid –
	(i) the worker's daily task rate, if the worker works for less than four hours; (ii) double the worker's daily task rate, if the worker works for more than four hours. (d) A time-rated worker who works on a public holiday must be paid – (i) the worker's daily rate of pay, if the worker works for less than four hours on the public holiday; (ii) double the worker's daily rate of pay, if the worker works for more than four hours on the public holiday.
SCC 59.3.9	**Sick Leave** (a) Only workers who work four or more days per week have the right to claim sick-pay in terms of this clause. (b) A worker who is unable to work on account of illness or injury is entitled to claim one day's paid sick leave for every full month that the worker has worked in terms of a Contract. (c) A worker may accumulate a maximum of twelve days' sick leave in a year. (d) Accumulated sick-leave may not be transferred from one Contract to another Contract. (e) An Employer must pay a task-rated worker the worker's daily task rate for a day's sick leave. (f) An Employer must pay a time-rated worker the worker's daily rate of pay for a day's sick leave. (g) An Employer must pay a worker sick pay on the worker's usual payday. (h) Before paying sick-pay, an Employer may require a worker to produce a certificate stating that the worker was unable to work on account of sickness or injury if the worker is – (i) absent from work for more than two consecutive days; or (ii) Absent from work on more than two occasions in any eight-week period. (i) A medical certificate must be issued and signed by a Medical Practitioner, a qualified Nurse or a Clinic staff member authorised to issue medical certificates indicating the duration and reason for incapacity. (j) A worker is not entitled to paid sick-leave for a work-related injury or occupational disease for which the worker can claim compensation under the Compensation for Occupational Injuries and Diseases Act.
SCC 59.3.10	**Maternity Leave** (a) A worker may take up to four consecutive months' unpaid maternity leave. (b) A worker is not entitled to any payment or employment-related benefits during maternity leave.

	(c) A worker must give her Employer reasonable notice of when she will start maternity leave and when she will return to work.
	(d) A worker is not required to take the full period of maternity leave. However, a worker may not work for four weeks before the expected date of birth of her child or for six weeks after the birth of her child, unless a medical practitioner, midwife or qualified nurse certifies that she is fit to do so. (e) A worker may begin maternity leave – (i) four weeks before the expected date of birth; or (ii) on an earlier date – (1) if a medical Practitioner, Midwife or Certified Nurse certifies that it is necessary for the health of the worker or that of her unborn child; or (2) if agreed to between Employer and worker; or (iii) on a later date, if a medical Practitioner, Midwife or Certified nurse has certified that the worker is able to continue to work without endangering her health. (f) A worker who has a miscarriage during the third trimester of pregnancy or bears a stillborn child may take maternity leave for up to six weeks after the miscarriage or stillbirth. (g) A worker who returns to work after maternity leave has the right to start a new cycle of twenty-four months' employment, unless the SPWP on which she was employed has ended.
SCC 59.3.11	**Family responsibility leave** Workers, who work for at least four days per week, are entitled to three days paid family responsibility leave each year in the following circumstances – (a) when the employee's child is born; (b) when the employee's child is sick; (c) in the event of a death of – (i) the employee's spouse or life partner; (ii) the employee's parent, adoptive parent, grandparent, child, adopted child, grandchild or sibling.
SCC 59.3.12	**Statement of Conditions** (a) An Employer must give a worker a statement containing the following details at the start of employment – (i) the Employer's name and address and the name of the SPWP; (ii) the tasks or job that the worker is to perform; and (iii) the period for which the worker is hired or, if this is not certain, the expected duration of the Contract; (iv) the worker's rate of pay and how this is to be calculated; (v) The training that the worker will receive during the SPWP. (b) An Employer must ensure that these terms are explained in a suitable language to any employee who is unable to read the statement.

	(c) An Employer must supply each worker with a copy of these Conditions of employment.

SCC 59.3.13	**Keeping Records** (a) Every Employer must keep a written record of at least the following – (i) the worker's name and position; (ii) in the case of a task-rated worker, the number of tasks completed by the worker; (iii) in the case of a time-rated worker, the time worked by the worker; (iv) Payments made to each worker. (b) The Employer must keep this record for a period of at least three years after the completion of the SPWP.
SCC 59.3.14	**Payment** (a) An Employer must pay all wages at least monthly in cash or by cheque or into a bank account. (b) A task-rated worker will only be paid for tasks that have been completed. (c) An Employer must pay a task-rated worker within five weeks of the work being completed and the work having been approved by the manager or the Contractor having submitted an invoice to the Employer. (d) A time-rated worker will be paid at the end of each month. (e) Payment must be made in cash, by cheque or by direct deposit into a bank account designated by the worker. (f) Payment in cash or by cheque must take place – (i) at the workplace or at a place agreed to by the worker; (ii) during the worker's working hours or within fifteen minutes of the start or finish of work; (iii) In a sealed envelope which becomes the property of the worker. (g) An Employer must give a worker the following information in writing – (i) the period for which payment is made; (ii) the numbers of tasks completed or hours worked; (iii) the worker's earnings; (iv) any money deducted from the payment; (v) The actual amount paid to the worker. (h) If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it

	(i) If a worker's employment is terminated, the Employer must pay all monies owing to that worker within one month of the termination of employment.
SCC 59.3.15	**Deductions** (a) An Employer may not deduct money from a worker's payment unless the deduction is required in terms of a law. (b) An Employer must deduct and pay to the SA Revenue Services any income tax that the worker is required to pay. (c) An Employer who deducts money from a worker's pay for payment to another person must pay the money to that person within the time period and other requirements specified in the agreement law, court order or arbitration award concerned. (d) An Employer may not require or allow a worker to – (i) repay any payment except an overpayment previously made by the Employer by mistake; (ii) state that the worker received a greater amount of money than the Employer actually paid to the worker; or (iii) Pay the Employer or any other person for having been employed.
SCC 59.3.16	**Health and Safety** (a) Employers must take all reasonable steps to ensure that the working environment is healthy and safe. (b) A worker must – (i) work in a way that does not endanger his/her health and safety or that of any other person; (ii) obey any health and safety instruction; (iii) obey all health and safety rules of the SPWP; (iv) use any personal protective equipment or clothing issued by the Employer; (e) Report any accident, near-miss incident or dangerous behaviour by another person to their Employer or manager.
SCC 59.3.17	**Compensation for Injuries and Diseases** (a) It is the responsibility of the Employers (other than a Contractor) to arrange for all persons employed on a SPWP to be covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993. (b) A worker must report any work-related injury or occupational disease to their Employer or manager. (c) The Employer must report the accident or disease to the Compensation Commissioner. (d) An Employer must pay a worker who is unable to work because of an injury caused by an accident at work 75% of their earnings for up to three months. The Employer will be refunded this amount by the Compensation Commissioner. This does NOT apply to injuries caused by accidents outside the workplace such as road accidents or accidents at home.

SCC 59.3.18	**Termination** (a) The Employer may terminate the employment of a worker for good cause after following a fair procedure. (b) A worker will not receive severance pay on termination. (c) A worker is not required to give notice to terminate employment. However, a worker who wishes to resign should advise the Employer in advance to allow the Employer to find a replacement. (d) A worker who is absent for more than three consecutive days without informing the Employer of an intention to return to work will have terminated the Contract. However, the worker may be re-engaged if a position becomes available for the balance of the 24-month period. (e) A worker who does not attend required training events, without good reason, will have terminated the Contract. However, the worker may be re-engaged if a position becomes available for the balance of the 24-month period.
SCC 59.3.19	**Certificate of Service** On termination of employment, a worker is entitled to a certificate stating – (i) the worker's full name; (ii) the name and address of the Employer; (iii) the SPWP on which the worker worked; (iv) the work performed by the worker; (v) any training received by the worker as part of the SPWP; (vi) the period for which the worker worked on the SPWP; (vii) Any other information agreed on by the Employer and worker.
SCC 59.3.20	**Reporting** The Contractor shall report the breakdown of each payment certificate into the broad categories of: a) Overheads, b) Supervision, c) Materials, d) Plant, and e) Labour. The Contractor shall further report for each payment certificate the person-days of employment as set out in the Pro Forma, Schedule X: Monthly Labour Report. In the calculation of person-days, a day shall be taken as 8 hours and no time over and above 8 hours per day shall be used to contribute to the number of person-days reported.
SCC 59.3.21	**Source of Labour** The Contractor shall source his labour from the local area through the services of an appropriate Councillor or Community Liaison Officer or another appointed person who has contact with a labour pool in the area.

3. TRANSFER OF RIGHTS

The successful tenderer should complete and submit a Transfer of Rights Form to claim for materials on site with every progress payment for the project. No payment for materials on site would be granted if this Document is not submitted with the progress payment being considered.

TRANSFER OF RIGHTS

TRANSFER OF RIGHTS AND INDEMNITY (To be completed during construction by successful Tenderer only)

Claim for materials on site, Payment Certificate No. …… **Date:** ……

Contract No: …….. For (Contract title) ……

……

I, the undersigned (name of signatory) ……..… in my capacity as

…….. of (name of Contractor) ……

duly authorised hereto on behalf of the Contractor hereby transfer, cede and assign all the Contractor's rights, title and interest in and to the materials and goods, for which evidence of bona fide ownership is attached hereto, unto and in favour of (name of Employer) ……. insofar as the Contractor retains actual control of the materials and goods, the right of ownership thereof passes to the Employer by *constitutum possessorium.*

I herewith indemnify the Employer against any claim to and in respect of said materials by reason of the Contractor's sequestration or liquidation or of any defect in the Contractor's title to the materials and agree that no payment for materials on site will be made by the Employer until such time as I have submitted documentary proof of bona fide ownership of the said materials and goods.

This transfer shall become effective upon conclusion of the Contractor receiving payment from the Employer or from any other person on behalf of the Employer for the materials and goods as Materials on Site, payment of retention money thereon excluded.

I further confirm that I am fully responsible for all materials and goods listed under this Transfer of Rights and that they have been insured adequately against all risks and will remain insured until they are built into or used in the permanent works and taken over by the Employer.

This certificate of Transfer of Rights applies only to the materials and goods as listed in the following table.

Description of Item	Unit	Quantity	Rate	Amount	Supplier
Total Value of Materials and goods					

Signed by: ……Date: ……..……..……
for and on behalf of the Contractor.

Witnessed by: …….. Date: ……

NOTE: This form, together with the documentary proof of ownership or proof of payment by the Contractor to the supplier, shall accompany the Contractor's claim for payment for materials on site in terms of Clause 49.1.5 of the General Conditions of Contract 2010.

C1.2.2 PART A: DATA PROVIDED BY THE EMPLOYER

The following Contract Specific Data are applicable to this Contract.

REFERENCE	CONTRACT SPECIFIC DATA BY THE EMPLOYER
Clause 1.1.14:	**Name of Employer:** Limpopo Department of Agriculture & Rural Development, Polokwane
Clause 1.2.2:	**Address of Employer:**

Physical:	Postal:
Limpopo Department of Agriculture 69 Biccard Street Polokwane 0700 Telephone No: (015) 294 3000	Limpopo Department of Agriculture P Bag X9487 Polokwane 0700 Fax No: (015) 294 4535

Clause 1.1.15:	**Name of Engineer: Sibuyi DE**
Clause 1.2.2:	**Address of Engineer:**

Physical:	**Postal:**
Public Works Building **Lebowakgomo Zone A** **0745** **E-Mail: sibuyide@gmail.com** **Telephone No: 015 632 7000**	**Public Works Building** **Private Bag x01** **Chuenespoort** **0745** **Fax No: 086 656 0601**

Clause 1.6 & 38.1:	Special non-working days are Sundays and the following statutory public holidays as declared by National or Regional Government: New Year's Day, Human Rights Day, Good Friday, Family Day, Freedom Day, Workers day, Youth Day, National Women's Day, Heritage Day, Day of Reconciliation, Christmas Day and the Day of Goodwill including the construction industry year end break.
Clause 1.6:	The year end break commences on the first working day after 15 December and ends on the first working day after 5 January of the next year.
Clause 2.3:	The Engineer is required to obtain the specific approval of the Employer for the following: The Engineer requires Departmental approval in order to authorise any expenditure in excess of the Tender Sum.
Clause 7:	Performance Guarantee to be delivered within 14 days of the Commencement Day. The total liability under the guarantee should not be less than 10% of the tender amount, excluding VAT.
Clause 10.1:	The Contractor shall commence executing the work within 14 days of the Commencement date.
Clause 12.2:	The Contractor shall deliver his programme of work within 14 days of the Commencement date.

Clause 35.1.1.2.2: The value of material to be supplied by the Employer is nil.

Clause 35.1.1.2.3: The amount to cover Professional fees for repairing damage and loss to be included in the Insurance sum is R 200 000.00

Clause 35.1.3: The limit of indemnity for Liability Insurance is R 5 000 000.00 for any single liability claim. Liability insurance shall include spread of fire risk.

Clause 37.2.2.3: The percentage allowance to cover overhead charges is 15%.

Clause 42.1: The Works shall be completed within 12 months excluding special non-working days and the year end break.

Clause 43.1: The penalty for failing to complete the works is 0.05% of the Total Tender Sum per Calendar Day.

Clause 46: No Contract Price Adjustment will be allowed for this Contract.

Clause 49.1.5: The percentage advance on materials not yet built into the Permanent Works is: 80%

Clause 49.3: The percentage retention on the amounts due to the Contractor is 10%, excluding Contract Price Adjustment, Contingencies and VAT, and limited to 5% of the Contract amount, excluding Contract Price Adjustment, Contingencies and VAT.

Clause 49.6: A Retention Money Guarantee will **not** be permitted.

Clause 53.1: The Defects Liability Period is 12 months measured from the date of the Certificate of Completion.

Clause 58.1.4 Dispute resolution shall be by Adjudication.

Clause 58.3: Dispute Resolution shall be by Adjudication.

C1.2.2: PART B: DATA PROVIDED BY THE CONTRACTOR

The following Contract Specific Data are applicable to this Contract:

REFERENCE **CONTRACT SPECIFIC DATA BY THE CONTRACTOR**

Clause 1.1.8: **Name of Contractor**: ……..

Clause 1.2.2: **Address of the Contractor**:

Physical: Postal:

....

....

....

....

E-Mail: .....

Telephone No: ……..... Fax No: ……

Clause 46.3: The variation in cost of all special materials is to be provided in the table SM 1 for special materials.

The rates and prices for the special materials shall be furnished by the Tenderer, which rates and prices shall not include VAT but shall include all other obligatory taxes and levies. **The quoted price is the ruling price on the Month prior to close of tender.**

TABLE: SM1

Special material	**Unit on which variation will be determined**		**Price for base month ex factory, excluding transport, labour or any other costs.**
	Containers	Delivered in bulk	

* Contractor to indicate the type, unit and rate of special material to be listed. When called upon to do so, the Contractor shall substantiate the above rates or prices with acceptable documentary evidence. Contractor to provide any other Special Materials if deemed necessary

C1.3 FORM OF GUARANTEE - PRO FORMA

Contract No.
WHEREAS **The Limpopo Department of Agriculture & Rural Development** (hereinafter referred to as the Employer") entered into, a Contract with:

. . . . . .

(Hereinafter called "the Contactor") on the . . . . . day of . . . . . 20. . . . . .

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE
AND WHEREAS it is provided by such Contract that the Contractor shall provide the Employer with security by way of a Guarantee for the due and faithful fulfilment of such Contract by the Contractor;

AND WHEREAS . . . . . has / have at the request of the Contractor, agreed to give such Guarantee;

NOW THEREFORE WE . . . . do hereby Guarantee and bind ourselves jointly and severally as Guarantor and Co-Principal Debtors to the Employer under renunciation of the benefits of division and execution for the due and faithful performance by the Contractor of all the Terms and Conditions of the said Contract, subject to the following Conditions:

1. The Employer shall, without reference and / or notice to us, have complete liberty of action to act in any manner authorized and/or contemplated by the terms of the said Contract, and/or to agree to any modifications, variations, alterations, directions or extensions of the completion date of the works under the said Contract, and that its rights under this Guarantee shall in no way be prejudiced nor our liability hereunder be affected by reason of any steps which the Employer may take under such Contract, or of any modification, variation, alterations of the completion date which the Employer may make, give, concede or agree to under the said Contract.

2. This Guarantee shall be limited to the payment of a sum of money.

3. The Employer shall be entitled, without reference to us, to release any Guarantee held by it, and to give time to or compound or make any other arrangement with the Contractor.

4. This Guarantee shall remain in full force and effect until the issue of the Certificate of Completion in terms of the Contract, unless we are advised in writing by the Employer before the issue of the said Certificate of his intention to institute claims, and the particulars thereof, in which event this Guarantee shall remain in full force and effect until all such claims have been paid or liquidated.

5. Our total liability hereunder shall not exceed the Guaranteed Sum of:

   . . . . . .

   . . . . Rand (in words);

   R. . . . . (in figures)

6. The Guarantor reserves the right to withdraw from this Guarantee by depositing the Guaranteed Sum with the beneficiary, whereupon our liability hereunder shall cease.

7. We hereby choose our address for the serving of all notices for all purposes arising here from as

   . . . . . .

   . . . . . .

   . . . . . .

. . . . . .

IN WITNESS WHEREOF this Guarantee has been executed by us at . . . . . .

on this . . . . . day of . . . . . 20 . . . . . .

Signature . . . . . .

Duly authorized to sign on behalf of . . . . . .

Address . . . . . .

. . . . . .

. . . . . .

As witnesses:

1 . . . . . .

2 . . . . . .

C1.4: AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT NO 85 OF 1993

THIS AGREEMENT is made between **The Limpopo Department of Agriculture & Rural Development**

(hereinafter called the EMPLOYER of the one part, herein represented by:

....

in his capacity as: ..... ;

AND: ....

(hereinafter called the CONTRACTOR) of the other part, herein represented by .....

....

in his capacity as: .....

duly authorised to sign on behalf of the Contractor.

WHEREAS the CONTRACTOR is the Mandatory of the EMPLOYER in consequence of an Agreement between the CONTRACTOR and the EMPLOYER in respect of

CONTRACT NO: ACDP……. THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

AND WHEREAS the EMPLOYER and the CONTRACTOR have agreed to enter into an agreement in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act No 85 of 1993, as amended by OHSA Amendment Act No 181/1993 (hereinafter referred to as the ACT);

NOW THEREFORE the parties agree as follows:

1. **The CONTRACTOR undertakes to acquaint the appropriate officials and employees of the CONTRACTOR with all relevant provisions of the ACT and the regulations promulgated in terms thereof.**

2. The CONTRACTOR undertakes to fully comply with all relevant duties, obligations and prohibitions imposed in terms of the ACT and Regulations: Provided that should the EMPLOYER have prescribed certain arrangements and procedures that same shall be observed and adhered to by the CONTRACTOR, his officials and employees. The CONTRACTOR shall bear the onus of acquainting himself/herself/itself with such arrangements and procedures.

3. The CONTRACTOR hereby accepts Sole Liability for such due compliance with the relevant duties, obligations, prohibitions, arrangements and procedures, if any, imposed by the ACT and Regulations, and the CONTRACTOR expressly absolves the EMPLOYER and the Employer's ENGINEERS from being obliged to comply with any of the aforesaid duties, obligations, prohibitions, arrangements and procedures in respect of the work included in the Contract.

4. The CONTRACTOR agrees that any duly authorised officials of the EMPLOYER shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the CONTRACTOR has complied with his undertakings as more fully set out in paragraphs 1 and 2 above, which steps may include, but shall not be limited to, the right to inspect any appropriate site or premises occupied by the CONTRACTOR, or to take such steps it may deem necessary to remedy the default of the CONTRACTOR at the cost of the CONTRACTOR.

5. The CONTRACTOR shall be obliged to report forthwith to the EMPLOYER any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the ACT and Regulations, pursuant

to work performed in terms of this agreement, and shall, on written demand, provide full details in writing of such investigation, complaint or criminal charge.

Thus signed at ..……..……...……..…….. for and on behalf of the CONTRACTOR

on this the …… day of ……...……..…… 20…….

SIGNATURE: .....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. .....

2. .....

Thus signed at …… for and on behalf of the EMPLOYER on this

the …….. day of ……..…… 20…….

SIGNATURE: .....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. .....

2. .....

PART C2: PRICING DATA

C2.1: PRICING INSTRUCTIONS

C2.2: BILL OF QUANTITIES

LIMPOPO DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

C2.1 Pricing Instructions

1. Measurement and payment shall be in accordance with the relevant provisions of the General Conditions of Contract (2010 edition) as amended in the Scope of Works.

2. The units of measurement described in this Bill of Quantities are metric units. Abbreviations used in the Bill of Quantities are as follows:

%	=	percent
h	=	hour
ha	=	hectare
kg	=	kilogram
kl	=	kilolitre
km	=	kilometre
km-pass	=	kilometre-pass
kPa	=	kilopascal
kW	=	kilowatt
l	=	litre
m	=	metre
mm	=	millimetre
m²	=	square metre
m²-pass	=	square metre-pass
m³	=	cubic metre
m³-km	=	cubic metre-kilometre
MN	=	meganewton
MN.m	=	meganewton-metre
MPa	=	megapascal
No.	=	number
Prov sum	=	Provisional sum
PC sum	=	Prime Cost sum
R/only	=	Rate only
sum	=	lump sum
t	=	ton (1000 kg)
W/day	=	Work day

3. For the purpose of this Bill of Quantities, the following words shall have the meanings hereby assigned to them:

Unit:	The unit of measurement for each item of work as defined in the Specifications
Quantity:	The number of units of work for each item.
Rate:	The agreed payment per unit of measurement.
Amount:	The product of the quantity and the agreed rate for an item.
Lump sum:	An agreed amount for an item, the extent of which is described in the Bills of Quantities but the quantity of work of which is not measured in any units.

4. Unless otherwise stated, items are measured net in accordance with the Drawings, and no allowance is made for waste.

5. The prices and rates in this Bill of Quantities are fully inclusive prices for the Work described under the items. Such prices and rates cover all costs and expenses that may be required in and for the execution of the Work described in accordance with the provisions of the Scope of Work, and shall cover the cost of all

general risks, liabilities, and obligations set forth or implied in the Contract Data, as well as overhead charges and profit. These prices will be used as a basis for assessment of payment for additional Work that may have to be carried out.

6. It will be assumed that prices included in the Bill of Quantities are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date for Bids. (Refer to www.stanza.org.za or www.iso.org for information on Standards)

7. Where the Scope of Work requires detailed Drawings and designs or other information to be provided, all costs associated therewith are deemed to have been provided for and included in the unit rates and sum amounts Bidded for such items

8. An item against which no price is entered will be considered to be covered by the other prices or rates in the Bill of Quantities. A single Lump Sum will apply should a number of items be grouped together for pricing purposes.

9. The quantities set out in this Bill of Quantities are approximate and do not necessarily represent the actual amount of Work to be done. The quantities of work accepted and Certified for Payment will be used for determining payments due and not the quantities given in this Bill of Quantities.

10. The short descriptions of the items of payment given in this Bill of Quantities are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.

11. The item numbers appearing in the Bills of Quantities refer to the corresponding item numbers in the Specifications where applicable.

12. Those parts of the contract to be constructed using labour-intensive methods have been marked in the Bills of Quantities with the letters “LI” in a separate column filled in against every item so designated. The works, or parts of the works so designated are to be constructed using labour-intensive methods only. The use of plant to provide such works, other than plant specifically provided for in the scope of work, is a variation to the contract. The items marked with the letters LI are not necessarily an exhaustive list of all the activities which must be done by hand, and this clause does not over-ride any of the requirements in the generic labour intensive specification in the Scope of Works.

13 Payment for items which are designated to be constructed labour-intensively (either in this schedule or in the Scope of Works) will not be made unless they are constructed using labour-intensive methods. Any unauthorised use of plant to carry out work which was to be done labour-intensively will not be condoned and any works so constructed will not be certified for payment.

Tompi Seleka Oil Refinery BOQ

SECTION : PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
	SABS 1200 A	**SECTION : PRELIMINARY AND GENERAL**				
1,1	PSA 8	**Fixed charges**				
1.1.1		Contractual requirements and obligations including insurance of works	Sum	1		
1.1.2		Establish facilities on site for the contractor:				
1.1.3		Storage shed	Sum	1		
1.1.4		Furnished 20m^2 site office	Sum	1		
1.1.5		Provision of sanitation facilities	Sum	1		
1.1.6		Water supply, electric power and communications	Sum	1		
1.1.7		Occupational Health & Safety, including preparation and implementation of a Health & Safety Plan, staff training in OHS and provision of safety gear, Covid19 measures, etc.	Sum	1		
1.1.8		Construction notice board	No	2		
1.1.9		Supply Operation and Maintenance Manual	No	3		
1.1.10		Provide training to beneficiaries	Days	3		
1.1.11		Compilation of a Risk Assessment prior to construction.	Sum	1		
1.1.12		Health and Safety Induction Training of employees	Sum	1		
1.1.13		Compilation and the keeping up to date of a Health and Safety file, which shall include all documentation required in terms of the Act	Sum	1		
1.1.14		Removal of Site establishment on completion	Sum	1		
1,2	PSA 8	**Time - Related items**				
1.2.1		Contractual requirements	Sum	12		
1.2.2		Operate & maintain facilities on site for Contractor				
1.2.2.1		Storage shed	Sum	12		
1.2.2.2		Furnished 20m^2 site office	Sum	12		
1.2.2.3		Provision of sanitation facilities	Sum	12		
1.2.2.4		OHS, all including Covid19 complience	Sum	12		
1.2.2.5		Water supply, electric power and communications	Sum	12		
1.2.3		Compensation to CLO appointed from local community	Prov Sum	12	4000	48 000
1.2.3.1		Mark up on 1.2.3	%	48 000		
1.2.4		Provide a sum to Service, modify and design where required, repair and recommission of the existing plant and Equipment to match/make suitable for new plant by an approved specialist	Prov Sum	1	1 700 000	1 700 000
1.2.4.1		Mark up on 1.2.4	%	1 700 000		
Total carried forward to summary						

Tompi Seleka Oil Refinery BOQ

ITEM NO	SPEC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
2,1		**SECTION :CIVIL WORKS**				
		ALTERATIONS				
2.1.1		Hydro wash affected floor area with rotating nozzle (to a minimum of 250 bar water pressure)	m²	300		
2.1.2		Supply resources and Excavate in pickable material not exceeding 2m deep below natural or reduced ground level for lean-to structure	m³	20		
2.1.3		Supply resources and Excavate in hardrock material	m³	5		
2.1.4		Supply and perform soil treatment using approved pest control operator and provide certificate for the applied area and operator's registration certificate	m²	150		
2.1.5		Provisional sum for external adjacent roofing shed complete with closed off penetrations to existing building as per new equipment needs and directed by the engineer	Prov Sum	1	400 000	400 000
2.1.6		Mark up on above item	%	400 000		
2.1.7		Supply, deliver and cast 25MPa concrete (19mm) for plinths and floors for ancillary external equipment	m³	30		
2.1.8		Supply and work casted concrete floor/screed to steel float finish	m²	30		
2.1.9		Supply and install 8mm Mild steel reinforcement to structural concrete work	ton	0,4		
2.1.10		Supply and erect 230mm wide double brick wall using clay stock bricks of at least 14MPa with brickforce on every second layer for foundations	m²	120		
2.1.11		Supply and erect 230mm wide double brick wall using clay stock bricks of at least 14MPa with brickforce on every third layer for walls below 3m height	m²	140		
2.1.12		Supply and erect 230mm wide double brick wall using clay stock bricks on the inside and jointed face bricks of at least 14MPa with brickforce on every third layer for walls	m²	100		
2.1.13		Supply and install Precast prestressed concrete lintels 112mm wide x 75mm deep in length not exceeding 3m	m	30		
2.1.14		Supply and plaster walls with 10mm smooth finished mortar plaster	m²	100		
2.1.15		Allow provisional sums for installation and alterations of closures and doors	Prov Sum	1	50 000	50000
2.1.16		Profit over above item	%	50 000		
2.1.17		Any penetrations to existing building for external services and the making good on completion	m²	10		
2.1.18		Epoxy flooring in the purified oil room and other instructed areas	m²	200		
2.1.19		Supply and install Stainless steel sheets ceiling on the purified oil room including supports and ceiling panels	m²	100		
		DRIVEWAYS				
2.1.18		Clear and grub width strips along the road to form a 7m wide road	m²	14 000		
2.1.19		Excavate in all material and remove the 450mm soil profile along the road	m³	6 300		
2.1.20		Compact the roadbed to 90% MOD AASHTO	m²	14 000		
2.1.21		Source and Import G5 material within college borrow pit and compact sub-base to 98% MOD AASHTO in layers of 150mm, forming a 300mm profile on a 6.5m wide road	m³	6 300		
2.1.22		20MPa concrete forming for the edge/kerbs restraints	m³	5		

2.1.23		Factory mould/prefabricated, 1m long, road concrete kerb, 25MPa min	No	4 000		
2.1.24		Factory mould/fabricated concrete, 330mm long, road kerb, 25MPa min	No	30		
2.1.25		Level and roll sand forming a 30mm profile along the road	m^3	370		
2.1.26		80mm Interlocking unicurve "Type A" paving bricks of 25 Mpa strength with 1% outwards drainage slope from centre. Including dry mix of fine sand and cement of 5:1 and compaction on the paving blocks joints	m^2	12 000		
2.1.27		Supply, delivery and installation of signs as per the Engineer's instruction	PC Sum	1	25 000	25 000,00
2.1.28		Mark-up on item 4.2.15 above	%	25 000		
		Plumbing Pipes				
		Excavate in all soft to intermediate materials for trenches, including backfill selected material, compact and dispose surplus material, to a depth of 1000mm and base width of 600mm, sewage /water pipe lines	m	500		
		Supply and install 50mm PVC pipe including straight coupling	m	24		
		Supply and install 50mm PVC pipe fittings such as bends, eyes,	item	5		
		Supply and install 160mm waste PVC pipe including straight coupling	m	200		
		Supply and install 160mm waste PVC pipe fittings such as bends, eyes,junction, etc	item	10		
		Supply and install 95mm uPVC CL6 pipe including straight coupling	m	300		
		Supply and install fully galvanized 150mm steel pipes	m	20		
				Total carried forward		

Oil Refinery Plant

OIL PLANT

ITEM NO	SPEC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
		SECTION : (PLANT)				
3.1.1		Supply, deliver, Install and test a complete vegetable oil refining plant to process 200l/h raw sunflower oil and 60 l/h raw soya oil into edible oil	sum	1		
3.1.2		Commissioning and Testing of the complete plant running	Sum	1		
		EQUIPMENT				
3,2		**BLEACHING:**				
3.2.1		Supply, deliver and install Kettle for refinery LYYG-100 or equivalent	No.	2		
3.2.2		Supply, deliver and install Heated stirrred tank for hot water and alkaline slurry 100x50x40	No.	1		
3.2.3		Supply, deliver and install Movable oil dispensing pump on wheels in food grade SS 316 with flexible food grade pvc piping	No.	1		
3.2.4		Supply, deliver and install Bleaching tank O325x400 or equivalent	No.	1		
3.2.5		Supply, deliver and install Pump for bleached oil slurry	No.	1		
3.2.6		Supply, deliver and install Tank for bleaching LYSG-100 or equivalent	No.	1		
3.2.7		Supply, deliver and install Filter press 4m2	No.	1		
3.2.8		Supply, deliver and install Pipes, valves, fittings for oil feeding from pump to filter.	Prov Sum	1	50 000	50 000
		Profit over item above	%	50 000		
3.2.9		Supply, deliver and install Instuments for MCCs and control units for equipment installed	Sum	1		
3.2.10		Supply, deliver and install Oil blowing tank	No.	1		
3.2.11		Supply, deliver and install movable oil pump on wheels with flexible food grade piping	No.	1		
		STEELWORK				
3.3.1		Supply, deliver and install Platform for Bleaching tank and Filter with access cat ladder to fit with offered equipment.	No	1		
3.3.2		Extra over Supply, deliver and install main support frames for threaded anchor bars and 2 adjusting nuts per bar epoxied into concrete floor with ABE epidermix 395. (Set of 3 anchors)	No	12		
3,4		**DEODORISING AND FILTRATION:**				
3.4.1		Supply, deliver and install Kettle for deodorizing LYG-100 or equivalent	No	1		
3.4.2		Supply, deliver and install Gas - liquid separator O325x400 or equivalent	No.	1		

3.4.3		Supply, deliver and install Steam generator ZG'3.6 or equivalent	No.	1		
3.4.4		Supply, deliver and install Vacuum pump QSWJ40 or equivalent	No.	1		
3.4.5		Supply, deliver and install Conduction oil stove YGL-120 or equivalent	No.	1		
3.4.6		Supply, deliver and install Tank for conduction oil dia 80x100	No.	1		
3.4.7		Supply, deliver and install Seperator dia 50x60	No	1		
3.4.8		Supply, deliver and install Gear pump KCB - 33.3 or equivalent	No.	1		
3.4.9		Supply, deliver and install Discoloured oil pump RY25-25-160 or equivalent	No.	1		
3.4.10		Supply, deliver and install Conduction oil pump RY40-25-160 or equivalent	No.	1		
3.4.11		Supply, deliver and install Crystallizer JJG.100 or equivalent	No.	2		
3.4.12		Supply, deliver and install Freezing saline tank 150x100x150	No.	1		
3.4.13		Supply, deliver and install Refrigeration unit 50 KW 503FSV@-F or equivalent to be mounted externally.	No.	1		
3.4.14		Supply, deliver and install Air compressor D3 or equivalent	No.	1		
3.4.15		Supply, deliver and install Frame filter press TYCB65X30 or equivalent	No.	1		
3.4.16		Supply, deliver and install Dewaxed oil tank 120x150x150	No.	1		
3.4.17		Supply, deliver and install Wax tank dia 60x120	No.	1		
3.4.18		Supply, deliver and install Gear pump 2CY5/0.33-1 or equivalent	No.	1		
3.4.19		Supply, deliver and install Saline pump 40VHB-2K-A-10-30 or equivalent	No.	1		
3.4.20		Supply, deliver and install Diaphram pump to fit with the Saline pump	No.	1		
3,5		**OIL FILTRATION AND BOTTLING AND LABLELING**				
3.5.1		Supply, deliver and install Precoat oil leaf filter with 300l/h clean flow capacity	No.	1		
3.5.2		Supply, deliver and install Filter aid stiring tank 500l/h capacity	No	1		
3.5.3		Supply, deliver and install Filter aid slurry pump with 500l/h capacity	No	1		
3.5.4		Supply, deliver and install Buffer tank for filtered oil in SS316 with 2000 l capacity	No.	1		
3.5.5		Supply, deliver and install Mobile final product pump in SS 316 on platform of same on wheels	No	1		
3.5.6		Supply, deliver and install Plates and frame filter for oil brightening with manual opening and closing screwed pusher press with collecting vessel for spilt oil and integrated oil pump with manual start/stop all in SS 316.	No.	1		

3.5.7		Supply, deliver and install Rotary bottle feeding table with a cacity to handle 1000 l/h of 1l bottles or 2l bottles with manual feed to fill 20 litre bulk containers all in SS 316.	Sum	1		
3.5.8		Supply, deliver and install rotary filling /capping head with feed conveyor with a 10 nozzle tatary filling section to handle 1000 l/h of both 1l and 2l PET bottles with push on caps complete with control panel, tools for 1l bottles and 2l bottles and a manual take off filler for 20 l bulk containers	Sum	1		
3.5.9		Supply, deliver and install Linear labelling machine for the application of self adhesive labels on round 1l bottles or square 2l bottles with an adjustable variable speed conveyor, with adjustable guides and labelling speed rotation to match the filling vessels with a capacity of 1000 bottles/h	Sum	1		
3.5.10		Supply, deliver and install Working tables in SS 316 for bottles and packaging. 3x1	No.	3		
3.5.11		Supply, deliver and install All pipe, valves and fittings from clean oil supply pump to filter and filling station in SS 316 for fixed installations with fittings, or food spec pvc for flexible hoses.	Sum	1		
3.5.12		Supply, deliver and install MCCs/All control systems including manual emergency stops on all electrical equipment within hand reach of the operator	Sum	1		
		Operational Equipment provisional sums				
3.5.13		Supply, deliver and install All PET 1l, 2l and 20l containers with labels and packing cartons with caps for 6 months of production	Prov Sum	1	70 000	70 000
3.5.13		Supply, deliver and install clothing including white overalls, white boots, disposable gloves, hair and beard nets for 6 months operation	Prov Sum	1	45 000	45 000
3.5.14		Supply, deliver and install all operating inputs including chemicals, slurry mix, cleaning materials, cleaning utensils, waste transportable sealable drums, recording equipment for a 6 month operational period	Prov Sum	1	60 000	60 000
3.5.15		Supply, deliver all micro lab tools and equipments with tables and chairs	Prov Sum	1	70 000	70 000
3.5.16		Relocation of Existing Bio-Diesel plant into the Oil Refinery Building	Prov Sum	1	150 000	150 000
3.5.17		Profit for above items	%	395 000		
		Existing Plant Service and Repairs and Modifications				
3.5.17		Provide a sum to Service, modify and design where required, repair and recommission of the existing plant and equipment and match/connect/make suitable for new plant by an approved/nominated specialist	Prov Sum	1	1 800 000	1 800 000
		Mark up on 1.2.4	%	1 800 000		
					Total carried forward to summary	

Tompi Seleka Oil Refinery BOQ

Control Equipment

ITEM NO	SPEC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
	PS 11.4	**SECTION : PROCESS (CONTROL)**				
		Supply,deliver and install:				
4,1		**CONTROL BOXES**				
4.1.1		MCC control boxes complete with all Connections, Switches, Indicator Lights and Labels to the Specifications.	Sum	5		
4.1.2		Siren Box complete with light and Siren.	Sum	1		
4.1.3		Supply delivery and installation of 100 mm2 380vkVa cable from main incomer, making off and making good to New Main DB	m	50		
4.1.4		Supply and delivery of a dedicated Main DB to accept the main incomer with dedicated surge arrestors and dedicated earthing given the unreliable supply quality	Sum	1		
4.1.5		Dedicated main DB with all controls and cablling to the selected suppliers own supplied main MCC's	Prov Sum	1	120 000	120 000
4.1.6		Extra over to make good of the protection any extraneous vulnerable electronic control equipment.	Prov Sum	1	20 000	20 000
4.1.8		Silo 1	Prov Sum	1	40 000	40 000
4.1.9		Silo 2	Prov Sum	1	35 000	35 000
4.1.10		Silo 3	Prov Sum	1	35 000	35 000
4.1.11		Well extraction plant	Prov Sum	1	35 000	35 000
4.1.12		Storage	Prov Sum	1	35 000	35 000
4.1.13		Toilet	Prov Sum	1	20 000	20 000
4.1.14		Silo overhead structure	Prov Sum	1	30 000	30 000
4.1.15		Weighbridge	Prov Sum	1	150 000	150 000
4.1.16		Weighbridge office	Prov Sum	1	70 000	70 000
4.1.17		Steel tanks	Prov Sum	1	30 000	30 000
4.1.18		Facility licencing	Prov Sum	1	200 000	200 000
4.1.19		Markup on above items **(Max 5%)**	%	820 000		
4.2.1		Provision to Supply and install Standby Generator with 2m high palisade fencing, roof structure, concrete floors (different slopes) , 2500l standby diesel tank inside the palisade and cabling	Provi Sum	1	900 000	900 000
4.2.2		Provision and replace power transformer with the 250kVA or as per Engineer's instruction	Prov Sum	1	350 000	350 000
4.2.3		Markup on 1.1 above **(Max 5%)**	%	1 250 000		
Total carried forward to summary						

Tompi Seleka Oil Refinery BOQ

Miscellaneous

ITEM NO	SPEC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
5		**Miscellaneous**				
5,1		Appoint accredited specialist lightning protection and earthing to supply deliver and install required earthing and ligtning protection infrastructure to:				
5.1.1		Silo 1	Prov Sum	1	35 000	35 000
5.1.2		Silo 2	Prov Sum	1	35 000	35 000
5.1.3		Silo 3	Prov Sum	1	35 000	35 000
5.1.4		Well extraction plant	Prov Sum	1	45 000	45 000
5.1.5		Storage	Prov Sum	1	42 000	42 000
5.1.6		Silo overhead structure	Prov Sum	1	35 000	35 000
5.1.7		Weighbridge	Prov Sum	1	40 000	40 000
5.1.8		Weighbridge office	Prov Sum	1	35 000	35 000
5.1.9		Steel tanks	Prov Sum	1	40 000	40 000
5.1.10		Markup on above **(Max 5%)**	%	342 000		
5.1.11		Cleaning material and equipment	Prov Sum	1	50 000	50 000
5.1.12		Fire protection specialist appointment and implementation of protection features	Prov Sum	1	200 000	200 000
5.1.13		6m Storage Container	Prov Sum	1	90 000	90 000
5.1.14		Signage	Prov Sum	1	20 000	20 000
5.1.15		Waste oil container 5000l	Prov Sum	1	75 000	75 000
5.1.16		Markup on above **(Max 5%)**	%	435 000		
Total carried forward to summary						

Tompi Seleka Oil Refinery BOQ

SUMMARY

NO	SECTION	AMOUNT R
1	**Preliminary and General**	
2	**Civil Works**	
3	**Oil refinery Plant**	
4	**Control_PC**	
5	**Miscellaneous**	
	SUB TOTAL A	
	CONTINGENCIES (15% OF SUBTOTAL A)	
	SUB TOTAL B	
	VALUE-ADDED TAX (VAT)(15% ON SUBTOTAL B)	
	TOTAL TENDER AMOUNT	

AMOUNT IN WORDS:

SIGNATURE OF TENDERER Date

PART C3: SCOPE OF WORK

C3.1: STANDARD SPECIFICATIONS

C3.2: PROJECT SPECIFICATIONS

C3.3: PARTICULAR SPECIFICATIONS

LIMPOPO DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

C3: SCOPE OF WORK

To establish a grain oil refinery plant at the existing crude oil plant at Tompi Seleka Agricultural College. The plant establishment will consist of the design, supply, delivery, installation and commissioning of new refinery equipment matched and connected to the existing facility to **process 200l/h raw sunflower oil and 60 l/h raw soya oil into edible oil**. Commissioning will also include testing, repairing and re-commissioning of all existing infrastructure to provide a functional plant. This plant must comply with all the SABS standards and food & health regulations.

The following processes steps are required, to achieve the goal of providing edible grain oil:

a. Pre-treatment / Degumming Section
b. Neutralizing Section
c. Bleaching Section
d. Deodorization Section
e. Cooling section
f. De-waxing Section
g. Bottling Plant

The refinery plant establishment will also require the implementation of the following facilities and activities:

h. Micro lab
i. Fire protection works
j. Waste oil handling
k. Backup power generator 250 kVA
l. Facility and Product Licencing
m. Road paving (Approximately 310m)

C3.1 STANDARD SPECIFICATIONS

C3.2 PROJECT SPECIFICATIONS

PART A: GENERAL

PS-1 Project Description

Tompi Seleka college has an existing grain oil plant. The grain crude oil need to be refined into edible oil.

PS-2 Description of the Site and Access

The oil facility is within the Tompi Seleka collge. The directions from Polokwane City are as follows: Head South on the Rxx and take R to Lebowakgomo town, drive across the Olifant river and turn right at the Apel four-way stop towards Marble Hall, turn right after passing Masanteng dam embankment/wall, turn right towards Phetwane village and left before Phetwane village at the Tompi Seleka college sign board, continue to the college recreational hall. The GPS coordinates of the farm are as follows: S-24.7928 and E29.4527.

PS-3 Details of the Works

The plant establishment will consist of the design, supply, delivery, installation and commissioning of new refinery equipment matched and connected to the existing facility. Commissioning will also include testing, repairing and re-commissioning of all existing infrastructure to provide a functional plant. This plant must comply with all the SABS standards and food & health regulations.

The work will be deemed complete after testing and commissioning of the whole project.

A batch vegetable oil refinery plant capable of refining/processing 200l/h raw sunflower oil and 60 l/h raw soya oil into edible oil.
The refinery plant should have the following sections:

Pretreatment / Degumming Section:- The oils are given acidic treatment where by gums are precipitated and separated out by centrifugal separation or sometimes only gum conditioning is carried out (when gum content is low) and gums are separated in subsequent neutralising process.

Neutralising Section:- The pretreated oil is subjected to Alkali Refining. The caustic soda reacts with Free Fatty Acids (F.F.A.) present in the oil and forms soap stock, the soap stock is separated out by centrifugal separator, oil is washed with water for complete removal of soap stock. The wash water is separated out by centrifugal separators.

Bleaching Section:- The neutralized oil is treated with bleaching earth/activated carbon for removal of colouring pigments. The bleaching agent is filtered out in vertical pressure leaf filters.

Deodorization Section:- Every vegetable oil has its own distinct natural odour. During neutralization and bleaching operation unpleasant odour is imparted to the oil, it is therefore essential to remove this odour. The operation is carried out at high temperature by injecting open steam and maintaining high vacuum at which time all odoriferous matter is distilled off and carried away to barometric condensors through vacuum system. The resultant oil is odourless – deodorized oil.

Dewaxing Section :- Oils like sunflower oil or maize germ oil (corn oil) have waxes present in them. At low temperature these waxes gives hazy appearance to oil, which is not liked by consumers.

Bottling and packaging: Complete bottling and packaging for the edible oil final product.

PS-4 Construction Programme

The submission of a construction programme as stated per Clause 5.6 of the General Conditions of Contract (2010) is compulsory.

Before any work is to be commenced on the site (within a period as stated in Clause 5.6.1 of the General Conditions of Contract), the Contractor must submit a detailed project programme for the construction of the Works to the Engineer for his approval.

In preparation of the construction programme the Contractor must liaise with the Engineer and the programme must take into account the coordination of all activities. The programme must consist of a detailed schedule or block diagram covering all aspects of the Works and the planned time thereof must, with the Contract Period as time basis, be shown.

Rainfall conditions will be taken as abnormal when the average rainfall, as shown in Clause P 2.3, is exceeded and the contractor must then apply in writing for extension of the contract period using Clause 42.2 of the Special Conditions of Contract.

The Bidder is required to state in the Appendix to the Form of Bidder the time in which he is prepared to undertake and complete the works.

The Contractor shall submit to the Engineer a realistic, detailed programme not later than 14 days after receipt of the Letter of Acceptance. The programme shall be in bar-chart format showing in detail how the Contractor proposes to complete the work covered by this contract by the Due Completion Date.

The programme shall be kept up to date. If a Contractor fails to maintain progress in terms of the programme, he shall produce a revised programme showing the modifications to the original programme necessary to ensure completion of the Works before the Due Completion Date.

The approval of any programme by the Engineer shall have no contractual significance, other than

satisfying the Engineer that the Work is carried out according to such programme and that the Contractor undertakes to carry out the work in accordance with the programme. The Engineer will have the right to instruct the Contractor to revise the programme if necessitated by circumstances.

PS-5 Site Facilities Available

None.

PS-6 Facilities required on site

PS 6.1 Water Supplies

The Contractor must make his own arrangements for provision of fresh water on site for domestic and construction purposes.

The rates on the bid for the relevant items in the Bill of Quantities shall include all costs for the establishment and maintenance of water supply to the works and the Contractor shall make his own arrangements for the possible conveyance and storage of water if necessary.

PS 6.2 Power Supply

The Contractor must make his own arrangements for the provision of electricity on site. The rates on the bid for the relevant items in the Bill of Quantities shall include all costs for the establishment and maintenance of a power supply to the works.

PS 6.3 Security

The Contractor shall provide security watchmen for the contract as he deems fit at no extra cost for the Employer. The Contractor must ensure that all his employees as well as the employees of his subcontractors are able to identify themselves as members of the construction team.

PS 6.4 Ablution and Sanitary Facilities

The Contractor shall erect and maintain on sites proper ablution facilities. The Contractor shall service and maintain the facilities in a clean and hygienic state for the duration of the contract period and on completion of the works remove it from the sites.

PS-7 Management and Disposal of Water

None

PS 8 Rainfall Figures

The following figures are applicable for Clause 50(5) of the Special Conditions of Contract.

Source of information: National Weather Bureau

Rainfall station: Not provided (Contractor to source rainfall figures)

Period: Not provided

	Rainfall station:					
	Period: 1938 - 2006					
	Month	$\overline{N_n}$	$\overline{R_n}$	**Month**	$\overline{N_n}$	$\overline{R_n}$
	January			July		
	February			August		
	March			September		
	April			October		
	May			November		
	June			December		
	Annual average:					

$\overline{N_n}$ = Average amount of days on which a rainfall of 10 mm or more has been recorded

$\overline{R_n}$ = Average monthly rainfall in mm

The contractor should agree with the Engineer on the rainfall station to be used for rainfall data. All the collected rainfall data must be shared with the Engineer.

PS-9 Security Clearance of Personnel

None

PS-10 Health and Safety

The bidder must ensure that an Occupational Health and safety file is submitted to the

(a) Employers must take all reasonable steps to ensure that the working environment is healthy and safe.

(b) A worker must –

(i) work in a way that does not endanger his/her health and safety or that of any other person;

(ii) obey any health and safety instruction;

(iii) obey all health and safety rules of the SPWP;

(iv) use any personal protective equipment or clothing issued by the Employer;

(e) Report any accident, near-miss incident or dangerous behaviour by another person to their Employer or manager.

PS-11 Subcontractors

PS-12 Deviation from Construction Programme

The construction programme submitted shall be kept up to date. If a Contractor fails to maintain progress in terms of the programme, he shall produce a revised programme showing the modifications to the original programme necessary to ensure completion of the Works before the Due Completion Date.

The approval of any programme by the Engineer shall have no contractual significance, other than satisfying the Engineer that the Work is carried out according to such programme and that the Contractor undertakes to carry out the work in accordance with the programme. The Engineer will have the right to instruct the Contractor to revise the programme if necessitated by circumstances

PART B: AMENDMENTS TO THE STANDARD SPECIFICATIONS

C3.3 PARTICULAR SPECIFICATIONS

PART E: ENVIRONMENTAL MANAGEMENT
PART F: OHSA 1993 SAFETY SPECIFICATION

LIMPOPO DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

C3.1 STANDARD SPECIFICATIONS

The standard specifications on which this contract is based are the SANS Standardised Specifications for Civil Engineering Works.

The following SANS specifications are also referred to in this document and the Contractor is advised to obtain them from Standards South Africa (a division of SABS) in Pretoria.

SABS 1200 AA	:	General (Small Works)
SABS 1200 C	:	Site Clearance
SABS 1200 DA	:	Earthworks (Small Works)
SABS 1200 DB	:	Pipe Trenches
SABS 1200 GA	:	Concrete (Small Works)
SABS 1200 L	:	Medium Pressure Pipelines
SABS 1200 LB	:	Bedding (Pipes)

A bidder should get his own copies of the above documentation.

The following SANS specification are also referred to in this document and the Contractor is advised to obtain them from Standards South Africa (a division of SABS) in Pretoria.

SANS 10396: 2003	:	Implementing Preferential Construction Procurement Policies using Targeted Procurement Procedures
SANS 1914-1to 6 (2002):		Targeted Construction Procurement
SANS 1921 – 1 (2004):		Construction and Management Requirements for Works Contracts Part 1: General Engineering and Construction Works

LIMPOPO DEPARTMENT OF AGRICULTURE & RURAL DEVELOPMENT

THE DESIGN, SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF A GRAIN OIL REFINERY PLANT AT THE EXISTING CRUDE OIL PLANT AT TOMPI SELEKA AGRICULTURAL COLLEGE IN EPHRAIM MOGALE MUNICIPALITY IN SEKHUKHUNE DISTRICT OF LIMPOPO PROVINCE

C3.2: PROJECT SPECIFICATIONS

STATUS

The Project Specification, consisting of two parts, forms an integral part of the contract and supplements the Standard Specifications.

Part A contains a general description of the works, the site and the requirements to be met.

Part B contains variations, amendments and additions to the Standardized Specifications and, if applicable, the Particular Specifications.

In the event of any discrepancy between a part or parts of the Standardized or Particular Specifications and the Project Specification, the Project Specification shall take precedence. In the event of a discrepancy between the Specifications, (including the Project Specifications) and the drawings and / or the Bill of Quantities, the discrepancy shall be resolved by the Engineer before the execution of the work under the relevant item.

PART A: GENERAL

PS 1 PROJECT DESCRIPTION

The project consists of, earth works (pipe trenches), medium pressure pipelines, small concrete works, electrical and mechanical works, galvanized steel or similar approved circular water reservoir and installation of a centre pivot (towable) irrigation system.

.

Service providers must list the suppliers of the equipment and their details. The information will be used in evaluating the Tenders.

PS 2 DESCRIPTIONS OF THE SITE AND ACCESS

2.1 Location of site

The oil facility is within the Tompi Seleka Agricultural College,

2.2 Access to site

The directions from Polokwane City are as follows: Head South on the Rxx and take R to Lebowakgomo town, drive across the Olifant river and turn right at the Apel four-way stop towards Marble Hall, turn right after passing Masanteng dam embankment/wall, turn right towards Phetwane village and left before Phetwane village at the Tompi Seleka college sign board, continue to the college recreational hall. The GPS coordinates of the farm are as follows: S-24.7928 and E29.4527.

The contractor shall be responsible for the maintenance and reinstatement of damage caused by him or his agents/deliveries during the construction activities. No damage to fauna and flora located outside the limits of the site will be permitted on the contract.

The contractor shall take cognisance of the aforementioned items concerning the environment and allow for any costs in his Bid under the relevant section in the Bill of Quantities.

PS 3 DETAILS OF THE WORKS

3.1 Brief description of works

A brief detail of the works for which this specification is applicable is as follows:

3.1.1 Site Clearance

There is grass and shrubs to be removed and disposed to a suitable location.

3.1.2 Setting Out

Survey beacons as set out by the engineer can be used for level control of the balancing dam rehabilitation. All other setting out is of a horizontal nature and accurate GPS equipment would be adequate.

3.1.3 Herbicides control

The service provider is advised to seek services of an approved institution or personnel. A certificate or Proof of executing such work will be required by the engineer prior to performing such task/activity.

3.2. **Project** Approach

The successful Bidder will be responsible for the full spectrum of supply, delivery, setting out, construction, quality control and defects attendance services. The Employer will appoint a consultant to monitor construction progress and quality. Regular progress payments, based on work actually performed at the Bidded rates, are envisaged. A defects liability period of 12 months will be applicable on this project.

3.3 Labour recruitment conditions

A Project Steering Committee (PSC) will be established and is a vital means of communication between all parties involved with the project. The composition of the PSC comprises representation by the Employer, the Engineer and formal structures within the community.

The contractor shall make use of these communication channels, and shall appoint from amongst his site personnel a responsible person to participate in the affairs of the PSC, and this representative may be also required to attend the monthly PSC meetings.

It is mandatory that the Contractor shall interact with the community via proactive project liaison and project participation by its leaders and constituted organisations and forums, as well as through the employment of its people, and these activities shall constitute essential facets of the project.

Local labour is to be used and the employment of such labour is to be done in conjunction with the PSC.

PSC shall appoint a Community liaison officer (CLO). The duties of the CLO shall consist inter alias of the following:

- To be available on site daily between the hour of 07:00 and 17:00 and at other times as the need arises. His normal working day will extend from 07:00 in the morning until 17:00 in the afternoon.
- To communicate daily with regard to number and skills, to facilitate in labour disputes and to assist in their resolution.
- To attend all meetings in which the community and/or labour are present or are required to be represented.
- To attend all PSC meeting to report on labour.
- To assist in the identification and screening of labourers from the community in accordance with the contractor's requirements.
- To advise and inform temporary labourers of their conditions of employment and to inform temporary labourers as early as possible when their period of employment will be terminated.
- To attend disciplinary proceedings to ensure that hearings are fair and reasonable.
- To keep a daily written record of his interviews and community liaison, labour force etc.
- To attend monthly site meetings and report in writing on labour and contract matters.
- Keeping a data base of available labour.
- All such other duties as agreed upon between all parties concerned.
- Compile a list of available skills in the area (skills audit).

PS 4 CONSTRUCTION PROGRAMME

PS 4.1 General

The submission of a construction programme as stated per Clause 5.6 of the General Conditions of Contract is compulsory.

- Before any work is to be commenced on the site (within a period as stated in Clause 5.6.1 of the General Conditions of Contract), the Contractor must submit a detailed project programme for the construction of the Works to the Engineer for his approval.

In preparation of the construction programme the Contractor must liaise with the Engineer and the programme must take into account the coordination of all activities. The programme must consist of a detailed schedule or block diagram covering all aspects of the Works and the planned time thereof must, with the Contract Period as time basis, be shown.

Rainfall conditions will be taken as abnormal when the average rainfall, as shown in Clause PS 8, is exceeded and the contractor must then apply in writing for extension of the contract period using Clause 10.1 of the Conditions of Contract.

The Contractor shall submit to the Engineer a realistic, detailed programme not later than 14 days after receipt of the Letter of Acceptance. The programme shall be in bar-chart format showing in detail how the Contractor proposes to complete the work covered by this contract by the Due Completion Date.

The following details must be stated:

i. The quantity of work applicable to each bar item as well as the rate at which the work will be completed.
ii. A budget of the value of completed work, month by month, for the full contract period.
iii. The Contractor's plant commitment on the contract for every fortnight.
iv. The critical path.

The programme shall be kept up to date. If a Contractor fails to maintain progress in terms of the programme, he shall produce a revised programme showing the modifications to the original programme necessary to ensure completion of the Works before the Due Completion Date.

The approval of any programme by the Engineer shall have no contractual significance, other than satisfying the Engineer that the Work is carried out according to such programme and that the Contractor undertakes to carry out the work in accordance with the programme. The Engineer will have the right to instruct the Contractor to revise the programme if necessitated by circumstances.

PS 4.2 Time for Completion

The maximum time allowed for the completion of the contract is **12 months** (excluding special non-working days and the year-end break) from the Commencement Date

PS 5 SITE FACILITIES AVAILABLE

PS 5.1 Water Supply

The Contractor must make his own arrangements for provision of fresh water on site for domestic and construction purposes.

The rates Bidded for the relevant items in the Preliminary and General Section of the schedule shall include all costs for the establishment and maintenance of water supply to the works and the Contractor shall make his own arrangements for the possible conveyance and storage of water if necessary.

PS 5.2 Power Supply

The Contractor must make his own arrangements for the provision of his own electrical requirements on site.

The rates Bidded for the relevant items in the Preliminary and General Section of the schedule shall include all costs for the establishment and maintenance of a power supply to the works as required for construction purposes.

PS 6 FACILITIES REQUIRED ON SITE

PS 6.1 Facilities for the Engineer

No site office for the Engineer is required.

PS 6.2 Facilities for the Contractor

Site Establishment

The Contractor is responsible to provide a suitable site for his camp and to provide accommodation for his

personnel and labourers. If the Employer can make any specific site available to the Contractor, such site will be pointed out to the Contractor.
The chosen site shall be subject to the approval of the Engineer and the Project Steering Committee (PSC). Possible locations for a campsite shall be pointed out at the Site inspection. The Contractor shall conform to all local authority, environmental and industrial regulations.

The Contractor shall provide security watchmen for the contract as he deems fit at no extra cost for the Employer. The Contractor must ensure that all his employees as well as the employees of his subcontractors are able to identify themselves as members of the construction team.

Ablution and Sanitary Facilities:

The Contractor shall erect and maintain on the site proper ablution facilities. The Contractor shall service and maintain the facilities in a clean and hygienic state for the duration of the contract period and on completion of the works remove it from the site.

PS 6.3 Laboratory Facilities

The contractor shall provide Laboratory facilities at an SABS accredited laboratory to conduct tests as required.

PS 6.4 Construction Notice Board (Name Board)

1 Official Name Board, as per C4.2 Site Information: Construction Notice Board is required for this contract.

PS 6.5 Housing for the Engineer and/or his Representative

No housing is required for the Engineer or his Representative.

PS 6.6 Telephone Facilities

Telephone and facsimile facilities are not needed on the site.

PS 7 MANAGEMENT AND DISPOSAL OF WATER

The Contractor shall pay special attention to the management and disposal of water and storm water on the site. It is essential that all completed works or parts thereof are kept dry and properly drained. Claims for delay and for repair of damage caused to the works as a result of the Contractor's failure to properly manage rain and surface water, will not be considered.

PS 8 RAINFALL FIGURES

The following figures are applicable for Clause 5.12.1 of the Special Conditions of Contract.
INFORMATION SOURCE: WRC Report 1994

Rainfall station:					
Rainfall station: 552653					
Period: 23 - 1953					
Month	**N_n**	**R_n**	**Month**	**N_n**	**R_n**
January	4	100	July	0	5
February	3	82	August	0	5
March	2.5	65	September	0	19
April	1	39	October	2.5	50
May	0.5	13	November	4	92
June	0	6	December	4	92
Annual average:					**570**

Nn = Average number of days on which a rainfall of 10 mm or more has been recorded.
Rn = Average monthly rainfall in mm

Extensions of time in respect of Clause 10.1 in the General Conditions of Contract for Construction Works (2010) in respect of abnormal rainfall shall be calculated using the following formula for each calendar month or part thereof:

$$V = (Nw - Nn) + \frac{(Rw - Rn)}{X}$$

Where:
V = Extension of time in calendar days in respect of the calendar month under consideration.
Nw = Actual number of days during the calendar month on which a rainfall of 10 mm or more has been recorded.
Nn = Average number of days in the relevant calendar month , as derived from existing rainfall records, on which a rainfall of 10mm or more has been recorded for the calendar month.
Rw = Actual average rainfall in mm recorded for the calendar month under consideration.
Rn = Average rainfall in mm for the calendar month as derived from existing rainfall records as stated in the Site Information.
X = 20mm

For purposes of the Contract Nn, Rn and Nn shall have those values assigned to them in the table above based on figures from the WRC report 1994.

If V is negative and its absolute value exceeds Nn, then V shall be taken as equal to minus Nn.

The total extension of time shall be the algebraic sum of all monthly totals for the period under consideration, but if the total is negative the time for completion shall not be reduced due to subnormal rainfall. Extensions of time for part of a month shall be calculated using pro rata values of Nn and Rn.

This formula does not take account flood damage which could cause further or concurrent delays and will be treated separately as far as extension of time is concerned.

The factor (Nw – Nn) shall be considered to represent a fair allowance for variations from the average in the number of days during which rainfall exceeds 10 mm. The factor (Rw-Rn) shall be considered to represent a fair allowance for variations from the average in the number of days during which the rainfall did not exceed 10 mm but wet conditions prevented or disrupted work.

For the purpose of applying the formula, accurate rain gauging shall be taken at a suitable point on the Site and the Contractor shall at his own expense, take all necessary precautions to ensure that rain gauges cannot be interfered with by unauthorized persons.

PS 9 SECURITY CLEARANCE OF PERSONNEL

Bidders to note that the Limpopo Department of Agriculture and Rural Development may require that Security Clearance investigations be conducted on any number of the Bidder's personnel.

If so required by the Limpopo Department of Agriculture and Rural Development, the Bidder must remove personnel as indicated immediately and ensure that they have no access to the works or documentation or any other information pertaining the site.

The Employer shall not be liable for any cost concerning the removal of personnel or the effect thereof on the execution of the work.

PS 10 HEALTH AND SAFETY

PS 10.1 General statement

It is a requirement of this contract that the Contractor shall provide a safe and healthy working

environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act (OHSA) No 85 and Amendment Act No 181 of 1993, and the OHSA 1993 Construction Regulations 2003 issued on 18 July 2003 by the Department of Labour.

For the purpose of this contract the Contractor is required to confirm his status as mandatory and employer in his own right for the execution of the contract by entering into an agreement with the Employer in terms of the Occupational Health and Safety Act in the form as included in section C1.5.

PS 10.2 Health and Safety Specifications and Plans

(a) Employer's Health and Safety Specification

The Employer's Health and Safety Specification is included in Section C3.3, Part E of the Bid documents as part of the Particular Specifications.

(b) Bidder's Health and Safety Plan

The Bidder shall submit with the Bid his own documented Health and Safety Plan he proposes to be implement for the execution of the work under the contract. The Health and Safety Plan must at least cover the following:

(i) a proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 7 to 28;
(ii) pro-active identification of potential hazards and unsafe working conditions;
(iii) provision of a safe working environment and equipment;
(iv) statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (*Regulation 5)*;
(v) monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
(vi) details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 6 and other applicable regulations; and
(vii) details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2003.

The Contractor's Health and Safety Plan will be subject to approval by the Employer, or amendment if necessary, before commencement of construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan.

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to obtain approval for his safety plan, shall not be used as a reason to claim for extension of time or standing time and related costs

PS 10.3 Cost of compliance with the OHSA Construction Regulations

The rates and prices Bided by the Contractor shall be deemed to include all costs for conforming to the requirements of the Act, the Construction Regulations and the Employer's Health and Safety Specification as applicable to this contract.

Should the Contractor fail to comply with the provisions of the Construction Regulations, he will be liable for penalties as provided in the Construction Regulations and in the Employer's Health and Safety Specification.

PS 11 SUBCONTRACTORS

The Employer shall have the right to cede any sub-contract under this contract to a pre-approved subcontractor, in accordance with the provisions of Clause 4.4.3 of the General Conditions of Contract.

PS 12 DELAY IN COMPLETION

The Contractor shall organise the Works in such a manner that no delays occur. Delay due to faulty organisation or lack or shortage of materials or labour or co-operation with other parties or to any other cause within the control of the Contractor will not be countenanced and full power is reserved by the Engineer to order the Contractor to expedite the work should the work, in the opinion of the Engineer, not progress in a satisfactory way.

PS 13 SUPPLY OF MATERIALS

All material to be used in the Works is to be supplied by the Contractor.

The Contractor shall ensure that the work is not delayed due to the lack of materials on Site, by placing orders for material required under this Contract as soon as possible. No extension of time will be allowed for any delay due to the supply of materials.

Although the quantities have been carefully calculated, it must be considered as approximate only and the Contractor, before ordering any materials, should check the quantities required. The bill of quantities is provisional.

PS 14 EXECUTION OF THE WORKS

PS 14.1 Inspection by the Engineer

No portion of the work shall be proceeded with until the Engineer or his representative has examined and approved the previous stage. If any work is covered or hidden from view before the Engineer or his representative has inspected the work, the Contractor shall at his own cost expose the covered or hidden work for inspection. The Contractor shall also be responsible for making good any work damaged during the uncovering.

PS 15 EXISTING SERVICES

The Contractor shall make himself acquainted with the position of all existing services before any excavation or other work likely to affect the existing services is commenced.

The Contractor will be held responsible for any damage to known existing services caused by or arising out of his operations and any damage shall be made good at his own expense. Damage to unknown services shall be repaired as soon as possible and liability shall be determined on site when such damage should occur.

Two weeks prior to commencing construction activities in a particular area, the Contractor shall also diligently enquire of local landowners as to whether there are any other known services which have not been shown on the drawings but which may be affected by the construction activities in that area, and any such services shall be brought to the attention of the Engineer immediately. The contractor shall make provision in his programme for the location and/or shifting of services.

PS 16 LABOUR INTENSIVE SPECIFICATION

PS 16.1 Labour intensive competencies of supervisory and management staff

Contractors having a CIDB contractor grading designation of **6ME** and higher shall only engage supervisory and management staff in labour intensive works who have either completed, or, are registered for training towards, the skills programme outlined in Table 1.

All site supervisory staff in the employ of the contractor must have completed, a skills programme for the NQF level 2 unit standards or NQF level 4 unit standards.

Table 1: Skills programme for supervisory and management staff

Personnel	NQF level	Unit standard titles	Skills programme description
Team leader / supervisor	2	Apply Labour Intensive Construction Systems and Techniques to Work Activities	This unit standard must be completed, **and**
		Use Labour Intensive Construction Methods to Construct and Maintain Roads and Storm water Drainage	any one of these 3 unit standards
		Use Labour Intensive Construction Methods to Construct and Maintain Water and Sanitation Services	
		Use Labour Intensive Construction Methods to Construct, Repair and Maintain Structures	
Foreman/ supervisor	4	Implement labour Intensive Construction Systems and Techniques	This unit standard must be completed, **and**
		Use Labour Intensive Construction Methods to Construct and Maintain Roads and Storm water Drainage	any one of these 3 unit standards
		Use Labour Intensive Construction Methods to Construct and Maintain Water and Sanitation Services	
		Use Labour Intensive Construction Methods to Construct, Repair and Maintain Structures	
Site Agent / Manager (i.e. the contractor's most senior representative that is resident on the site)	5	Manage Labour Intensive Construction Processes	Skills Programme against this single unit standard

PS 17.2 Employment of unskilled and semi-skilled workers in labour-intensive works

PS 17.2.1 Requirements for the sourcing and engagement of labour.

Unskilled and semi-skilled labour required for the execution of all labour intensive works shall be engaged strictly in accordance with prevailing legislation and SANS 1914-5, Participation of Targeted Labour.

The rate of pay set for a day task is 90% of the statutory daily wage applicable for the areas.

Tasks established by the contractor must be such that:

a) the average worker completes 5 tasks per week in 40 hours or less; and
b) the weakest worker completes 5 tasks per week in 55 hours or less.

The contractor must revise the time taken to complete a task whenever it is established that the time taken to complete a weekly task is not within the requirements of 5.2.1.3.

The Contractor shall, through all available community structures, inform the local community of the labour intensive works and the employment opportunities presented thereby. Preference must be given to people with previous practical experience in construction and / or who come from households:

a) where the head of the household has less than a primary school education;
b) that has less than one full time person earning an income;
c) where subsistence agriculture is the source of income.
d) those who are not in receipt of any social security pension income

The Contractor shall endeavour to ensure that the expenditure on the employment of temporary workers is in the following proportions:

a) 60 % women;
b) 20% youth who are between the ages of 18 and 25; and
c) 2% on persons with disabilities.

PS 17.2.2 Specific provisions pertaining to SANS 1914-5

Training of targeted labour

a) The contractor shall provide all the necessary on-the-job training to targeted labour to enable such labour to master the basic work techniques required to undertake the work in accordance with the requirements of the contract in a manner that does not compromise worker health and safety.

b) The cost of the formal training of targeted labour will be funded by the provincial office of the Department of Labour. This training should take place as close to the project site as practically possible. The contractor, must access this training by informing the relevant provincial office of the Department of Labour in writing, within 14 days of being awarded the contract, of the likely number of persons that will undergo training and when such training is required. The employer must be furnished with a copy of this request.

c) The contractor shall be responsible for scheduling the training of workers and shall take all reasonable steps to ensure that each beneficiary is provided with a minimum of six (6) days of formal training if he/she is employed for 3 months or less and a minimum of ten (10) days if he she is employed for 4 months or more.

d) The contractor shall do nothing to dissuade targeted labour from participating in training programmes.

e) An allowance equal to 100% of the task rate or daily rate shall be paid by the contractor to workers who attend formal training, in terms of (d) above.

f) Proof of compliance with the requirements of (b) to (e) must be provided by the Contractor to the Employer prior to submission of the final payment certificate.

PART B: AMENDMENTS TO THE STANDARD SPECIFICATIONS

B1 PROJECT SPECIFICATIONS RELATING TO THE STANDARD SPECIFICATIONS AND OTHER ADDITIONAL SPECIFICATIONS

In certain clauses in the standard, standardised and particular specifications, allowance is made for a choice to be specified in the project specifications between alternative materials or methods of construction, and for additional requirements to be specified to suit a particular contract. Details of such alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains the necessary additional specifications required for this particular contract.

VARIATIONS TO REQUIREMENTS OF SPECIFICATIONS LISTED IN C3.1

PSAA SABS 1200 AA : GENERAL (SMALL WORKS)

PSAA 5.1: Setting out the Works

Survey beacons as set out by the Engineer can be used for level control. All other setting out is of a horizontal nature and accurate GPS equipment would be adequate.

PSC SABC 1200 C: SITE CLEARANCE

None

PSDA: SABS 1200 DA: EARTHWORKS (SMALL WORKS)

None

PSDB: SABS 1200 DB: EARTHWORKS (PIPE TRENCHES)

None

PSGA: SABS 1200 GA: CONCRETE (SMALL WORKS)

PSGA 5.1.2: Welding

Welding of reinforcement is permitted.

PSGA 5.4.1.6 Ready mixed concrete

Use of ready-mixed concrete is permitted and the manufacturer's quality control system will be acceptable.

PSGA 5.4.7 Concrete Curing

Where suitable water for curing of the concrete is not readily available, the contractor is to allow for the use of an approved curing compound.

PSL SABS 1200 L : MEDIUM PRESSURE PIPELINES

PSL 7.3 Testing

Confirm that the Contractor will be required to carry out the standard hydraulic pipe test with suitable testing equipment on all the pipelines.

PSLB SABS 1200 LB: BEDDING (PIPES)

PSLB 3.4.2 Selective Excavation

It is expected that the selected granular material for the bedding, cradle and blanket are generally to be derived from the trench excavation, even if to be transported along the pipeline route. It is therefore important for the contractor to be selective during trench excavation, to ensure that suitable materials are not contaminated by unsuitable materials.

A-SPES-37-01-W01

STANDARD SPECIFICATION FOR REFRIGERATION PIPE WORK (TUBING) & INSULATION

Prepared by:

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Table of Contents

STANDARD SPECIFICATION

1. GENERAL

This Specification covers copper refrigeration tubing and insulation.

2. STANDARDS AND SPECIFICATIONS

Commissioning Code R of the Chartered Institute of Building Services (CIBS) will apply.

3. TUBING

3.1. All refrigeration tubing shall be MAKSAL type L hard-drawn refrigeration-grade copper tubing and shall be seamless, dehydrated and de-oxidised, and shall be supplied in lengths of at least 5,5 m and sealed.

3.2. Soft-drawn refrigeration-grade copper tubing shall only be used with the prior written approval of the Engineer, for tubing of 15 mm and smaller. ----------Hld/pnt[1]

3.3. For soldered joints, standard wrought copper with forged brass sweat fittings and 95% tin - 5% antimony solder, shall be used. Silver-soldered joints are also acceptable.

3.4. If the distance between the units and coils allows, the connection shall be made in one length of tubing. All soldered joints shall be positioned in such a way that easy access for inspection is possible.

3.5. A sufficient number of nut couplings shall be provided in the tubing to facilitate the removal and replacement of equipment, controls, etc. without causing damage to the rest of the system.

3.6. Tubing shall only be cut by means of a tube cutter with cutting wheel. No saw cutting will be allowed.

4. FITTINGS

4.1. All fittings shall be refrigeration class brass flare or NIBCO sweat fittings.

4.2. Hard-drawn tubing circuits shall utilise sweat fittings with soldered joints, while the soft annealed type tubing shall utilise flared fittings.

Flared type joints shall be of the standard forged brass type. The flared joint nuts shall be of the short anti-freeze type.

[1] Hld/pnt = See Project Specification in Section C3.2 of the Contract Document

5. VALVES, DRIERS, INSTRUMENTATION, ETC

5.1. Liquid refrigerant lines shall be complete with all the following components:

- · Moisture-indicating single-port sight glass
- · Replaceable filter drier of suitable and acceptable manufacture
- · Diaphragm-type isolating valves to drier
- · Thermostatic expansion valve
- · Capped backseating-type charging valve with seal cap fitted to the charging connection.

5.2. The sensing bulbs of thermostatic expansion valves shall be securely clipped to suction line piping with copper strip.

5.3. Oil traps shall be installed in the suction lines at all pipe risers.

5.4. Vibration eliminators shall be installed in the pipe work at all compressors.

6. SUPPORTS

6.1. Refrigeration pipe work shall be firmly supported at not more than 1,5 metre centres by means of suitable mountings. Vapour-proofing of the suction line at points of support shall be carefully executed.

6.2. Particular care shall be exercised to ensure that pipe work is neatly run in straight lines. Tubes shall pitch with a gradient of not less than 1 : 250 in the direction of flow, to prevent oil traps. The selection of tube sizes shall make provision for the return flow of oil from the evaporator to the compressor.

6.3. All valves in the tubing shall be installed in such a way that the valves are free of vibration.

Valves shall be supported independently and shall be mounted with the stems horizontal.

6.4. All tubes shall be installed so that easy access for purposes of repair work is possible, whilst at the same time ensuring sufficient flexibility to resist the vibration caused by the compressor. All tube clamps shall be made of copper and shall be neatly fixed to walls or ceilings. Where tubing penetrates walls, ceiling, etc, metal sleeves shall be installed exactly horizontal or vertical, depending on the application.

7. PIPE SIZING

For low temperature applications at the design suction pressure, the pressure drop from the evaporator to the compressor shall not exceed 10 kPa. The pressure drop from the refrigerant receiver to the expansion valves shall not exceed 27,5 kPa. It is therefore of the utmost importance that the sizing of the suction and liquid lines be done correctly.

8. REFRIGERANT CHARGING

8.1. The system shall be charged with the type of refrigerant specified. ---------- P/Spec2

8.2. The system shall be charged only after the system has passed its vacuum and pressure tests successfully.

8.3. The (sub-) Contractor shall guarantee the installation against any refrigerant loss for the full warranty period.

8.4. Completed refrigerant circuits shall be pressure tested with dry nitrogen to an absolute pressure of 1 400 kPa. This pressure shall be held for 12 hours.

8.5. After testing for leaks with a halide-type leak detector (with the system still under pressure of nitrogen), the system shall be evacuated to a vacuum of 1 mm of mercury. The vacuum shall be held for twelve hours without pressure gain.

8.6. If either the pressure or the vacuum test fails, the leak shall be repaired and both tests shall then be repeated.

8.7. The system may then be charged with the specified refrigerant. Charging shall continue until the sight glass shows no evidence of bubbling.

8.8. The system shall then be set into operation after a check has been made of compressor crankcase oil level and, if necessary, additional oil has been added in accordance with the recommendations of the condensing unit manufacturer.

8.9. The system shall at all times be under pressure, with a hold charge to prevent moisture from entering the system.

8.10. The system shall be commissioned in terms of Code R of CIBS.

9. PIPE INSULATION

9.1. All suction lines shall be insulated with ARMAFLEX seamless pipe insulation of the following thickness:

Diameter	APPLICATIONS	
	Cold/Freezer Rooms	Air-Conditioning
10 mm (3/8") and below	10 mm	10 mm
13 mm (1/2") - 22 mm (7/8")	13 mm	13 mm
Above 22 mm (7/8")	19 mm	13 mm

9.2. All pipe insulation exposed to the weather or in visible positions shall be installed in sheet metal wiring channels with removable coverplates, or protected by means of 0,6 mm galvanised cladding.

2 P/Spec = See Project Specification in Section C3.2 of the Contract Document

10. ANNEXURE A: APPLICABLE STANDARDS AND SPECIFICATIONS

The latest version of the following shall apply:

- CHARTERED INSTITUTE OF BUILDING SERVICES (CIBS) Commissioning Code R

11. ANNEXURE B: APPLICABLE TYPICAL DRAWING DETAILS

The following typical drawings apply to this specification:

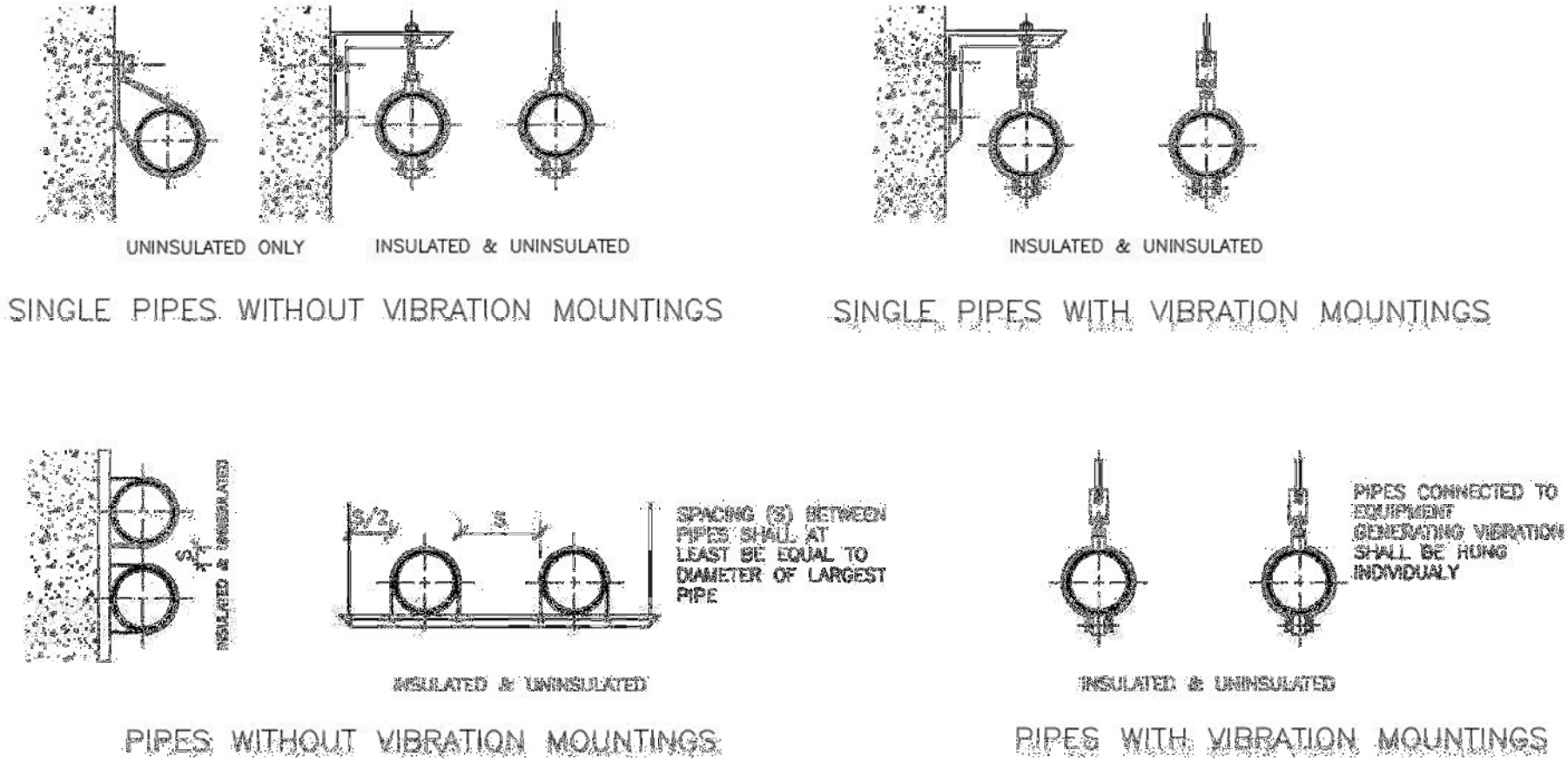

Figure 1: Typical Wall to Floor Fixing Detail

A-SPES-08-01-W02

STANDARD SPECIFICATION FOR ELECTRIC MOTORS, MOTOR STARTERS & MOTOR PROTECTION

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Table of Contents

STANDARD SPECIFICATION

1. MOTORS

1.1. All electric motors shall fully comply with the relevant standard specifications:

SABS 948 : Standard Specification for Three Phase Induction Motors.

BS 2613 : The Electrical Performance of Rotating Electrical Machinery (except as stated in Clause 1.4).

BS 170 : The Electrical Performance of Fractional Horsepower Electric Motors and Generators.

1.2.

a. Standard squirrel-cage motors shall be three-phase, (or single-phase up to 3 kW), continuously rated, screen-protected and drip-proof, suitable for direct-on-line (DOL) or star-delta starting.

b. High-starting-torque squirrel-cage motors shall be three-phase, continuously rated, screen-protected and drip-proof, with a suitable rotor design which will ensure a high starting torque and moderate starting current and shall be suitable for direct-on-line or star-delta starting.

c. Slip-ring motors shall be three-phase, continuously rated, screen-protected, drip-proof, with continuously rated slip rings and brushes and all brush gear shall be suitable for automatic starting.

d. Fractional kW motors shall be continuously rated, totally enclosed, single-phase, capacitor started, induction run or of the shaded pole design.

e. Motors suitable for part-wound starting shall be three-phase, continuously rated, screen-protected and drip-proof, with wound rotor circuits suitably rated to provide continuous full load power when switched to provide starting in graded steps sufficient to overcome the starting load torque without exceeding the specified starting current. ----------D/Spec[1]

f. Hermetically sealed motors shall be three-phase squirrel-cage motors, totally enclosed, with a suitable internal cooling medium and suitable insulation to provide continuous full load power under the specified ambient conditions. ----------D/Spec

g. Pole-changing motors shall be three-phase, continuously rated, screen-protected, and drip-proof, with cage rotor and separate stator windings, providing several poles with various interconnections of the windings. The use of pole-changing motors to alleviate starting conditions shall be limited to 2:1 speed ratios. Additional speed ratios shall only be used where the driven load specifically so requires. ----------D/Spec

[1]D/Spec: Detailed Specification: See Detailed Specification in Section 400 of the Contract Document

Pole-changing rotor circuits are not preferred and shall only be used in exceptional circumstances, with the prior written approval of the Engineer. Dahlander connections providing a 2:1 speed ratio with variable torque and variable power characteristics of the motor may be used to drive centrifugal pumps. Dahlander connections providing constant torque characteristics may be used for high friction loads; and connections providing constant power characteristics may be used for constant power loads, viz., machine tools. ----------Hld/pnt2

1.3. Motors with a speed in excess of 1500 r.p.m., except in the case of centrifugal and rotary vane compressors and close-coupled pumps, will not be accepted unless agreed upon by the Engineer. ----------Hld/pnt

1.4. When determining motor rating, the following shall be taken into account:

a. All motors shall be rated for continuous full load duty.

b. The Continuous Maximum Rating (CMR) of the motor shall be 20% in excess of the full load running duty of the load, in order to withstand the tolerance of 105% – 120% in the tripping characteristics of overload protection devices allowed for in BS 4941, Part I.

c. All starting times, irrespective of the load characteristic for DOL starting, shall be limited to 20 seconds, unless prior approval to the contrary is obtained from the Engineer. The safe "locked rotor time" shall be well in excess of the run-up time to allow for protection discrimination. ----------Hld/pnt

d. All motors shall be capable of a minimum of three consecutive starts per hour, with the load connected and employing the specified method of starting, without exceeding the allowable temperature limits of the insulation. In addition, the motor shall be capable of the number of starts per hour for the particular load, as may be specified or as may be experienced under normal operating conditions. (See also Clause 1.8, 2.4 and 2.8) ----------D/Spec

e. Unduly over-rated motors, resulting in a low power factor and efficiency, are not acceptable.

f. The motor starting torque and speed/torque characteristics shall be carefully matched to that of the load to ensure that the motor will not stall at a low speed. A safety margin shall be allowed to overcome voltage drops and load fluctuations. The maximum torque developed by the motor in its final running condition (i.e. when the motor is switched to its final running configuration, in the case of pole-changing motors; and after all starting devices have been switched out of the circuit, in the case of assisted starting motors) shall be 1,6 times the rated full load torque, in order to overcome temporary overloads and voltage fluctuations.

g. The actual ambient temperature in which the motor will be operating (and not the prevailing outside ambient temperature only) shall be taken into account. ----------D/Spec

1.5. It is a requirement of this Specification that the above information and any other requirements that will affect the type of motor to be used, be submitted to the motor

2Hld/pnt: Hold point = See Detailed Specification in Section 400 of the Contract Document

manufacturer when the motor is ordered. The Contractor shall, if requested by the Engineer, submit written proof that the motor manufacturer will guarantee the performance of the motor for the expected duty and load. ----------Hld/pnt

1.6. Special attention shall be paid to the starting requirements of motors. The motor starting requirements of Clauses 2.4 and 2.5 shall apply, unless stated otherwise in the Detailed Technical Specification or written permission to the contrary has been obtained from the Engineer. It is essential that the starting torque produced by motors, under the starting conditions specified, shall be sufficient to accelerate the load within the time period allowed by the manufacturer for the motor, with a maximum starting time of less than 20 seconds (refer to Clause 1.4(c) above). The Contractor may be required to submit calculations showing acceleration torque available, load torque characteristics and run-up time. The following formula may be used to calculate the run-up time: ----------D/Spec / ----------Hld/pnt

Te = ((T1/T2-1)(T1+T2))/((T1/T2+1) Loge(T1/T2))

t = (GD E 2 N)/(9,55Te)

Te = equivalent acceleration torque in Nm

T1 = maximum acceleration torque in Nm

T2 = minimum acceleration torque in Nm

G = moment of inertia of the rotating parts of the load and motor in kg/m

N = final speed in r.pm.

t = run-up time in seconds.

Acceleration torque is the difference between motor torque and load torque at any given speed on the torque/speed characteristic curve.

1.7. Sealed compressors and sealed package units shall also comply with the starting requirements of Clauses 2.4 and 2.5.

1.8. Where inching operations occur or where motors are controlled by pressure or level switches where frequent cycling duty may occur, motors shall be capable of 40 starts per hour.

1.9. The insulation of all motor windings shall be of Class B or better. The following maximum temperatures as determined by the resistance method shall not be exceeded

Class of Insulation	ALTITUDE					
	0 - 1 000 m	1 200 m	1 400 m	1 600 m	1 800 m	2 000 m
B	120°C	118,4	116,8	115,2	113,6	112,0
F	140°C	138,0	136,0	134,0	132,0	130,0
H	165°C	163,7	162,5	161,2	106,0	158,7

The above figures comply with BS 2613 and SABS 948 for a maximum cooling air temperature of 40°C. Where higher ambient temperatures occur (particularly in cas-

es where heaters are installed), the above temperatures shall be reduced in accordance with the BS or SABS Specifications. (See also Clause 1.13)

1.10. All windings shall be varnished and baked. The insulation shall be tropicalised and shall provide protection against dust, oil and high humidity as well as aggressive vapours and gases where these are present and specified in the Detailed Technical Specification. ----------D/Spec

1.11. End-windings shall be carefully wrapped and supported to prevent movement and to prevent mechanical damage due to vibrational stresses, especially under starting conditions.

1.12. All motors with ratings of 25 kW and above, and all motors with a rating of 15 kW and above which are subjected to run-up times in excess of 15 seconds, shall have thermistors for over-temperature protection installed in the slots of the stator windings. Three thermistors, one per phase, shall be installed in single wound motors, and six thermistors shall be installed in double wound motors.

1.13. Where thermistors are installed in the end-winding, the "Curie Point" shall be 5°C above the temperature values of Clause 1.9. Where thermistors are installed in the winding "hot spot", the “Curie Point” shall be 15°C above the temperature values of Clause 1.9.

1.14. The thermistors shall comply with the following :

a. Only Positive Temperature Co-efficient (PTC) thermistors shall be used.

b. Thermistors installed in motors connected to supply voltages up to 600 V shall be pressure tested at 2 kV rms. Additional insulation shall be provided on higher voltage machines.

c. A varnished Terylene or glass fibre sleeve shall be fitted around those parts of the thermistor leads which are embedded in the winding, for mechanical protection of the leads. Care shall be taken with the sleeve not to cover the thermistor head in the slot.

d. The thermistor shall be inserted in the windings in such a way as to ensure best thermal contact with the adjacent conductors of the winding, and fixing shall be such that thermal cycling shall not bring about a loss of adhesion between the thermistor and the winding, the result of which would be the appearance of an air gap and reduced sensitivity.

e. All leads from thermistors to the protection control units shall be twisted pairs to minimise stray voltage pick-up. Screened cables shall be used where the control units are far from the motor.

f. All the thermistors acting on one control unit shall be connected in series.

1.15. Where thermistors are installed, it is essential that relay panels be safeguarded against high voltages in case of a short circuit between the sensor and the motor windings. Isolation transformers are recommended for this purpose.

1.16. The housing, end-shields and feet of totally enclosed surface-cooled motors shall be of cast iron to BS 1452. Standard protected, internally cooled motors may be of welded steel construction. A condensation hole shall be provided at the lowest point in the motor frame.

1.17. It is essential that the correct mounting type is selected for each application.

1.18. Motor terminals shall be clearly marked, U, V, W, or U1, V1, W1, and U2, V2, W2. An earth terminal shall be provided in a convenient position on the motor frame. Vulcanised rubber insulation shall not be used for the connections from the windings to the terminals.

1.19. When viewed from the drive shaft end, the motor rotor shall rotate in a clockwise direction when the R-W-B supply leads are connected to the U-V-W motor terminals.

1.20. All terminals shall be totally enclosed in a waterproof box, which shall be sealed with gaskets and shall be complete with nuts, locknuts, lugs, etc. Cable boxes for PILCA cables shall be complete with tinned brass wiping glands and armoured clamps. PVC cable shall be terminated using compression glands with shroud. Cables shall be provided with a means of support to remove the weight of the cable from the gland (refer to Clause 3.7) of KARIWA A-SPES-08-03). All terminal boxes shall be large enough to ensure proper termination of the cables and connection of cores without exceeding the allowable bending radius of the cable. All terminal boxes shall be capable of being rotated through 360 degrees. Where condensation may form on motor terminals, e.g., certain centrifugal refrigeration compressors, terminal boxes shall be hermetically sealed and filled with silica gel.

1.21. Bearings shall be protected against possible shaft eddy currents and shall be suitable to withstand vibrations caused by reciprocating or unbalanced loads.

1.22. Anti-condensation heating elements shall be provided in the motor windings for the following motor applications:

a. close-coupled motors and pumps in chilled water systems,

b. standby motors in refrigeration installations where the ambient air surrounding the motor may drop below the dew point;

c. pumps installed in damp areas where the pumps will not run continuously; and

d. fans in kitchen canopies and fume cupboards.

The heating elements shall be arranged to prevent terminals and exposed connections becoming damp. The heating element shall be disconnected before the motor is started up. As an alternative for heating elements, a low voltage transformer (approx. 50 V) can be switched into the circuit when the motor is stationary to provide a continuous circulating current in the motor windings.

1.23. Where requested by the Engineer, copies of type test certificates for routine and performance tests in accordance with SABS 948, BS 2613 and BS 170 shall be submitted to the Engineer for approval before delivery of the motors. In addition, the manufacturer shall guarantee (refer to Clause 1.5) that the motor will comply with the duty, as described in Clause 1.4. Curves of torque/speed and current/speed shall be provided on request. ----------Hld/pnt

1.24. The Engineer reserves the right to witness all routine or performance tests and shall be notified in writing 14 days before the commencement of such tests.---------- Hld/pnt

1.25. Motors which have become damp shall be dried out before connection to the supply. Damage to motors, resulting from non-compliance with this requirement, shall be rectified by the Contractor at his cost.

2. MOTOR STARTERS

2.1. When requested, starters shall be provided for all electrical motors driving mechanical equipment and shall be as specified or as required by the local Supply Authority or as dictated by the system requirements. ----------D/Spec

2.2. All contactors and starters shall comply with BS 775 or VDE 0660 Section 14 or IEC 158 specifications for Utilisation Category AC 3, except in cases where plugging duty occurs, when Utilisation Category AC 4 shall be used. Where sail or float switches are used in the ON/OFF control circuit, inherent time delays or other protection shall be built into the control circuits to prevent hunting or chatter of the starter contactor at or near the switching point.

2.3. All electrically driven mechanical equipment shall be provided with a means of isolating the electrical supply from the equipment by one of the following methods:

a. an isolator on the equipment (refer to Clause 2.19);

b. a motor starter with positive manual stop control and isolating characteristics, mounted within 2 m from the equipment;

c. a separately mounted on-load isolator within 2 m from the equipment in cases where the starter is mounted further away from the equipment (refer to Clause 2.18). The isolator shall have a "locked rotor" breaking capacity on all motor circuits. As an alternative, lock-out stops located within 2 m of the equipment which will trip the operating contactor may be used, on condition that lockable type circuit isolation is provided on the Control Board, and on condition that this arrangement is acceptable to the Supply Authority; or

d. each circuit shall in addition be provided with an on-load isolator, circuit breaker or combination fuse switch unit on the control board to which the circuit is connected. These devices shall have "locked rotor" breaking capacity in the case of motor circuits.

2.4. The method of starting shall in all cases comply with all the requirements of the local Supply Authority. The following schedule of starting requirements will apply, unless the Supply Authority prescribes more stringent requirements or unless written permission to the contrary has been obtained from the Engineer (refer to Clause 1.6).

----------Hld/pnt

NOTE : "Reduced voltage starting" includes

- Star-Delta starters (Clause 2.9)
- Auto-Transformer starters (Clause 2.10)
- Liquid starters (Clause 2.11)
- Resistive and Inductive starters (Clause 2.12)
- Electronic starters (Clause 2.13).

Application	Rating (kW)	Maximum Starting Current as % of Full Load Current	Method of Starting
All applications	Up to 5 kW	750%	Direct-on-line
Fans, Pumps etc*	5 kW up to 50 kW	250%	Reduced voltage, part-wound or slip-ring methods
Fans, Pumps, etc	Over 50 kW	250%	Reduced voltage part-wound or slip-ring methods. CLOSED TRANSITION ONLY
Open type reciprocating compressors	5 kW to 50 kW	250%	Reduced voltage part-wound or slip-ring methods
Open type reciprocating compressors	Over 50 kW	250%	Reduced voltage, part-wound or slip-ring methods. CLOSED TRANSITION ONLY
Sealed type reciprocating compressors	5 kW to 50 kW	300%	Reduced voltage or part-wound
Sealed type reciprocating compressors	Over 50 kW	300%	Reduced voltage or part-wound CLOSED TRANSITION ONLY
Sealed or open type low voltage centrifugal compressors		250%	Reduced voltage, part-wound or slip-ring methods. CLOSED TRANSITION ONLY
High voltage centrifugal compressors		600%	Direct-on-line

*Note: exception stated in paragraph 2.5

2.5. DOL starting of motors may be used for motors with ratings in excess of 5 kW on condition that:

a. the mechanical equipment allows DOL starting;

b. the peak system current will be less than the peak current if the maximum number of sequential devices is running and the largest connected motor is started at reduced current in accordance with Clause 2.4. Where a low voltage compressor motor and ancillary pumps, cooling tower etc. are supplied from the same transformer, all pump motors and associated equipment which come on line before the compressors, shall be started direct-on-line if the starting current of these motors is less than the starting current of the compressor motor. Any of these items of equipment that are supplied from an emergency (standby) source, which however shall comply with the starting requirements of Clause 2.4;

c. all other motors that are supplied from an emergency (standby) power source shall comply with the starting requirements of Clause 2.4; and

d. that the Supply Authority approves all the above arrangement.

2.6. Starters and contactors for fractional kW motors shall be rated at 1,2 kW minimum. All other starters shall have a minimum rating of 20 A inductive load.

2.7. All non-direct-on-line starters shall have inherent no-voltage release characteristics and shall be interlocked to prevent restarting in the direct-on-line mode.

2.8. Direct-on-line (DOL) Starters

a. All DOL starters shall be capable of 15 starts per hour, except where plugging duty is required, when starters shall be rated for 40 starts per hour.

b. Where motors are not switched frequently, electrically operated circuit breakers equipped with thermal overload, single-phase and undervoltage protection devices may be used as DOL/starters.

2.9. Star-Delta Starters

a. All star-delta starters used to switch motors with a rating in excess of 50 kW shall be closed transition arranged according to the Wauchope resistance system.

The resistors shall be sized to ensure that the transient currents in no instance exceed the starting currents stated in the table of Clause 2.4.

b. All star-delta starters, including resistors where applicable, shall be rated for 15 starts per hour, unless automatic time delays are incorporated which will prevent more frequent starts than the starter rating allows. In no case, however, shall ratings be less than three consecutive starts per hour. Starters for plugging duty shall be rated at 40 starts per hour.

c. The timers for open transition star-delta starters shall be a break-before-make, snap-acting type, with a minimum of 50 m/sec and a maximum of 120 m/sec between break and make, in order to quench the arc on the star contactor but to prevent magnetic flux decay in the motor with consequent high transients. These timers shall be similar to ATW Type ATEY 1-11 or SPRECHER AND SCHUH Type RBZ 2-21. If this type of timer is not provided, the star and delta contactors shall be electrically and mechanically interlocked. In any starter above 37 kW, mechanical interlocking shall be compulsory.

d. All star-delta starters shall be electrically interlocked via N/C contacts on the contactors.

e. The timing and control circuit for closed transition star-delta starters shall be designed to employ only one timer to initiate the star-to-delta change over. The closed transition switching shall be inherent in the arrangement of the auxiliary contact operation. A "policeman" timer to protect the transition resistance for motors up to 100 kW shall be provided if specified in the Detailed Technical Specification. For motors above 100 kW, a "policeman" timer shall always be provided. ----------D/Spec

f. An overall "policeman" timer shall be provided on all closed transition star-delta starters, in addition to the star-delta change over timer, to disconnect the load if the total allowable starting time is exceeded. The make and principle of operation, e.g., electronics vs. electro-mechanical, shall be

different from the star-delta timer. On two-wire control systems, the "policeman" timer must lock out and be manually reset in order to prevent re-cycling.

g. The thermal overload protection shall be fitted in the winding connection to the motor and not in the line connection, except as stated in Clause 3.16.

2.10. Auto-Transformer Starters

a. The tappings of auto-transformer starters shall be arranged to limit the starting and transient currents to values stated in the table of Clause 2.4.

b. Auto-transformer starters shall be arranged as follows:

- Up to 20 kW - open delta
- 20 - 50 kW - three-legged auto-transformer
- above 50 kW - closed transition (Korndorfer)

c. All auto-transformer starters shall have time delays incorporated to limit the number of starts per hour to the rating of the transformer. Alternatively, manually reset thermostatic cut-outs shall be provided to protect the transformer. This rating shall, however, not be less than four starts per hour.

d. An overall "policeman" timer shall always be provided in addition to the change over timer in the case of three-legged and closed transition auto-transformer starters, to disconnect the system if the total allowable starting time is exceeded. The make and principle of these timers shall differ from the change over timer (refer to Clause 2.9 (f) above).

2.11. Liquid Starters

a. STATORMATIC or similar stator-connected liquid starters and VAPORMATIC or similar rotor-connected starters may be used on all load applications. All starters shall be three-phase units.

b. The starters shall be designed to start the motor in compliance with Clauses 1.4(c), 1.4(d) and 2.7, and the starting currents in the table of Clause 2.4.

c. Liquid starters shall provide a smooth accelerating torque curve up to the final switch-over. The short-circuiting contactor shall be rated for the full load duty of the motor.

d. All the necessary data concerning the motor full load and starting characteristics shall be supplied to the manufacturer, who shall determine the design of the starter and the composition of the electrolyte. The type of electrolyte and composition shall be indelibly stamped on a nameplate for future reference.

e. The electrolyte shall be contained in suitable non-deteriorating tanks with the maximum and minimum electrolyte levels indelibly indicated. Refill holes shall be easily accessible and shall be plugged.

f. All liquid starters shall be fitted with thermostatic cutouts to prevent the electrolyte from over-heating. Manual start/stop pushbuttons shall be provided.

g. Suitable precautionary measures shall be taken to prevent electrolyte evaporation, e.g., a layer of oil on the electrolyte.

h. All liquid starters shall be housed in suitable sheet metal enclosures.

2.12. Resistive and Inductive Starters

a. All starting methods employing resistive or inductive switching in stator or rotor circuits, shall employ switching in graded steps, to ensure that the transient current does not exceed the values determined by the Supply Authority or as stated in Clause 2.4.

b. All switching shall be closed transition.

c. Manually reset thermostatic cut-outs shall protect all resistors for primary resistor and slip-ring starting applications. In the case of primary reactor starters, an overall "policeman" timer shall always be provided in addition to the changeover timer, to disconnect the system if the allowable starting time is exceeded (refer to Clause 2.9 (f) above).

d. Resistors or inductors installed in only one of the phases of the motor are not acceptable.

2.13. Electronic Starters

a. Electronic starters incorporating thyristor control of voltage may be used on all load applications to give smooth, stepless acceleration of squirrel-cage motors.

b. The starter shall give an adjustable voltage ramp from zero to full voltage, and the ramp period shall be adjustable from 1 second to 10 seconds.

c. Fast acting fuses shall be incorporated into the unit.

d. The unit shall have single phasing protection.

e. Adequate ventilation shall be provided in the section of the switchboard housing the unit.

f. Harmonic filtering shall be provided for in areas where radio frequency interference cannot be tolerated.

2.14. All starters which contain resistive or inductive components (including auto-transformers) in the switching circuit shall be housed in well ventilated portions of the switchboard, or in ventilated enclosures when mounted separately. Ventilation louvres shall be covered with copper mesh or rust-proofed expanded metal to render them vermin proof. Forced ventilation shall be provided where the starter rating warrants this and shall always be provided for environments where the expected ambient temperature exceeds 40°C. Centrifugal fans and air filters shall be provided in these cases.

2.15. All timers that control automatic switching operations in starters shall be adjustable and shall provide timing settings well in excess of the expected changeover time adjustment, in order that the timers can be re-adjusted on site if required. This requirement is particularly important where high inertia loads are encountered.

2.16. All starters shall have manual start and stop controls, with reset and reversing controls as required by the system. All two-wire control systems shall have manual resets to prevent hunting after a fault trip.

2.17. Manual motor starters which are used as main switches shall have main switch characteristics in accordance with BS 587 or VDE 0660 and shall have a rupturing capacity suitable for the maximum fault current that can be encountered at the starter (not at the motor). These starters shall comply with Clause 2.7.

2.18. Magnetic overcurrent trips or relays for short-circuit protection may never be allowed to trip contactor starters. These relays may be used in manual motor starters only if the starter has a rupturing capacity which matches the maximum fault current that can be encountered at the starter (refer to Clause 10) .

2.19. In all cases where an isolator is provided in the motor circuit between the starter and motor, an electrical interlock from an auxiliary contact on the isolator shall be provided to trip the starter when the isolator is switched off.

2.20. Starters mounted separately from control boards shall be of the dustproof, totally enclosed type, with a water-repellent gasketed seal between cover and base suitable for sealing after acceptance by the Engineer. The class of protection shall be at least IP 54 to IEC 144. Dustproofing does not apply to inherently heat generating starters, e.g., slip-ring starters, etc., except where they are mounted in dusty ambient conditions, in which case forced ventilation with air filtration shall be provided. ----------Hld/pnt

All starters exposed to the weather or starters mounted in damp areas shall be weatherproof. Adequate provision shall be made for the termination of power, control, alarm and indication cables in waterproof glands. Outdoor starters shall be housed in double enclosures with ventilation louvers in the outer enclosure or protective canopies shall be provided in order to prevent generation of high temperatures in the starter enclosure due to direct exposure to sunlight.

2.21. One ammeter shall be provided on all starters for three-phase motors, with the exception of remotely mounted DOL starters for motors smaller than 3 kW. Ammeter selector switches shall not be provided. Ammeters shall be suitably scaled to indicate the full load current of the motor and shall cater for condensed overscales for the starting current of motors as laid down in BS 89, i.e., 100% O/L scaling. In addition, the ammeters shall withstand an overcurrent of 40 times the rated current for 1 sec.

The normal running condition of the circuit shall be 50 - 70% of full scale. Ammeters shall be 72 x 72 mm, Clause 1.5 of PCI Type Fa or ATW Type AF or similar. The ammeter housing shall be suitable for the environment in which the starter is installed. (Refer to Clause 30 of KARIWA A-SPES-08-03 for Ammeter Specification).

2.22. Starters shall have a sufficient number of auxiliary contacts to facilitate electrical interlocking, and alarm and indication requirements of the system, as laid down in the detailed specification and to provide for the connection of economy resistances and hold-in circuits. ----------D/Spec

i. For control circuits of 220 V or 110 V, starters shall have ordinary auxiliary contacts.

ii. For control circuits below 50 V, auxiliary contacts of the wiping action type or of bifurcated construction shall be provided.

iii. Auxiliary contacts shall comply with Clause 18.12 - 8.16 of KARIWA Specification A-SPES-08-03. The current loading of auxiliary contacts shall not exceed the manufacturer's recommendations.

2.23. Where the number of auxiliary contacts required is greater than that which can be accommodated on the starter contactor(s), or where the current loading of the auxiliary contacts exceeds the contact rating, an auxiliary relay or additional contactor shall be provided. The auxiliary contactor/relay shall be operated by an auxiliary contact on the main contactor. In three wire control systems, the maintaining contact for the control circuit shall be provided by a contact on the auxiliary contactor/relay to ensure that the circuit drops out in the case of failure of either the main or auxiliary contactor.

2.24. Each starter, whether control panel mounted or separately mounted, shall be clearly labelled in respect of function and rating. All equipment on control panel mounted starters shall be identified as stated in Clause 8 of KARIWA Specification A-SPES-08-03.

3. MOTOR PROTECTION

3.1. Motor protection shall be provided as follows :

TYPE OF PROTECTION	APPLICATION
Thermal overload	All motors
Magnetic overload	Only for short circuit protection when acting on circuit breakers with sufficient rupturing capacity. Note exception in Clause 3.5.
Thermistor over-temperature	All motors of 25 W and above (refer to Clause 1.12).
Single phasing	All three-phase motors without thermistor over-temperature protection
Earth fault	Only when condensation in motors can take place, e.g., standby close-coupled pumps on chilled water system.
Phase reversal	All centrifugal compressor circuits and large reciprocal compressors or other circuits where phase reversal can cause damage.
Under voltage	As specified ----------D/Spec
Over-temperature cut-outs	Auto-transformer starters: Clause 2.10(c). Liquid starters: Clause 2.11(f). Resistor starters: Clause 2.12(b)

3.2. All the protection specified in the Detailed Technical Specification shall be supplied, in addition to the list in Clause 3.1 above. ----------D/Spec

3.3. Motor overload (O/L) protection shall be provided in accordance with BS 587. O/L protection shall be provided by means of thermal trips or relays actuating contactors,

manual motor starters or circuit breakers. HRC fuses are not acceptable for this purpose.

3.4. On motor starters on which the overload protection forms an integral part of the starter, the protection shall be by means of temperature compensated bi-metal thermal O/L trips, indirectly heated by separate heating elements in each phase and connected in series with the load. The O/L trips shall be adjustable within the range of approx. 75% to 120% of the rated current of the motor.

3.5. Where motors are used on frequent repetitive cycles or for inching operations, magnetic overload protection with time delays may be used, provided the motor is suitably rated for the duty (refer to Clause 1.4 (d) above).

3.6. Single phasing protection, where provided, shall be inherent in the overload protection unit in the case of integral motor starters. Protection schemes depending solely on the excess current drawn by the motor during single phasing are not acceptable.

3.7. Magnetic overcurrent trips or relays for short circuit protection may never be allowed to actuate contactor starters and may only operate on suitably rated circuit breakers.

3.8. Short circuit protection shall be provided by means of HRC fuses or suitably rated circuit breakers (refer to Section 4 of this document, “short Circuit Protection).

3.9. As an alternative to a conventional circuit breaker and starter system having overload and single phasing relays, a FUCHS MOTOR SENTINEL circuit protector which incorporates overcurrent, single phasing and short circuit protection and which has adjustable current and time characteristics may be used, together with a contactor.

3.10. Thermistor overtemperature protection shall be installed as described in Clause 1.12 - 1.15. The thermistor control units shall, where possible, be integrated with the motor starter. Care shall be taken to select units with sufficient current rating to operate the contactor coil.

3.11. Thermistor protection may not be provided in lieu of overcurrent protection.

3.12. Motor protection equal or similar to ATW Type EMP or SPRECHER & SCHUH Type CET electronic relays, with thermal simulation system and with memory independent of auxiliary power supplies, shall be used. Type EMP shall be used for motors between 50 kW and 132 kW, and Type CET shall be used for motors of 132 kW and larger. The relay shall be mounted in such a manner that all indicators shall be visible from outside the starter enclosure. The provisions of Clause 2.20 shall also apply.

Thermal (or magnetic if required) overload, single phasing (or phase unbalance) and earth fault protection relays, as well as auxiliary relays where specified, shall be included. The relays shall be housed in a panel-mounted unit in a withdrawable case.

3.13. Motor protection relays shall not be allowed to operate on metering current transformers but shall be connected to separate Class 5P10 relays for electronic protection and Class 10P10 for other relays. In each case, the output shall be suitable for the burden of the relays chosen. The current transformer ratio shall be matched to the motor full load current.

3.14. If called for in the Detailed Technical Specification, the electronic relays referred to in Clause 3.12 shall, when tripped, provide a visual indication of the fault condition

which caused tripping, e.g., overload, single phasing, locked rotor, etc. ---------- D/Spec

3.15. Where motors are used which are not described in BS Specifications, e.g., semi-hermetic compressor motors, etc., protection shall comply with the manufacturer's requirements.

3.16. Special attention shall be paid to motors driving high inertia loads to ensure that motors are adequately protected against sustained overcurrents but do not trip unnecessarily during starting.

a. Shorting of the overcurrent protection during starting is not acceptable.

b. Increased overload settings on protection units are not acceptable.

c. Connecting the overload relay in the delta loop in star-delta starting applications, thus providing no protection during starting, is not acceptable.

In all such cases, electronic motor protection relays as covered by Clause 3.12 shall be employed, irrespective of the motor power rating.

4. SHORT CIRCUIT PROTECTION

4.1. All circuits shall be adequately protected against short circuit conditions at any point in the circuit up to the maximum fault current that can occur.

4.2. Short circuit protection of circuits shall consist of circuit breakers with HRC fuse backup protection.

4.3. Protection devices (circuit breakers and fuse gear) shall be adequately rated to break the maximum fault current that can occur at the point in the circuit at which the equipment is installed. The following factors shall be taken into account:

a. the maximum symmetrical fault current (in A);

b. the supply voltage (380 V, 3,3 kV, etc.); and

c. the power factor during fault conditions.

5. DETERMINATION OF FAULT CURRENT

5.1. Where a supply connection is provided by others, it is the responsibility of the Mechanical Contractor to obtain the fault level from the Electrical Contractor at the point where he receives the supply. The switchgear shall be rated accordingly.

5.2. Where the supply is obtained directly from a transformer, the fault level can be determined from Table 5.1 below.

TABLE 5.1

Transformer Size (kVA)	Percentage Impedance (%)	Fault level (MVA)	Fault Current		
			(A)	(A)	(A)

10	4,5	0,22	228	244	-
16	4,5	0,36	540	391	-
25	4,5	0,56	844	611	-
50	4,5	1,11	1 688	1 222	-
100	4,5	2,22	3 376	2 444	389
200	4,5	4,44	6 753	4 888	778
315	4,5	7,00	10 635	7 698	1 225
400	4,5	8,89	13 505	9 775	1 555
500	4,5	11,11	16 882	12 219	1 944
800	4,5	17,78	27 011	19 550	3 110
1000	5,0	20,00	30 387	21 994	3 499
1250	5,0	25,00	37 984	27 493	4 374
1600	5,0	32,00	48 619	35 191	5 600
2000	5,0	36,36	55 249	40 000	6 362

6. SHORT CIRCUIT PROTECTION OF MOTORS

6.1. The short circuit protection of motors shall consist of HRC fuses and/or suitably rated circuit breakers with instantaneous magnetic trips, subject to the following conditions:

a. Circuit breakers may be used for fault levels up to 5 kA.

b. Circuit breakers backed up by HRC fuses with a maximum current rating of 200 A may be used for fault levels up to 10 kA in cases where more than one motor circuit is supplied from the same set of fuses. The rupturing capacity of the breaker shall comply with the requirements of Clause 10.3.

c. HRC fuses shall be used in all cases where the fault level exceeds 10 kA.

Prospective fault levels at the input to the control board shall be used in the above considerations (refer also to Clause 7.1).

6.2. Some of the implications of the previous paragraph are as follows :

a. HRC fuses may be used for short circuit protection of all motor circuits.

b. Contactor shall NEVER be used for short circuit protection.

6.3. The required fuse sizes and the setting of instantaneous magnetic trips on circuit breakers for the short circuit protection of motor circuits based on average figures for full load current, power factor and efficiency are shown in Tables 6.1, 6.2 and 6.3.

6.4. Circuit breakers with fixed magnetic trips must be selected to comply as closely as possible with the values listed in Tables 6.1, 6.2 and 6.3. In the case of adjustable magnetic trips, the values shall be taken as maximum values and shall be set lower if

the starting characteristic of the motor and load allows this without causing nuisance tripping.

6.5. If motor currents deviate significantly from the values stated below due to special constructions, suitable fuse ratings or circuit breaker settings shall be obtained from the supplier. In cases where the motor is subjected to long starting periods or frequent repetitive starting cycles, the fuse ratings shall be matched to the motor duty.

6.6. Tables 6.1, 6.2 and 6.3 show fuse sizes as supplied by GEC for standard Type T fuses according to BS 88. If other fuse types are employed, the Contractor shall obtain the necessary information from both the motor and the fuse manufacturer to ensure that the fuse characteristics are matched to those of the motors

.

TABLE 6.1

MOTOR RATING	DOL STARTING						ASSISTED STARTING					
	380 V SUPPLY			525 V SUPPLY			380 V SUPPLY			525 V SUPPLY		
kW	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)
0,75	2,1	10	30	1,5	6	30	2,1	4	30	1,5	2	30
1,1	2,7	15	35	2,0	10	30	2,7	6	35	2,0	3	30
1,5	3,7	15	55	2,7	15	35	3,7	6	55	2,7	6	35
2,2	5,3	20	55	3,8	15	50	5,3	15	55	3,8	10	50
3,0	7,0	20	90	5,1	15	55	7,0	15	90	5,1	10	55
4,0	9,4	25	110	6,8	20	90	9,4	15	110	6,8	15	90
5,5	12,6	35	140	9,1	25	110	12,6	20	140	9,1	15	110
7,5	15,8	40	175	11,4	30	140	15,8	25	175	11,4	20	140
9,0	18,9	40	220	13,7	35	165	18,9	30	220	13,7	20	165
11,0	23	50	275	17	40	220	23	35	275	17	25	220
15,0	31	80	385	22	50	275	31	40	285	22	30	275

18,5	38	80	440	28	60	330	38	50	440	28	35	330
22	45	100	500	33	80	385	45	60	500	33	40	385
26	53	100	660	38	80	440	53	60	660	38	50	440
30	61	125	700	44	100	500	61	80	700	44	60	500
33	68	125	770	49	100	550	68	80	770	49	60	550

TABLE 6.1

MOTOR RATING	DOL STARTING						ASSISTED STARTING					
	380 V SUPPLY			525 V SUPPLY			380 V SUPPLY			525 V SUPPLY		
kW	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)
0,75	2,1	10	30	1,5	6	30	2,1	4	30	1,5	2	30
1,1	2,7	15	35	2,0	10	30	2,7	6	35	2,0	3	30
1,5	3,7	15	55	2,7	15	35	3,7	6	55	2,7	6	35
2,2	5,3	20	55	3,8	15	50	5,3	15	55	3,8	10	50
3,0	7,0	20	90	5,1	15	55	7,0	15	90	5,1	10	55
4,0	9,4	25	110	6,8	20	90	9,4	15	110	6,8	15	90
5,5	12,6	35	140	9,1	25	110	12,6	20	140	9,1	15	110
7,5	15,8	40	175	11,4	30	140	15,8	25	175	11,4	20	140
9,0	18,9	40	220	13,7	35	165	18,9	30	220	13,7	20	165
11,0	23	50	275	17	40	220	23	35	275	17	25	220
15,0	31	80	385	22	50	275	31	40	285	22	30	275
18,5	38	80	440	28	60	330	38	50	440	28	35	330

22	45	100	500	33	80	385	45	60	500	33	40	385
26	53	100	660	38	80	440	53	60	660	38	50	440
30	61	125	700	44	100	500	61	80	700	44	60	500
33	68	125	770	49	100	550	68	80	770	49	60	550

TABLE 6.3

MOTOR RATING	DOL STARTING						ASSISTED STARTING					
	380 V SUPPLY			525 V SUPPLY			380 V SUPPLY			525 V SUPPLY		
kW	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)	Full Load Current (A)	Fuse Rating (A)	Magnetic o/c Setting for Breakers (A)
250	476	600	-	345	450	-	476	550	-	345	400	-
270	511	600	-	370	450	-	511	550	-	370	450	-
280	519	600	-	376	500	-	519	550	-	376	450	-
300	560	650	-	405	500	-	560	600	-	405	450	-
315	587	650	-	425	500	-	587	600	-	425	450	-
375	696	700	-	504	600	-	696	700	-	504	550	-
400	744	750	-	539	600	-	744	750	-	539	600	-
450	837	850	-	606	650	-	837	850	-	606	650	-

7. SHORT CIRCUIT PROTECTION OF CONTACTORS

7.1. Clauses 6.1, 6.2 and 6.4 are applicable to the short circuit protection of contactors. Prospective fault currents at the input to the control board shall be used in the above considerations.

7.2. Fuse ratings and circuit breaker settings shall be matched to the

- motor full load current
- method of starting
- operating voltage
- motor duty.

In Table 7.1, average values for contactor ratings, required fuse backup protection, and settings for magnetic trips are shown for the short circuit protection of contactors for AC 3 switching duty (refer to Appendix A) at 380 V. The protection required for other switching duties or other operating voltages shall be obtained from the contactor manufacturer. Where contactors switch motor circuits, the protection of the motor (refer to Clause 6) shall be matched to the contactor protection to ensure that both motor and contactor are protected.

TABLE 7.1

Maximum Rated Switching for AC Duty @ 380 V		Maximum Fuse Rating (A)	Maximum Setting of Magnetic Trip (A)
kW	A		
4	8	20	110
5,5	12	20	140
7,5	15	25	175
11	20	30	400
12,5	25	35	500
15	30	60	600
18,5	37	80	800
22	44	80	1 000
32	63	100	1 400
40	80	150	1 600
55	110	200	2 000
63	125	250	-
75	150	250	-
90	170	250	-
110	220	300	-

132	250	350	-
160	300	400	-
200	380	500	-
250	480	600	-
340	630	800	-
430	800	1 000	-
540	1 000	1 200	-

8. SHORT CIRCUIT PROTECTION OF OVERLOAD DEVICES

8.1. Overload relays shall be protected against short circuits by means of fuses or circuit breakers with instantaneous magnetic trips.

8.2. The short circuit protection for motors, as stated in Clause 6, will in most cases protect the overload device, if the device is properly matched to the motor. The Contractor shall verify that the overload relay is protected sufficiently by the motor short circuit protection.

9. SHORT CIRCUIT PROTECTION OF CABLES

The maximum fuse ratings or the maximum settings of instantaneous magnetic trips on circuit breakers for the short circuit protection of cables are shown in Table 9.1 for multi-core PVC cables with stranded copper conductors. The prospective fault current used shall be calculated at the supply end of the cable.

TABLE 9.1

Cable Size (mm^2)	Maximum Load Current (A)	Maximum Fuse Rating (A)	Maximum Setting of Instantaneous Magnetic Trips (kA)
1,5	12	50	0.4
2,5	17	60	0.56
4	23	100	0.95
6	30	150	1.5
10	46	200	2.0
16	61	250	3.0
25	81	300	5.4
35	99	500	8.0

50	125	600	10
70	155	800	14
95	185	1 600	20
120	215	-	27
150	250	-	34
185	280	-	42
240	330	-	53
300	380	-	70

10. BACK-UP PROTECTION FOR CIRCUIT BREAKERS

10.1. Where the maximum fault current exceeds the rupturing capacity of a circuit breaker which is required at a point in the electrical system, HRC fuses shall be installed in series with the circuit breaker to provide backup short circuit protection.

10.2. The Contractor shall match the characteristic curves of the fuses and circuit breakers to ensure that adequate discrimination is provided between the two characteristics.

10.3. The required symmetrical RMS rupturing capacity of circuit breakers at 380 V and a power factor ± 0,25 with backup fuse protection is shown in Table 10.1

Table 10.1

Circuit Breaker Rupturing Capacity (kA)		Prospective Fault Current (kA)															
		2,5	3	4	5	6	7	8	9	10	12.5	15	17,5	20	25	30	35
F	60	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	5	5	5	5	5
u	80	2,5	2,5	2,5	2,5	2,5	5	5	5	5	5	5	5	5	5	5	5
s	100	2,5	5	5	5	5	5	5	5	5	5	5	10	10	10	10	10
e	150	2,5	5	5	5	5	10	10	10	10	10	10	10	10	10	10	10
	200	2,5	5	5	5	10	10	10	10	10	10	10	10	10	10	10	14
R	150	2,5	5	5	5	10	10	10	10	10	10	10	10	10	10	14	14
a	300	2,5	5	5	5	10	10	10	10	10	10	10	14	14	14	14	14
t	400	2,5	5	5	5	10	10	10	10	10	14	14	14	14	14	15	20
i	500	2,5	5	5	5	10	10	10	10	10	14	15	20	20	20	20	25
n	600	2,5	5	5	5	10	10	10	10	10	14	15	20	20	25	25	25
g	700	2,5	5	5	5	10	10	10	10	10	14	15	20	20	25	30	30
(A)	800	2,5	5	5	5	10	10	10	10	10	14	15	20	20	25	30	35

11. CAPACITY OF ISOLATORS

On-load isolators located at any point in the electrical system shall be capable of making onto the maximum fault current that can occur at that point (refer to Clause 3.10 of KARIWA A-SPES-08-03)

12. DISCRIMINATION

It is essential that the required discrimination shall exist between the short circuit and overcurrent protection. Fuses shall exclusively be used for short circuit protection and shall be selected to blow on short circuits which approach or exceed the rupturing capacity of the overload protective device (circuit breaker or contactor). All components and ratings in the electrical system shall be carefully chosen to maintain discrimination between main circuits and sub-circuits.

13. ANNEXURE A: APPLICABLE STANDARDS

- SABS 948
- BS 2631
- BS 170
- BS 4941 PART 1
- BS 1452
- BS 775
- VDE 0660 SECTION 14
- IEC 158
- BS 587
- BS 89
- BS 88

A-SPES-31-04-W03

STANDARD SPECIFICATION FOR AIR-HEATING AND COOLING COILS

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Table of Contents

STANDARD SPECIFICATION

1. GENERAL

1.1. Only standard products of a reputable local manufacturer, regularly engaged in the fabrication of these particular types of coils, shall be considered.

1.2. Coils shall be selected with pipe connections only on the one side.

1.3. Coils shall be selected in accordance with AIR Code 410-64, with economic pressure drops to suit the complete pipe and pump circulation system.

1.4. Each coil section shall be securely mounted on a die-formed 1,5 mm thick galvanised sheet steel casing, arranged for bolting to other sections, ductwork, unit casings, and the like.

1.5. Coil sections shall be supported on an angle frame or other strong and rigid construction. Supports for cooling coils shall not damage the drip pans and shall be arranged so that condensate cannot run down past the drip pans. Cooling coil supports shall be galvanised. Coils shall be accurately levelled during installation.

1.6. Coils shall be provided with inlet, outlet, vent and drain connections for each section. Pressure gauges and thermometer wells shall be installed as shown on the Engineer's Drawings.

1.7. Unless otherwise specified in the Detailed Specification, each coil shall be supplied complete with: P/Spec

- isolating valves in the supply-and-return chilled water pipes
- a calibrated balancing valve with pressure differential gauge connection in the chilled water feed pipe
- a three-way mixing control valve in the coil bypass pipe
- a bypass globe valve to balance the flow in the bypass pipe
- an angled strainer in the chilled water feed pipe.

The layout shall be as shown on the Engineer's schematic pipe drawings.

1.8. Cleanable coils shall be provided with straight tubes and steel or cast-iron header. Clean-out plugs shall be provided in the return bends opposite each end of the tubes, if cleanable serpentine coils are specified, as may be the case with closed-circuit cooling towers. P/Spec

1.9. Tube shall be seamless copper with wall thickness not less than 0,04 times the outside diameter. Pressure parts of coils shall be constructed and tested for a testing pressure of not less than 1 500 kPa or 1,5 times the normal working pressure, whichever is the highest.

1.10. Coil headers shall be of copper, steel or cast-iron. Tubes shall be soldered or brazed to headers, unless the headers are sturdy enough to withstand, without undue distortion, the stresses due to the rolling or expanding of the tubes.

1.11. Coils shall be suitably protected during transport and installation so that no damage will occur. Coils having loose or damaged fins at the time of final inspection will be rejected and shall be replaced with new coils at the Contractor's own expense.

1.12. Fins shall be of aluminium or copper and shall extend at right angles to the tubes to be mechanically fixed to tubes.

1.13. Coils shall be selected for the correct altitude media density and a fouling factor of 0,099 m² K/kW.

2. COOLING COILS

2.1. Cooling coils shall be of the extended-surface type, constructed of copper tubing with a minimum outside diameter of 13 mm, with plate fins of aluminium, extending at right angles to the tubes. For sprayed coils, fins shall be of copper.

2.2. Coils shall be of the serpentine type.

2.3. Fins shall be spaced not closer than 10 per 25 mm for "dry" coils and 8 per 25 mm for sprayed coils. Plate fins may be flat or formed, and shall have nominal thicknesses of not less than 0,0085 times the outside diameter of the tubes. Plate fins shall be soldered to the tubes or shall be provided with integral spacing collars the full width of the space between fins. Tubes shall be tightly and permanently expanded into spacing collars.

2.4. SPRAYED COOLING COILS

2.4.1. Sprayed cooling coils are normally not acceptable since "dry" cooling coils with a separate air washer are preferred. Refer to KARIWA STANDARD SPECIFICATION FOR EVAPORATIVE COOLER UNITS AND AIR WASHERS A-SPES-31-14.

2.4.2. Water-sprayed cooling coils shall consist of copper tubes with copper fins. Eliminators shall be provided after each coil. Spray water quantities shall be at least 0,24 l/s per 1 m³/s or 1 m³/s of air flow. Spray nozzles shall be arranged uniformly over the face area of the coils and shall operate at a pressure of 200 kPa.

2.4.3. Each spray chamber shall consist of a sump, spray pipes with spray nozzles, casing, eliminator section and a spray pump.

2.4.4. Spray nozzles shall be manufactured of brass or plastic material and shall be easily cleanable. The capacity and spacing of the nozzles shall be to provide a uniform spray at the specified water quantity and at a pressure of 170 kPa.

2.4.5. Each nozzle header shall be provided with an isolating valve.

3. HEATING COILS

3.1. Heating coils shall be of the extended-surface type, constructed of copper tubing with a minimum outside diameter of 13 mm, with helical or plate fins of aluminium. Fins shall extend at right angles to the tubes.

3.2. Heating coils shall be of the serpentine type.

3.3. Fins shall be spaced not closer than 12 per 25 mm and shall have a minimum thickness of 0,012 times the outside diameter of the tubes.

3.4. Steam-heated coils shall be of the single-pass type and shall have supply and return tappings for each section.

3.5. Tubes of steam-heated coils shall be arranged so that expansion stress cannot occur and headers shall be welded steel, brass or copper.

4. FACE VELOCITIES

4.1. Face velocities for all coils shall not exceed 2,5 m per second.

5. DRIP PANS

5.1. Drip pans shall be fitted under each cooling coil section.

5.2. Drip pans mounted one above the other shall not drain into each other.

5.3. Drip pans shall be arranged so that no droplets are carried over the drip pan and shall extend at least 350 mm to the downstream side of the coil.

5.4. Drip pans shall be at least 50 mm deep at the coil and may reduce to a depth of 25 mm at the end away from the coil.

5.5. Drip pans shall also be manufactured to extend to the upstream side of the coil. A lip of at least 25 mm, extending upwards at an angle of 45° on the upstream side of the coil, shall form part of the drip pan.

5.6. All drip pans shall be fitted with U-traps similar to those used on kitchen sinks. These shall not be less than 40 mm in diameter.

5.7. Drip pans shall be large enough to collect all condensate formed on the header.

5.8. Drainpipes shall not be less than 40 mm in diameter.

6. AMMONIA COOLING COILS

All evaporators shall be of robust construction, with heavy channel iron supports attached to the tube sheets.

The liquid supply and return headers fitted to the ammonia coil shall be mounted at the bottom and top of the evaporator tube nest respectively, in the horizontal position (no liquid distributors are allowed).

When headers are connected in the vertical position the evaporators will be rejected.

The headers shall extend well beyond the evaporator face to facilitate easy welded pipe connections.

The refrigeration plant will operate with the following circuits:

- Chilling circuit, liquid temperature – minus 8 °C
- Freezing circuit, liquid temperature – minus 28 °C
- Chill rooms, temperature – minus 1 °C to plus 2 °C
- Freezing rooms, temperature – minus 18 °C to minus 25 °C

7. DEFROSTING REQUIREMENTS

All freezing circuit evaporators shall operate with hot gas defrosting.

Drain pans shall be of double construction, whereby the bottom tray shall be insulated with asbestos insulation and fitted with CALROD heater elements. The heater elements are to be mounted in such a way as to allow for free expansion and contraction and shall be easily removable for maintenance purposes.

Fan rings shall also be fitted with heaters to prevent fan freeze-up during defrosting. Heater elements shall be pressed against the bottom of the inner drip tray to facilitate heat distribution.

Drainpipes shall be heated and thermally insulated with one pass of 6 mm asbestos cord or tape tightly wound around the pipe and the heater element. All electric heater elements shall terminate in a moisture-proof terminal box, mounted for easy electrical installation. All terminals shall be clearly numbered at both ends. The terminal boxes inside cooled areas shall be filled with a suitable mastic or other water-repellant non-conductive sealing compound.

Defrost is to be initiated by a suitable PARAGON defrost timer or equivalent.

8. FAN AND MOTORS

Individual fan noise levels shall not exceed 65 dB/A at one metre.

All evaporator fan motors shall be of totally enclosed construction, with weep holes at the bottom to enable condensate drainage.

Fan motors shall be designed for:

- Volt 380
- Phase 3
- Hz 50

The fan motors for all evaporators shall be of single-speed design.

All fans supplied with the evaporators shall be of aerofoil design and preferably manufactured of aluminium alloy. Fans shall be dynamically balanced for the speeds at which they operate.

Fan motors shall be suitable, in all respects, for operation in saturated atmosphere (SATMOS treated), and hose-proof to BS IP 55.

Where evaporators are mounted in such a position that they can be reached from floor level, fans shall be provided with fan guards of hot-dipped galvanised steel wire construction.

All evaporator fan motors shall be fitted with terminal connections and sealing glands to acceptable South African Standards and all cabling must be taken to a common, moisture-proof terminal box, suitably mounted on each evaporator. All terminals shall be clearly numbered at both ends. The terminal boxes for heaters and motors shall be separate (two per evaporator).

Electric cables for the chilling circuit evaporators shall be suitable for operation at temperatures down to minus 10° C

The freezing circuit evaporators shall be wired with cables insulated with material suitable for operation at temperatures down to minus 30° C

NOTE: The evaporators shall be of the inducted draught design.

9. METHOD OF CONSTRUCTION

Evaporator coils shall be of the following construction:

9.1.1. Steel tube and fin, hot-dip galvanised after manufacture. Great care shall be taken that the fins are in solid contact with the tubes by press-fitting the fins on to the tubes. In the hot-dip galvanising process, the bath shall be regularly skimmed to prevent build-up of impurities and accumulation of material at the bottom of the fins when coils are removed from the bath.

9.1.2. Tube configuration: It is considered economical to allow either a square or staggered configuration with 19/22 mm diameter tube, at tube centres of 80 mm high and 50 to 70 mm across. Manufacturers shall advise the optimum solution when considering the k-factors and frost factors which limit the coil capacity and efficiency.

9.1.3. The evaporator header end cap (blanking cap) welds on both liquid and suction headers must be X-rayed.

9.1.4. 10% of the welds must be treated in this manner and the X-rays marked with coil serial number and weld number. If flaws are regularly detected, all coil header welds must be X-rayed and corrected where required.

10. APPLICABLE TO ALL EVAPORATORS:

Evaporator fin spacing shall be not less than 10 mm between fins for chillers, and 12 mm between freezer fins to prevent excessive frosting on the coil surfaces. Coils shall be manufactured to the following minimum standards:

10.1.1. High-frequency induction-welded steel tubing of minimum wall thickness 1,5 mm to American ASTM Standards may be used in the manufacture of evaporators.

NOTE: Such tubing shall not be used elsewhere in the pipe installation.

10.1.2. Minimum standards required:

- minus 10 °C circuit - ASTM/A214
- minus 30 °C circuit - ASTM/A334

10.1.3. Evaporators shall be clearly marked Minus 30 °C circuit or Minus 10 °C circuit, as applicable.

10.1.4. Tenderers are required to provide details, standards and temperature limitations of the evaporator tubing with their tender.

11. CASING AND DRIP PANS

Casing and drip pans shall be manufactured of suitable heavy-gauge material and sufficiently braced to prevent the generation of sympathetic vibration, such as could be caused by the operation of an fan unbalanced by ice build-up on the fan blades.

It is proposed that the casing should be manufactured of 2 mm galvanised sheet steel, finished with self-etching primer coat and a two-pack epoxy final coat. Aluminium coils may have aluminium casings, provided these are sufficiently robust.

The drip trays shall not be penetrated in any way (by securing bolts, rivets and the like).

The evaporators will be suspended from the roof supporting steel structure.

Care shall be taken that the heater elements below the drip trays of the freezing units are easily removable, without actually lifting or displacing the evaporator unit.

Drip trays shall extend beyond the evaporators to prevent any uncontrolled dripping during defrosting or normal operation.

All evaporator drip trays shall be insulated to prevent condensation and drip. This applies to both freezing and chilling applications.

12. DRAWINGS TO BE SUPPLIED WITH TENDER

- Overall dimensions of evaporator units
- Type and details of mounting or handling construction
- Details of drip tray construction, insulation and drainage
- Details of drip tray heating and coil heating where applicable, heater sizes, insulation, terminal boxes and the facility to remove these heater elements
- Details of fan ring heaters, heater sizes and terminal boxes
- Details of fans, motors, motor sizes, two-speed schematic wiring diagram and terminal box details, both on the motors and the evaporators, if applicable.

All wording on drawings shall be in English and all dimensions shall be in the SI system.

13. DAMAGED FINS

In the event of evaporators being delivered to site with bent fins, a fin comb shall be used to straighten all aluminium fins before commissioning. Hot-dip galvanised fins may require more robust equipment and labour but fins must be straightened before commissioning.

14. MAXIMUM HEIGHT OF EVAPORATOR UNITS

Evaporator units, including supporting steelwork, shall not exceed 1 000 mm in height.

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STANDARD SPECIFICATION FOR CONTROL BOARDS & SMALL WIRING

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Table of Contents

STANDARD SPECIFICATION

1. SCOPE

This Specification provides for the physical construction of control boards used for relay panels, control boards, marshalling kiosks and pilot cubicles, and includes the fitting of instruments, control switches, labelling, indication and auxiliary equipment, as well as the wiring of the control board, including control fuses and miniature circuit breakers.

2. GENERAL

The Contractor shall ascertain the required positions of all control boards timeously and shall ensure that provision is made in the building structure for sleeves, pipes, access holes, etc, if required.

All control boards and kiosks shall be totally enclosed, vermin- and insect-proof, drip proof and dustproof, whilst all boards intended for outdoor applications shall, in addition to the above, also be weatherproof.

3. CONSTRUCTION OF FLOOR-STANDING BOARDS

Floor-standing boards shall be totally enclosed and shall be of the multi-tiered type, fixed pattern, sectional construction, allowing for logical grouping of equipment behind individual hinged doors or panels to the full approval of the Engineer.

The control board shall basically consist of the following:

3.1. A solid, U-channel or solid angle iron base frame of sufficient strength to carry the total mass of the board complete with equipment over any proposed cable ducts, trench or access hole, with the necessary safety and without distorting. The maximum height of the board shall be 2,1 m.

3.2. The top, side and rear panels of the board shall be of minimum 2 mm folded steel and shall be fixed by means of studs welded to the base frame, and by chromium-plated brass dome nuts and washers where required. Suitable mounting facilities to the approval of the Engineer shall also be provided for the equipment, doors and panels.

3.3. Unless otherwise specified in the Detailed Specification, access to the board shall be via hinged front and back door panels, with approved non-ferrous handles and fasteners designed to draw the door panel to the fully closed position and designed with facilities for padlocking. Square-key operated fasteners are not acceptable. The door panels shall be manufactured of 2 mm sheet metal, folded in a 20 mm deep rigid pan section, with a 10 mm return edge towards the inside, parallel to the closing face of the cubicle, suitably arranged for an effective 10 mm wide sealing face between the door and framework. A neoprene-type seal of 3 mm thickness shall be applied to this 10 mm return edge. All corners of pan sections shall be welded and shall be completed to a smooth finish. In areas of high pollution and humidity, the doors shall be

arranged to close over a 10 mm return edge on the board frame, projecting into the door pan, to the full approval of the Engineer. ----------P/Spec[1]

3.4. Doors shall have a maximum width of 800 mm. Cubicles or kiosks with widths in excess of 800 mm shall be provided with double doors, opening from the centre outwards.

3.5. All doors without equipment mounted thereon shall be provided with lift-off type hinges.

3.6. Any removable top, side or back panels shall be manufactured of minimum 2 mm sheet steel, and shall be fixed to the cubicle frame by means of studs with a minimum diameter of 6 mm, welded to the frame and bolted down by means of chromium-plated hexagonal brass dome nuts and washers. Hank nuts and bolts will not be accepted without the written approval of the Engineer.

3.7. All sharp points and edges shall be avoided in the construction of any cubicle or kiosk. Sharp-ended self-tapping screws or similar fixing items shall not be used.

3.8. The construction and assembly of a control board shall be such that the individual cubicles or kiosks are completely separated from one another by means of the side sheets of each cubicle.

3.9. The side panels of the board shall internally be suitable for mounting equipment thereon. No equipment shall however be directly mounted to the external sheet metal of the board. All equipment mounted on the inside of any door or external panel shall be fixed in such a manner that it is not visible from the outside.

3.10. To prevent internal condensation, an approved type of metal-clad heater shall be provided, controlled by a single-pole rotating switch and protected by a 5 Amp fuse and neutral link or suitable MCCB (moulded case-type circuit breaker) within the kiosk. Suitable ventilation louvers shall be provided, complete with brass or copper gauze fitted internally. The louvers shall be shaped so as to maintain the weather-proofness of the cubicle, and the maximum mesh size shall be 1 mm to maintain the termite- and vermin-proof requirements of the kiosk. Any internal cubicle or kiosk subdivisions shall be perforated to permit natural air circulation within the cubicle.

3.11. A gland plate with a minimum thickness of 3 mm for the glanding off of all required cables shall be provided at the base of all such cubicles and kiosks. Preference will be given to designs where a continuous vermin-proof gland plate is provided 250 mm above the base frame of the cubicle, with an access panel on the rear or the front of the cubicle to the cable gland space below the above gland plate. In the case of a kiosk being used for a pilot cubicle, an approved insulating gland plate of at least 8 mm thick DELERON or TUFNAL shall be provided for glanding off of pilot cables.

3.12. A suitable cubicle interior illumination light (minimum 40 watts AC) for operation on an alternating current supply, with an approved limit switch operated by opening and closing the cubicle door, shall be provided for each cubicle or kiosk. The lamp holder shall be of the adjustable angle batten type. Internal wiring for this light arrangement shall be terminated on a suitable terminal strip. Once the board has been installed, the Contractor shall also be responsible for the installation and termination of the required power supply cable to the board.

1 P/Spec = See Project Specification in Section C3.2 of the Contract Document

3.13. All relays and instruments shall be of the flush-mounted type, unless otherwise approved by the Engineer in writing.

3.14. Where any equipment having live uninsulated terminals at a voltage in excess of 42 volts, such as meters, lamps, relays and switches, is mounted on any cubicle or kiosk door, such terminals shall be effectively shrouded by means of approved removable shrouds to protect against accidental contact by any person working in such a cubicle.

4. CONSTRUCTION OF SURFACE-MOUNTED BOARDS

Surface-mounted boards shall be totally enclosed and shall consist of:

4.1. A minimum of 2,0 mm sheet metal enclosure, of approved design suitably braced and with the necessary reinforced fixings for wall mounting. All joints shall be welded and shall be completed to a smooth finish.

4.2. A front door panel meeting the same requirements for dust- and waterproofing as specified above for floor-standing boards. The door panel shall be rigid and designed to safely and efficiently accommodate all the door-mounted equipment required.

4.3. All locking and closing facilities, the general construction, gland plates, interior cubicle lighting, heating and ventilation, and the mounting of equipment, as well as the shrouding of all live terminals of equipment on the cubicle or kiosk doors, shall fully comply with the requirements for floor-standing cubicles called for in Clause 3 above.

5. METALWORK FINISH AND PAINTING

5.1. All metalwork shall be smooth, free from rust, scale or grease, and shall be cleaned in strict accordance with SABS 780 of 1966 (as amended), and finished with either baked enamel or electrostatically applied powder coating in the case of interior applications. In the case of all outdoor applications, the final paint layer shall consist of an ultraviolet-resistant epoxy-type paint to the approval of the Engineer, and shall generally comply with :

5.1.1. Dry primer paint thickness – minimum 0,03 millimetres of approved rust-inhibiting paint.

5.1.2. Total dry-paint thickness for indoor applications – minimum 0,06 millimetres.

5.1.3. Total dry-paint thickness for outdoor applications – minimum 0,09 millimetres.

5.1.4. Shock resistance on 0,9 soft steel plate – 25kg.

5.1.5. Scratch resistance – 2 000 grams

5.1.6. Each coat of paint shall be of a different colour and shall only be applied to a clean and dry surface.

5.2. Where the electrostatic powdercoating method is used, the paint shall be baked to harden within 10 minutes at a constant temperature of 190 °C.

5.3. The internal surfaces of all boards and kiosks shall be painted satin "white" with a durable paint, while the external surfaces shall be painted to the colours specified in the Detailed Specification or the applicable KARIWA Standard Specification. ----------P/Spec

5.4. Special attention shall be given to achieving the required paint thickness to all edges and corners, as well as the inside of slots and channels formed by folding of the metal.

5.5. It is a requirement of this Specification that the fully painted metal cubicle be subject to inspection and approval by the Engineer before any wiring or equipment is fitted.

5.6. Before the Installation is handed over, the Contractor shall ensure that all painted surfaces are clean and undamaged.

5.7. Any damage to paintwork incurred during transport and erection shall be made good to the full approval of the Engineer, by thoroughly cleaning the damaged portion to the original metal surface and applying the full number of coats that existed previously.

6. SEMAPHORE INDICATORS AND INDICATION LIGHTS

6.1. 6.1Where called for in the Detailed Specification, control boards and kiosks shall be fitted with an approved mimic panel along the top portion on the front panel of such cubicle or kiosk. ----------P/Spec

All such mimic panels shall be clearly visible from a minimum distance of 3 metres and shall be equipped with semaphores of the automatically operated type, which shall distinctly indicate the status of the "primary circuit", elements such as:

i. The “open” or “closed” status of the circuit breakers, isolators or earth switches.

ii. To which set of busbars the respective feeders have been connected.

6.2. As a convention, all rear or top busbars shall be represented by the upper busbar line of the mimic panel and shall be labelled “rear” or “top” busbars, whilst the front or bottom busbar shall be represented by the lower mimic line, also suitably labelled to the full approval of the Engineer.

6.3. All semaphores shall be suitable for operation on a 110 V direct current supply system and are to be electrically controlled in both the “open” and the “closed” position. The contacts of the semaphores shall be so arranged that the operating current is automatically cut off on the completion of any movement of the instrument. Separate auxiliary, potential free contacts shall also be provided for supervisory use, and shall be suitably wired to the terminal block.

6.4. All other indicating devices, such as volt meters, ammeters and associated instruments and lamps for indication and alarm shall be mounted at eye-level (1 700 mm above finished floor level, ±200 mm) for clear visibility, and shall be of a design that imposes the minimum load on the power supply system.

6.5. A lay-out drawing clearly indicating and dimensioning the cubicle or kiosk, as well as the mimic panel and all associated indication and control instruments, shall be submitted to the Engineer for approval within six weeks after the tender has been

awarded. The construction of any such cubicle or kiosk without written approval of the above drawings shall be at the risk of the supplier.

6.6. All indicating instruments intended for outdoor application shall be of a weather-proof design approved by the Engineer in writing, after submission of the necessary test certificates to prove the claimed characteristics.

6.7. All indication lights shall be of the low current drain LED type. These indication lights shall make use of a cluster of 4, 6 or 8 LED's housed in a single housing behind a single front glass of colour specified in the Detailed Specification. Should the incandescent type of indication lights be preferred or proposed by the Contractor, this shall be subject to the prior written approval of the Engineer. ----------P/Spec

6.8. All lamp voltages shall suit the supply or control voltage. Should incandescent lamps be approved, such lamps shall be derated for continuous duty by using economical resistors or using input voltages at least 20% lower than the rated lamp voltages.

6.9. 6.9Where quad LED's are used as indicators on main supply voltages, a suitable current limiting capacitor and reverse voltage protection diode shall be used. For low AC or DC voltages (± 24 V), a current limiting resistor will suffice.

6.10. Indicator lights shall comply with BS 1050, where applicable.

6.11. Indicator lights shall be suitable for installation in control board panels and doors, and shall consist of interchangeable lenses, lamp base, suitably rated and accessible terminals, and a chromed screw-on retaining ring or other suitable means of securing the units.

6.12. It shall be possible to replace all lamps from the front of the panel. Should special tools be required to remove lamps, such special extraction tools shall be provided.

6.13. All indication lights shall be equipped with suitable and descriptive legend plates. Alternatively, the function shall be clearly indicated by means of labels or by engraving directly onto the lenses of the indicating lights.

6.14. All indicator lights for a specific application or switchboard shall be from the range of one manufacturer and shall be of the same size and shall use the same lamp types.

6.15. Unless otherwise specified, the following are the colours for indicator lights: ----------P/Spec

- Red : Abnormal state
- Yellow (or amber) : Attention or caution
- Green : Ready for operation
- White (or clear) : Circuit live or circuit operating normally
- Blue : Any function not covered by the above colours

7. CURRENT TRANSFORMERS

7.1. Current transformers shall be of the ring type or bar type. The ring type shall have an opening to suit the dimensions of the conductors or busbars and shall comply with BS 3938. The opening shall not be unnecessarily large as accuracy is thereby reduced.

7.2. Current transformers shall have an output near in value to, but not less than, the actual output at which they are to operate. The saturation point shall be chosen to match the operating characteristics of circuit protection equipment.

7.3. Current transformers intended for metering purposes only shall be selected to saturate at less than 200% of the full load for normal load conditions, and at 700% for meter load applications.

7.4. Unless specified to the contrary, current transformers shall have a Class 1 accuracy and shall be suitable for operation on 50 Hz AC systems up to 600 V. ----------P/Spec

7.5. Each current transformer shall be provided with a robust mounting bracket and proper terminal studs on the circumference of the coil for connections.

7.6. A nameplate shall be fixed to the coil circumference in such a position that it can be easily read from outside the switchboard after removal of the access panels. The nameplate shall clearly indicate manufacturer, serial number or type, rated primary and secondary current, rated frequency, rated output and accuracy class, highest system voltage and rated insulation level.

7.7. Current transformers shall be capable of withstanding the maximum fault current that can occur at that point in the system for the time taken by the circuit protection devices to clear the fault.

7.8. The primary current values shall be 10, 15, 20, 30, 50 and 75 A and their decimal multiples. Secondary current ratings of 1, 2 and 5 A are acceptable.

8. INSTRUMENTS

All instruments specified in the Detailed Specification shall be provided and installed on the control board. All such instruments shall be of the following types and shall comply with the following specific requirements:----------P/Spec

8.1. VOLTMETERS

8.1.1. Voltmeters shall be of the moving iron type, with Class 1.5 accuracy as specified in IEC 51, shall be suitable for flush mounting on vertical control board panels, and shall be provided with studs for rear connection. The terminals of voltmeters mounted on hinged front panels shall be shrouded or covered to prevent accidental contact when the panels are open.

8.1.2. Voltmeters shall be of 72 mm or 96 mm square pattern, unless specified to the contrary. Voltmeters, ammeters, frequency meters, etc. shall all have the same dimensions for any particular application. ----------P/Spec

8.1.3. Voltmeters shall be suitable for operation on a 50 Hz system and shall be manufactured in accordance with the requirements of BS 89 for industrial grade accuracy. The voltmeters shall be calibrated as specified in the Detailed Specification and shall withstand an insulation test voltage of 2 kV AC for 1 minute. ----------P/Spec

8.1.4. Voltmeters shall be fitted with zero adjustment screws.

8.1.5. Voltmeters shall be screened to prevent magnetic interference and shall be fitted with anti-static glass.

8.1.6. Voltmeters shall be equal or similar to the PCI type Fv, except where special voltmeters are required for aggressive atmospheres. Whatever the atmosphere, the type to be used shall be approved by the Engineer. ----------P/Spec

8.1.7. Voltmeters shall be protected by suitable and approved fuses or MCCB's. Selector switches shall comply with the requirements of Clause 11 of this specification.

8.1.8. Each voltmeter shall be marked to indicate the appropriate phase to which it is connected. Where three voltmeters are provided, they shall be installed in a horizontal line. The voltage which is being measured shall be clearly marked.

8.1.9. Where voltmeters are connected to potential transformers, the ratio of the potential transformer shall be marked on the voltmeter faceplate.

8.1.10. Voltmeters shall be suitable for the environment in which they are installed.

8.1.11. Under certain conditions, voltmeters to be supplied shall be of the suppressed zero type and shall be scaled in accordance with the requirement of the switchgear. Where only one voltmeter is specified, a voltage selector switch shall be provided having four positions marked OFF, R-B, Y-B and R-Y, so that the voltage across any two lines may be indicated or the voltmeter may be disconnected from the circuit.

8.1.12. Voltmeter fuses shall always be used in voltmeter circuits. These fuses shall comply to the following requirements:

a. The fuse shall consist of a porcelain or other approved base suitable for panel mounting, a fuse carrier, and a cartridge-type HRC fuse link

b. The cartridges shall be for a nominal current rating of 1A at 380 V 50 Hz

c. The fuses shall generally be in accordance with BS 88 for fuses of the AC 16 or AC 33 category of duty, whichever is applicable. For higher system fault levels, backup fuses with the required rupturing capacity shall be provided

d. The installation of voltmeter fuses shall comply with Clause 18 of this Specification.

8.2. AMMETERS

8.2.1. Ammeters shall be of the moving iron type, suitable for flush mounting on vertical control board panels and shall be provided with studs for rear connection. The terminals of ammeters mounted on hinged front panels shall be shrouded or covered to prevent accidental contact when the panels are open.

8.2.2. Ammeters shall be of 72 mm or 96 mm square pattern, unless specified to the contrary. Voltmeters, ammeters, frequency meters, etc. shall have the same dimensions. ----------P/Spec

8.2.3. 8.2.3Ammeters shall be suitable for operation on a 50 Hz AC system and manufactured to the requirements of BS 89 with an accuracy which need

not exceed 1,5%. Current transformer-operated ammeters shall be used to measure large currents. All current transformer-operated ammeters shall be calibrated to read actual primary circuit currents. The current transformer ratio shall be indicated on the scale. Full load ratings shall be indicated by a red line. Ammeters shall withstand a test voltage of 2 kV.

In the case of all ammeters connected into protection circuits, such meters shall be fitted with saturation current transformers in order to protect the meter and associated circuiting. For normal load applications, these current transformers shall saturate at 200% of their full load and they shall saturate at 700% on motor load applications.

8.2.4. Where the calibration and current transformers are not specified, the ammeters shall be calibrated for a full scale deflection of approximately 110% of the rated current of the circuit, with matching current transformers. Ammeters used in motor circuits shall cater for motor starting current by condensed overscales up to 100% overload scaling. ----------P/Spec

8.2.5. Ammeters shall be fitted with zero adjustment screws.

8.2.6. Ammeters shall be screened to prevent magnetic interference and shall be fitted with anti-static glass.

8.2.7. Ammeters shall be equal or similar to PCI type Fa or ATW type AF, except where special ammeters are required in aggressive atmospheres. Whatever the atmosphere, the type to be used shall be approved by the Engineer. ----------P/Spec

8.2.8. Three ammeters shall normally be provided on three-phase circuits. Ammeter selector switches are not preferred and shall not be provided without the prior written approval of the Engineer. Where ammeter selector switches are however unavoidable, they shall be of the make-before-break type. The wiring shall be arranged so that the CT terminals are short-circuited when the ammeter is not connected across the CT.

8.2.9. Each ammeter shall be marked to indicate the appropriate phase to which it is connected. Where three ammeters are provided, they shall be installed in a horizontal line, unless otherwise approved by the Engineer. Labels shall be fitted to indicate the specific circuit current being measured.

8.2.10. Ammeters shall be suitable for the environment in which they are installed.

8.3. MAXIMUM DEMAND AMMETERS

8.3.1. Maximum demand ammeters shall be provided if specified in the Detailed Specification. ----------P/Spec

8.3.2. Maximum demand ammeters and associated current transformers shall comply with the requirements of Clause 8.2 above, except that, in addition to the moving iron ammeters showing instantaneous current, a maximum demand ammeter shall be installed employing a bi-metallic spiral device which indicates mean current value integrated over a 30 minute period and a residual pointer to indicate the maximum mean current reached during any period. Manual resettings shall be combined in the same housing.

8.3.3. All three indications shall be given on concentric scales. Instruments having small moving iron ammeters with window cut-out scales are not acceptable.

8.3.4. The bi-metallic system shall incorporate ambient temperature compensation.

8.3.5. It shall be possible to reset the residual pointer from the front glass panel by means of a sealable knob.

8.3.6. The accuracy of the moving iron ammeter and maximum demand ammeter shall be 1,5% and 3% respectively.

8.4. KILOWATT-HOUR METERS

8.4.1. Kilowatt-hour meters shall be provided, if specified in the Detailed Specification. ----------P/Spec

8.4.2. Kilowatt-hour meters shall be of the drawout pattern, with cases suitable for flush mounting in the switchboard. The terminals of kilowatt-hour meters mounted on hinged front panels shall be shrouded or covered to prevent accidental contact when the panels are open.

8.4.3. The meter shall be manufactured in accordance with the requirements of BS 37. The meter shall be suitable for operation on a three-phase, 50 Hz AC system with Class 2 accuracy.

8.4.4. Unless otherwise called for, the meter shall be of the induction disc type with a magnetic type bearing, and shall be capable of carrying the full rated current continuously. ----------P/Spec

8.4.5. The registering mechanism shall be of the cyclometer type giving a reading of six figures. The lowest figure shall indicate tenths of a unit.

8.4.6. The meter shall provide a direct reading in kW•h without the use of multiplication factors. The gear ratios shall be matched to the current transformer, scale, etc.

8.4.7. All polyphase meters shall be driven by current transformers with 5 A secondaries.

8.4.8. If required in the Detailed Specification, the meter shall in addition be equipped with a 30 minute integrated kVA maximum demand indication, which shall be ambient temperature compensated and shall have an accuracy of 3%. ----------P/Spec

9. CONTROL SWITCHES

9.1. Control switches for the control of the main circuit breaker or on-load isolators in high voltage power circuits shall be of the pistol grip type with approved facilities for padlocking. Such control switches shall be arranged so as not to close the circuit breaker or on-load isolator unless first turned to the "open" position, and shall always return to the neutral position when released.

9.2. Any alternative types of control switches shall be submitted to the Engineer for approval prior to the installation thereof.

9.3. Such control switches shall be provided with switching contacts with a minimum continuous current rating of 25 Amps and a voltage of 400 Volts AC or DC, which rating shall be supported by type test certificates from a recognised testing authority if requested by the Engineer. Preference will be given to designs employing a wiping action on all such contacts.

9.4. All such switches shall be mechanically robust and shall be moulded in a non-hygroscopic and self-extinguishing material, which shall have a high impact strength and shall be dimensionally stable.

9.5. The pistol grip handles for the control switches called for above shall be of the machined tool type and to the approval of the Engineer. The handle shall be provided with a pointer clearly indicating the position to which the switch has been selected.

9.6. All switches shall be provided with approved escutcheon plates with approximate dimensions of 75 x 75 mm. Such escutcheon plates shall be engraved in strict accordance with the requirements of Clause 16 covering labels in this Specification.

9.7. All switches intended for outdoor application shall be of a weatherproof design approved in writing by the Engineer after submission of the necessary test certificates supporting such claims.

10. SELECTOR SWITCHES

10.1. All selector switches required shall be of the rotary pattern type having three positions i.e. LOCAL/OFF/REMOTE, and shall comply with all the constructional and electrical requirements of control switches called for in Clause 9 above.

10.2. All other selector switches specified, e.g. control bypass switches, shall provide the required switching functions and shall comply with the requirements of Clause 10.5 and 10.11. Rotary switches shall have roll and wipe contacts to ensure low resistance. Rocker arms or toggle switches shall have bifurcated contacts.

11. VOLTMETER SELECTOR SWITCHES

11.1. Voltmeter selector switches shall be rated for the system voltage and shall be suitable for use in conjunction with a voltmeter.

11.2. The switch shall have an OFF and three metering positions and provide readings between neutral and each of the three phases. The contacts shall be break-before-make types.

11.3. The switch shall be suitable for vertical panel mounting with studs for back of panel connections. The switch shall be provided with a suitable faceplate and operating handle, and shall be of the cam actuated or wiping air break type with two breaks per pole.

11.4. The contacts shall be of silver alloy, and the latching mechanism shall ensure positive accurate positioning of the knob in relation to the faceplate markings. The terminals shall be clearly marked and arranged to facilitate wiring.

12. AMMETER SELECTOR SWITCHES

12.1. Three ammeters shall always be provided where all three phase currents must be monitored, unless clearly specified to the contrary. A single ammeter with selector switch is not acceptable without the written approval of the Engineer. ----------P/Spec

12.2. Where ammeter selector switches are explicitly specified, they shall comply with the requirements of Clause 11, except that they shall be make-before-break types. The wiring shall be arranged so that the current transformer terminals are short-circuited when the ammeter is not connected across them. ----------P/Spec

13. PUSH BUTTONS

13.1. Push buttons and push-button arrangements may be used in switchboards and control boards or in self-contained units for control functions.

13.2. Push buttons and push-button assemblies for one specific project shall be supplied from a single reputable supplier's product range.

13.3. The various types of push buttons employed shall be specifically selected for the required duty and mounting characteristics e.g. flush-mounted, enclosed, self-contained, illuminated, etc.

13.4. All push buttons on a specific switchboard shall be of the same physical dimension (round or square) and shall be fully interchangeable with indicator lamps, key switches, etc.

13.5. Push buttons shall be designed for long life, low contact bounce and constant contact resistance. Mechanisms may be of the mechanical type with spring control and a clutch or catch frame, or of the solid-state type operating on the principle of a non-contacting, inductive proximity switch.

13.6. All push buttons shall be provided with replaceable lenses with a variety of symbols. Legend plates shall be interchangeable.

13.7. Push-button terminals shall be suitable for the application with regard to spacing, conductor capacity, etc. Screw-type, soldered or connector-type terminals shall be chosen to suit the specific application with regard to good contact, ease of removal or alteration, rigidity, etc. Terminals shall be suitable for conductor sizes to be used. Push-button assemblies mounted on doors of control boards shall be enclosed to prevent inadvertent contact with the terminals. Push buttons with "spade" type "push-on" terminals will not be accepted.

13.8. Push buttons shall be suitable for the environmental conditions to be encountered, e.g. moisture, excessive temperatures, mechanical shock, vibration, etc.

13.9. Contact duty shall be chosen to suit the application. Wiping contacts shall be used for low voltages and currents and snap-action contacts for high voltages and currents. Contacts shall be constructed of high quality material such as silver-tipped or gold-laminated contacts.

13.10. Illuminated push buttons may employ neon or quad LED lamps. Incandescent type illuminations shall be avoided as far as possible and shall be subject to the written approval of the Engineer. Lamp voltages shall suit system control voltages. Lamps

shall be derated when used for continuous duty, e.g. using 20 V supply on 28 V rated lamps. External resistors shall be used with LED lamps to avoid excessive current.

13.11. Push buttons may be grouped together in purpose-made stations, suitable for the environment in which they are to be installed.

13.12. Keylock push buttons shall be supplied with duplicate keys. The removal action of the key shall suit the application.

13.13. Where test push buttons are provided, these shall be of the self-cancelling type.

13.14. Push buttons shall comply with the applicable requirements of BS 4794, BS 3955, Part 1 or VDE 0660.

13.15. The following are the colours for push buttons:

.Red : Stop or emergency stop

·Green : Start (preparation)

·Green : Start (implementation) (or black)

·Yellow : Initiation of a return to an initial state before the original function has been completed (i.e. breaking into a partially completed cycle)

White : Any function not covered by the above colours (or pale blue)

14. RELAYS

14.1. The coil, contacts and operating mechanism of all relays shall be contained in a transparent, dustproof enclosure of plastic or other suitable synthetic material.

14.2. Relays shall be supplied with plug-in bases of BAKELITE or other insulating material. Bases shall be fixed to the switchboard frame to facilitate removal or insertion of the relay and enclosure.

14.3. Relay bases shall be fitted with wire-spring type retaining clips to ensure positive relay contact even when the switchboard is subjected to severe vibrations.

14.4. Relay contact rating shall be sufficient for the duty, taking into account:

a. ·voltage, current, inductance and capacitance of the circuit

b. ·ambient conditions, including temperature, humidity and gases, and

c. ·switching frequency.

14.5. Relays shall provide the type of switching function required. Late-make or late-break functions, etc. shall be inherent in the design and shall under no circumstances be improvised by bending contacts, loading contacts, etc.

14.6. Wiring connections to the relay shall be by means of solder, screw or pin type terminals.

15. TIME SWITCHES

15.1. Time switches shall be of single-pole type, suitable for 220/250 V systems, with contacts rated for the duty to be performed, with a minimum rating of 15 A. Contacts shall be of high quality material, e.g. silver-plated or solid silver.

15.2. The clock shall be driven by a self-starting hysteretic synchronous motor, keeping accurate mains time. All clocks shall be controlled by an electrically wound escapement providing the main spring with a minimum of 15 hours reserve in case of a power failure. The main spring shall be kept fully wound without the use of slipping clutch devices that may wear and fall out of adjustment.

Solid-state type quartz-driven clocks may also be used, subject to the written approval of the Engineer and provided the specified time reserve can be provided. However, solid-state type R-C oscillator-driven time switches will not be acceptable.

15.3. The main spring shall have a minimum of 15 hours reserve under full load and, if fully discharged, shall be completely rewound within 15 minutes of the restoration of power.

15.4. An external manual bypass switch shall be provided to permit the circuit to be switched ON or OFF manually without affecting the operation of the time switch or of the clock itself.

15.5. The time switch shall have a 24 hours dial, with day and night indication, that can be set to switch in 15 minutes intervals. The dial shall be fitted with 96 tappets corresponding to 96 changeover operations in a 24 hour period.

15.6. The time switch shall be fitted with a day omission dial comprising a total of 14 tappets which can be set to switch on 12 hour steps.

15.7. The time switch shall be housed in a dust-tight moulded plastic or metal case, consisting of a plastic clip-on front cover and a moulded plastic or metal base. Time switches to be used for surface mounting on walls shall be provided with a suitably positioned 20 mm conduit knockout.

15.8. Sequence time switches shall be of the reversible type, i.e. switching the machines on in the required sequence when rotating forward and switching the machines off in the reverse sequence when rotating backwards.

15.9. Sequence time switches or time-delay switches shall be provided to prevent the simultaneous starting of major or multiple items of equipment. The sequence shall not be reversible.

15.10. The switches shall be constructed so that the driving motor of the unit shall switch off when forward rotation is complete, while the controlled machines run on uninterrupted. When the machinery is to be switched off, the drive motor on the unit shall rotate backwards and switch the machinery off in the reverse sequence. An ON/OFF switch shall control the sequence time switch from a remote position, where ON denotes the starting sequence and OFF denotes the stopping sequence. Switch positions shall be indelibly labelled.

15.11. The switches shall return automatically to the start-up position when a power failure occurs.

15.12. The switches shall be suitable for operation at the system voltage.

15.13. Sequence time switches controlled by a solid-state or microprocessor based control unit providing the above functions are acceptable, provided full details are provided to the Engineer, and provided such time switches are supplied by a reputable manufacturer.

16. LABELS

16.1. GENERAL

All labels, warning- and danger signs as prescribed by KARIWA A-SPES-00-01 STANDARD SPECIFICATION FOR GENERAL REQUIREMENTS AND PROCEDURES and the Occupational Health and Safety Act and Regulations, No. 85 of 1993, shall be installed on the boards to the satisfaction of the Engineer.

It is the responsibility of the Contractor to ensure that, unless otherwise approved by the Engineer, all labels installed are in both official languages, and are complete and descriptive. Should there be any doubt concerning the label descriptions, such doubts shall be cleared with the Engineer prior to the manufacture of the labels.

TRAFOLITE or other approved engraved type labels shall be used externally on all indoor-type boards, as well as on the inside of all cubicles or kiosks.

Care shall be taken to ensure that all equipment is fully labelled and that accurate descriptions and safety warning notices appear in both official languages.

Labels shall be provided:

· to identify each switchboard and each outgoing circuit, and

· for all equipment on the inside and outside of the switchboard, indicating function and rating.

Labels shall correspond to the equipment description on circuit diagrams.

Each piece of equipment shall have a separate label. Combined labels on long label strips, eg. for single-pole circuit breakers are not acceptable. Each label shall be separately removable.

Brass or stainless steel engraved labels only shall be used externally on all outdoor-type boards, unless otherwise approved in writing by the Engineer.

All indication and descriptive labels shall have black letters on a white background, while danger labels will have white letters on a red background.

All labels shall be mounted in an approved manner by means of screws or rivets. Under no circumstances shall the labels be glued to the metalwork.

All fuses, fuse-switches, relays and contactors shall be separately labelled, clearly indicating the type, rating and functions.

One designation label shall be fitted to the front of the cubicle, one externally to the rear door of each cubicle and a third inside the cubicle at the rear, to indicate clearly the panel designation when the doors are in the open position.

16.2. DIMENSIONS

The following minimum letter sizes shall be used:

Designations for floor-standing boards - 32 mm

Designations for surface-mounted boards - 20 mm

Designations for equipment on floor-standing boards - 10 mm

Designations for equipment on surface-mounted boards - 6 mm

Indication and descriptions on control and instrumentation equipment - 4-6 mm

All danger notices - 6 mm

16.3. LABELS FOR MAIN SWITCHBOARDS

Main switchboards and sub-main switchboards shall be supplied with the following bilingual labels:

Number and allocation of switchboard

Example : **CONTROL BOARD A4**

BEHEERBORD A4

Lettering at least 38 mm high. Label on the outside in a prominent position.

Designation of busbar sections.

Example : **BUSBAR SECTION 2**

GELEISTAMSEKSIE 2

Lettering at least 25 mm high. Label on the outside in a prominent position.

Designation of all switchgear, including circuit breakers, isolators, contactors, etc. If the current rating of circuit breakers is not clearly marked on the equipment, the value shall be indicated on the engraved label.

Example : **SUPPLY TO BOARD C3**

TOEVOER NA BORD C3

PUMP SUPPLY

POMPTOEVOER

Lettering at least 6 mm high. Label on the outside of the switchboard.

All other equipment, including meters, instruments, indicator lights, switches, push buttons, circuit breakers, fuses, contactors, control relays, protection relays, etc. shall be identified. The function of the equipment and circuits shall be clearly indicated. The main switch shall be labelled as such and designated:

SWITCH OFF IN CASE OF EMERGENCY

SKAKEL AF IN NOODGEVAL

Flush-mounted equipment within doors or front panels shall be identified by labels fixed to the doors or front panels respectively. The labels for equipment installed behind panels shall be fixed to the chassis close to the equipment. If this equipment is positioned too close together to accommodate descriptive engraved

labels, the equipment may be identified by a code number on an engraved label which shall be fixed close to the equipment. The code number shall be identified on a legend card which shall be installed on the switchboard behind a perspex or other protective cover. The lettering shall be 4 mm high.

16.4. LABELS FOR OTHER SWITCHBOARDS

All equipment on switchboards shall be identified with the necessary bilingual labels. The circuit numbers shall appear at grouped single-pole circuit breakers. The circuit numbers shall correspond to the circuit numbers on the final installation drawings. The above-mentioned circuits shall be identified on a legend card, which shall be installed on the inside of the switchboard door, or in any other approved position where it can conveniently be observed. All fuses, including instrument fuses, shall have labels stating function, fuse rating and duty or type where applicable. All other equipment shall be identified separately and their functions shall be clearly indicated to the approval of the Engineer.

16.5. FIXING OF LABELS

Labels shall not be fixed to any components or trunking but to doors, panels, chassis or other permanent structures of the switchboard.

Engraved strips shall be secured so as to facilitate a neat alteration of the designation on the labels. The labels shall under no circumstances be glued to the switchboard or any other item or structure.

Sufficient fixing points shall be provided to prevent labels from warping. Labels in slotted holders shall be secured in position to prevent unauthorised removal. The following means of securing labels are acceptable: brass bolts and nuts, self-tapping screws, slotted label holders and pop rivets.

17. TERMINAL BLOCKS

Multi-core terminal blocks shall be provided inside the cubicles in an easily accessible position(s) for terminating all multi-core cable tails and for connecting up with the internal wiring in the cubicles. Unless otherwise approved, terminal strips shall be of the rail-mounted spring-loaded insertion type, mounted vertically in order that ferrule numbers on wires may be read without difficulty. Each individual terminal strip or group of terminal blocks shall be clearly labelled or marked as per the design drawings.

Terminal blocks shall either be of the double-ended insertion type or the linked double-terminal stud type, with suitable provision made for mounting the terminal blocks on terminal boards or rails in rows or in strips. End brackets shall be used to prevent lateral movement of terminal blocks.

Terminal blocks of the insertion type shall incorporate separated spring-loaded clamping yokes of plated steel, which clamp the wire ends onto a silver- or nickel-plated separated current bar by means of plated steel clamping screws. The complete assembly shall be encased in a non-hygroscopic moulding of insulating material with high electrical and mechanical strength. KLIPPON RSF 1 type terminals are preferred. Equivalent alternative terminals may be submitted to the Engineer for approval.

Any springs used in the terminals shall be treated to withstand corrosion which might affect performance during their working life, and they shall be arranged not to carry any current.

The studs of stud type terminals shall be locked in the insulating base to prevent turning. The base shall be made of moulded non-hygroscopic insulating material of high mechanical and electrical strength, and suitable insulating barriers shall be provided between adjacent terminals. Each terminal stud shall be provided with two brass nuts and two brass washers. The minimum diameter of studs made of brass or copper shall be 5 mm. Phosphor bronze studs shall not be less than 4,5 mm in diameter, and stainless steel studs not less than 3 mm in diameter. KLIPPON STL 5 type terminals are preferred. Equivalent alternative terminals may be submitted to the Engineer for approval.

The materials used for terminal blocks or strips shall be self-extinguishing, non-hygroscopic and shall not carbonise when tested for tracking. The final moulding shall have a high impact strength, shall be mechanically robust, and shall be dimensionally stable. Terminal boards or strips shall be mounted to allow sufficient space for cable tails and for working on cable glands without impeding access to any other equipment, and shall start 300 mm above the gland plate of the cubicle or kiosk.

Terminal boards or strips shall be wired with all internal or incoming wiring entering from one side and all outgoing or external connections (multi-core cable tails) leaving from the other side.

Only one wire shall be connected to each terminal. Jumper bars or bridge pieces of the approved type shall be used as a busbar for multi-circuit connections on terminal strips.

At least 20% spare terminals shall be provided on all terminal boards or strips.

Unless terminal blocks are of the totally enclosed type, covers of transparent insulating material shall be fitted to all terminal rows or banks where circuits are connected with voltages in access of 42 volts, to prevent accidental contact with live equipment.

Each terminal shall be marked clearly, permanently and conspicuously, and all terminal strips and boards shall be suitably identified with durable labels fixed in an approved manner.

18. FUSES AND LINKS

Fuses and links shall be provided as required for the protection of circuits. The type and rupturing capacity of fuses shall be indicated on the wiring and schematic diagrams to be submitted by the Tenderers and shall be to the approval of the Engineer. Cartridge-type fuses are preferred.

All fuse and link carriers and bases shall be moulded of high quality non-hygroscopic insulating material with high dielectrical and mechanical strength.

Fuse carriers and bases shall be suitably and permanently labelled, displaying the designation and identification number using the prefix "Fs" for fuses and the prefix "Lk" for links. Fuse current rating shall also be displayed. The labels shall not be fixed to removable parts of fuses or links, and shall be fixed to the mounting frame by means of screws.

Fuses and links shall be mounted vertically in horizontal rows, and shall preferably be arranged for back connection.

19. MOULDED-CASE CIRCUIT BREAKERS

All moulded case-type circuit breakers (MCCB's) required by this contract shall be in strict accordance with the requirements of SABS 156:1963 a.a. and, unless approved by the Engineer, shall be of South African manufacture.

MCCB's shall be of the flush-mounted type, suitable for safe operation at a voltage of 600 V, with a breaking capacity of 10 kA at a lagging power factor of 0,5.

MCCB's fitted with magnetic tripping mechanisms shall be preferred. Alternatives may be submitted for approval by the Engineer.

Where MCCB's are used in DC circuits, these shall be suitably rated for current carrying as well as fault current capacity and shall be to the full approval of the Engineer. Documentary proof of adequacy for the particular application shall be provided to the Engineer prior to the installation of any DC circuit breakers

20. MOSAIC TILE-TYPE CONTROL BOARDS

20.1. GENERAL

Should it be allowed for in the Detailed Specification, Tenderers may offer control panels of the mosaic tile-type construction, subject to the written approval of the Engineer of the tile and the mounting frame construction. ----------P/Spec

The colour of the appropriate tiles shall be in accordance with the specified paint colour for the control board defined in the Detailed Specification. All panelling and the finishing off thereof shall be subject to the full approval of the Engineer, and details of panelling and finishing shall be submitted to the Engineer for approval prior to commencement of construction.

20.2. CONTROL SWITCHES AND INDICATORS

Such a mosaic-type control board shall be equipped with the necessary indicating devices, as well as discrepancy-type control/indicating switches, LOCAL/OFF/REMOTE selector switches, as well as any required DC isolating switches. Hand-dressed type discrepancy semaphores shall be provided for all isolators and for earth switches which are manually operated.

All discrepancy-type control switches and hand-dressed semaphores shall fully comply with the requirements of Clause 20.3 below. All control instruments such as discrepancy control switches and hand-dressed semaphores shall be mounted at an easily reachable height not exceeding 1,9 m and not lower than 1,0 m above the substation floor levels. It is a requirement of this Contract that the indication bars on the above switches shall all be of the same width and colour as that of the diagram line on the mimic panel.

20.3. HAND-DRESSED SEMAPHORES AND DISCREPANCY-TYPE CONTROL/INDICATION SWITCHES

The discrepancy control switches and hand-dressed semaphores shall have an indication bar to indicate whether the particular item of primary equipment controlled and/or represented is open or closed. The bar in line with the associated diagram line shall represent a “closed” device and the bar at right angles to the associated diagram line shall represent an “open” device.

The discrepancy control switch and hand-dressed semaphores shall be illuminated when the position of the indication bar does not conform with the position of the primary equipment item it represents. The discrepancy control switches shall be such that a control can only be carried out by the action of turning the switch to the desired indication position and then depressing the switch and turning the switch at least a further 30° beyond the normal indication position. The switch shall automatically return to the relevant normal indication position after being released.

The discrepancy switches and lamps shall be suitable for operation at a DC voltage of 110 V. Preference will be given to discrepancy switches equipped with low current drain LED indication devices. Should incandescent lamps however be used, a suitable resistor shall be wired in series with each lamp so as to increase the life of the lamp without reducing the light output significantly. The lamp DC supply shall be part of the local indication supplies and shall be electrically separated from the control DC supplies. Both the instruments and the circuits shall be designed to impose the minimum load on the battery system.

The switches shall be capable of switching the circuit breaker trip and closing coil currents and the isolator and earth switch control currents, unless otherwise approved by the Engineer in writing. Proof of the current rating of the auxiliary contacts of these switches shall be provided to the Engineer if required.

The discrepancy switches controlling the circuit breakers, isolators and earth switches shall have different escutcheon plates to provide a clear distinction between the different items of equipment being controlled.

21. SMALL WIRING

Small wiring shall be insulated with at least 600 V grade insulation according to SABS 1507 and SABS 1574.

All wiring that may come into contact with oil shall have oil-resistant insulation.

On normal control and indication wiring, the size of conductor to be used shall be either 2,5 mm² seven-stranded or 1,5 mm² multi-stranded (at least 19 strands) copper conductor wiring to the full approval of the Engineer.

All current transformer circuits shall however be wired with 4 mm² seven-stranded or 2,5 mm² multi-stranded (at least 19 strands) copper conductors to the full approval of the Engineer.

All wiring shall be terminated onto terminal blocks by means of pre-insulated ring type or flat type crimping lugs. "Blade and spade" type terminals will not be acceptable for any current transformer circuits.

Motor and coil circuits supplied or controlled from remote control boards shall be wired with at least 4 mm² copper conductor or shall have an adequate cross-section area for the required current rating (where a cross-section larger than 4 mm² is required.)

All wiring shall be continuous between terminals. Under no circumstances shall wiring be jointed or “teed” into between terminals.

The ends of all wiring shall be terminated in approved pre-insulated crimping type terminals and ferrules which shall be applied, or crimped with approved crimping tools of the applicable

size and which unlatch only after completion of the total crimping action. All such terminals shall be to the full approval of the Engineer.

The applicable terminal sizes shall be used and, under no circumstances, shall conductor strands be cut to fit terminals.

Under no circumstances shall more than two wires be terminated onto any equipment or instrument terminal. A separate sub-busbar shall be used for common multi circuit termination.

Where earth and neutral conductors have been "looped-in" to intermediate equipment or instruments between the main terminations, the two branches forming the "loop-in" shall be crimped together into one common terminal to ensure continuity of the circuit if the intermediate equipment is removed for any reason.

No strands shall be visible after a terminal has been crimped to a wire.

All bundles of wire to instrumentation mounted on doors shall be protected by means of a flexible protection sleeve over the conductors against any damage that may occur when opening the door. The bundles of wires shall be fixed with clamps of the screw-on type to both the door and the framework. Under no circumstances will glue-on type clamps be allowed. All such conductor bundles shall be arranged to go through a twisting motion when the door is opened.

All wiring shall be arranged in horizontal rows and vertical columns without twisting and crossing of conductors, in order to present a neat and uniform appearance. All such groups of conductors shall be bundled and bound together with an approved wire tie or channel system. Under no circumstances may PVC adhesive tape be used for the bunching or grouping of conductors or for colour identification of the conductors.

The main clamps or channels shall be screwed or riveted to the baseframe. Systems glued to the baseframe or doors shall not be accepted.

Where a wiring channel system is used, care shall be taken to ensure that such channels are not more than 60% filled with wiring, to allow for possible future extension.

Wherever wiring passes through holes in the sheet metal (i.e., from one cubicle to another), such holes shall be provided with approved grommets to protect the wiring against damage.

All control, interlocking, metering and any other circuits shall be terminated on to numbered KLIPPON or other type of terminal strip approved of in writing by the Engineer. Such terminal strips shall be the appropriate size for the relevant conductors and the conductor, sizes and all wire numbers shall be recorded on As-installed Drawings and wiring diagrams. These terminals shall be grouped separately from any terminals of power circuits.

All conductors terminated on terminal blocks shall only be terminated with crimped-blade type pre-insulated terminals. Round-pin type terminals are not acceptable. Other methods of termination shall be approved by the Engineer in writing. Bare conductors shall not be terminated directly into any terminal strips or blocks.

22. POLARITY OF CURRENT TRANSFORMERS

The direction of power flow, when defined, shall enter a current transformer at terminal "P 1 ".

When the direction of power flow is not defined, Terminal "P 1" shall be nearest the primary busbar side.

In the case of neutral current transformers, Terminal "P 2" shall be nearest the transformer neutral, i.e., Terminal "P 1" shall be nearest the neutral earth connection.

Where current transformers are starred directly on one side, this shall be the "S 2" side, i.e., corresponding to the "P 2" terminal of the current transformer.

N.B. This gives the following standard arrangement: Where the direction of power flow is not defined, or important, or is away from the busbars, the star point shall be on the cable side.

23. FIXED STARTING POINTS FOR NUMBERING CONNECTIONS

Connections made directly to the secondary terminals of current transformers and to star points in current transformer circuits, shall take the lowest number in the group allocated for the purpose.

On current transformers, the lowest even number shall be used for "S 2" terminal connections, and the lowest odd number for "S 1" terminal connections.

Numbering shall always be in ascending order from a point such as those defined above.

Where a starting point is defined as an odd or even number, the ascending numbers shall respectively be odd or even only.

In current transformer circuits, preference shall be given to commencing the ascending numbering from the "S" terminal side and, where phase and neutral current transformers are together in a circuit, phase current transformers shall take precedence.

Numbers shall be skipped where necessary for the possible future addition of items of equipment in series.

24. ADDITIONAL REQUIREMENTS FOR PILOT CUBICLES

All pilot cubicles shall be equipped with terminal strips of the KLIPPON-MICRO-SAKR series or approved alternative type of terminals for terminating the pilot cores. At least 20% spare terminals shall be provided on the terminal strips. Preference will be given to vertical mounting of terminal strip rails.

The rear side of the pilot cubicle shall be equipped with an approved MASONITE terminal mounting board of at least 8 mm thickness to the full approval of the Engineer, for the mounting of terminals, fuses, trunking, etc.

The terminal strips shall be neatly and logically arranged and adequate provision shall be made by means of trunking for marshalling pilot wires into and out of the terminals.

All pilot cubicles shall be equipped with suitable and approved pilot surge arresters of the GEC type 16 series. For most applications, the type 16B shall be used. Alternative surge arresters will be considered and shall be subject to the full written approval of the Engineer.

25. FERRULE MARKING

The marking and colouring of small wiring shall comply strictly with BS 158 and with the same ferrule marking as that shown on any schematic diagrams that may be used with the Enquiry,

and on any applicable wiring diagrams supplied by the Tenderer and approved by the Engineer.

All wiring shall be ferrule marked to approval with suitable ferrules, preferably of the interlocking type. Alternative wire identification systems may be submitted to the Engineer for approval.

The type of ferrule markers to be used shall be to approval. Ferrule markers shall be of a durable insulating material having a reasonably glossy finish to prevent adhesion of dirt. Ferrule markers shall be marked clearly and permanently and shall not be affected by moisture or oil. Unless otherwise approved, ferrules shall be white with black marking.

Wire marking and identification by means of tape-on type number strips will not be accepted.

26. EARTHING

Each cubicle or kiosk shall be provided with a copper earth bar with minimum dimensions of 25 x 5 mm. Such earthbar shall be mounted in an accessible position in the bottom of each kiosk, and shall be continuous over the full length of a control board made up of various cubicles or kiosks.

The earthbar shall be pre-drilled over its full length at 15 mm centres, with holes with a minimum diameter of 5 mm. The above earthbar shall be earthed to the main substation earth by means of an earth connection with a cross-section equal to the earthbar.

All exposed instruments shall be effectively earthed to the earthbar by means of copper conductors with a minimum cross-sectional area of 2,5 mm², which shall be insulated by means of green PVC insulation. Care shall be taken that the gland plate and screens of all incoming cables be connected to the above earthbar to the approval of the Engineer.

27. BOLTS AND NUTS

Unless otherwise approved, all bolts and nuts shall be of metric sizes complying with an approved international standard. The size used for each application shall be to the approval of the Engineer. Terminal bolts or studs used for carrying current of more than 100 Amps shall not be less than 16 mm in diameter. All terminal bolts and studs used for electrical connections with diameters less than 4 mm shall be made from either stainless steel or phosphor bronze. Brass shall not be used.

Nuts and screws shall be adequately locked to prevent unintentional loosening. Wherever possible, bolts shall be fitted so that, if the nut works loose and falls off, the bolt will remain in position. Self-tapping bolts and screws are not acceptable. All bolts, nuts and washers exposed to atmospheric conditions shall be suitably treated to prevent corrosion by means of either hot-dip galvanising or cadmium plating to the approval of the Engineer.

Bolts shall project a maximum of 4 threads and a minimum of 1 thread through their respective nuts.

28. DRAWINGS FOR APPROVAL

A set of three prints of shop drawings for the manufacturing of the control board shall be submitted to the Engineer for approval at least four weeks before manufacturing starts. The following information shall in particular be included: -

- a complete wiring diagram of all the equipment on the board
- a complete layout of the switchboard, indicating all equipment dimensions and the construction of the board. The positions and method of fixing and sizes of wiring shall be shown
- all labelling information in the required languages shall be provided on a separate sheet
- the make, catalogue number and capacity of all equipment, such as isolators, circuit breakers, fuses, etc.

The approval of drawings shall not relieve the Contractor of his responsibility to supply the control boards according to the requirements of this Specification.

29. ANNEXURE A: APPLICABLE STANDARDS AND SPECIFICATIONS

The latest editions of the following shall apply:

BS	37	[Kilowatt-hour meters]
BS	88	[Fuses]
BS	89	[Meters]
BS	158	[Marking and colouring of wiring]
BS	1050	[Indicator lights]
BS	3938	[Current transformers]
BS	4794	[Push buttons]
IEC	51	[Voltmeters]
KARIWA A-SPES-30-01		Standards specification for painting and coatings
OHS Act		Occupational Health and Safety Act and Regulations, Act No. 85 of 1993 a.a
SABS	156	Moulded-case circuit-breakers
SABS	780	Distribution transformers
SABS	1507	Electric cables with extruded solid dielectric insulation for fixed installations (300/500 v to 1 900/3 300 V)
SABS	1574	Electrical cables – Flexible cords
VDE	0660	

A-SPES-30-01-W05

STANDARD SPECIFICATION FOR PAINTING AND COATINGS

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Table of Contents

STANDARD SPECIFICATION

1. GENERAL

Unless otherwise specified the Contractor shall be responsible for the painting of the complete Installation. All SABS publications specifications referred to shall be the latest version, as amended.

2. COLOURS AND COLOUR-CODING

2.1. PIPING

Copper pipes and fittings shall not be painted. Galvanised pipes shall remain un-painted unless the Engineer considers that the zinc layer has, been damaged, in which case the Engineer may request that the damaged pipe be replaced or that the entire pipe be painted or stick soldered.

The direction of flow shall be indicated by means of arrows, in accordance with SABS 0140: Part III.

ITEM		SABS 1091 COLOUR REF.	REF. STANDARD
Chilled water	Light Blue	Cornflower Blue F29	-
Condenser water	Dark Green	Brilliant Green D01	-
Steam	Grey	Pastel Grey G54	TPA
Hot water	Light Green	Olive Green D21	
Condensate	Brown	Golden Brown B13	
Drainpipes	Black		
Fire sprinklers	Red or Yellow		
Hose reels & hydrants	Red	Signal Red A11	
Flash gas & hot gas defrost	Light Orange	B26	
Suction HT	Canary Yellow	C61	
Suction LT	Primrose Yellow	C67	
Warm liquid	Ultramarine Blue	F09	
Cold liquid	Cornflower Blue	F29	
HP liquid	Flag Blue	F04	
Hot gas discharge	Signal Red	A11	

ITEM		SABS 1091 COLOUR REF.	REF. STANDARD
Oil	Golden Brown	B13	
Glycol	Peacock Blue	F08	
Cooling water	Turquoise Blue	E18	
Water lines	Brilliant Green	D10	
Compressed air	Arctic Blue	F28	
Relief lines	Black		
Brackets	Black		
Gasses	To SABS 0140 Part III – 1978 a.a		

NOTE: All visible pipelines (insulated or uninsulated) must be entirely painted in the Colour Code. Painted rings are not acceptable.

2.2. AIR-HANDLING

Only ducting within plant rooms and not concealed by ceilings and shafts need be painted. Identification and coding shall be according to SABS 0173.

Only external surfaces of plenums manufactured from galvanised sheet metal need to be painted.

ITEM	SABS 1091 COLOUR REFERENCE		SABS 0173 COLOUR REFERENCE	
Supply ducts	Ivory	B77	Blue	F11
Return ducts	Ivory	B77	Grey	G25
Exhaust ducts	Ivory	B77	Brown	B07
Outside air ducts	Ivory	B77	Green	P14
Plenums and air-handling units	Cornflower Blue	F29	–	

2.3. ELECTRICAL

ITEM	SABS 1091 COLOUR REFERENCE	
Motor control centres and air-conditioning control boards	Light Orange	B26
Low voltage (400V) distribution boards	Light Beige	C57
Emergency power boards	Signal Red	A11
No-break power supply boards	Olive Green	D05

Computer equipment and boards	IBM Blue
Medium voltage (11kV to 66kV)	Admiralty Grey G12
High voltage switchgear	Biscuit B64
Transformers and mini-sub	Light Beige C57

2.4. GENERAL

ITEM	SABS 1091 COLOUR REFERENCE
Bases and plinths	Black
Pumps, chillers, motors and equipment	Same as piping and electrical
Safety guards	Light Orange B26

3. METAL SPRAY FINISH

3.1. GENERAL

3.1.1. All surfaces to be metal sprayed shall be thoroughly cleaned of rust, mill-scale, grease and foreign matter to a continuous metallic finish. The surface shall be prepared by abrasive blasting, in accordance with SABS 064 to Swedish Standard SA 3 of SIS 05/59/00, using angular grit of appropriate size.

3.1.2. After blasting, the surface shall be cleaned by vacuum, in accordance with SABS 1391, so that the remaining dust shall not exceed 0,2 per cent by area. Contamination of prepared surface shall be prevented by using gloves (on hands and feet).

3.1.3. Metal spray shall be applied to the surface within four hours after completion of blasting under dry conditions, or within two hours under humid conditions, all as specified in SABS 1391. Inside vessels, by using dry circulating air, this time may be extended to six hours maximum.

3.1.4. Application shall preferably be by arc-spray or alternatively by oxygen gas thermal spray.

3.1.5. Appearance of the sprayed coating shall be of uniform density and free from defects such as bare areas, blisters, lumps, and areas of loosely adhering particles, as defined in SABS 1391.

3.1.6. Any repair work shall be carried out immediately, as set out in SABS 1391.

3.1.7. Metal spraying shall only be done by an approved specialist.

3.2. 3.2 ALUMINIUM SPRAY

3.2.1. The aluminium spray process shall comply with SABS 1391. The thickness of the coating shall average 150 micrometres, with minimum individual values

not less than 120 micrometres and maximum individual values not exceeding 225 micrometres.

4. ANODISING OF ALUMINIUM

Aluminium surfaces to be anodised shall have a layer thickness of Grade 25 for external and Grade 15 for internal use, in accordance with SABS 999.

5. CHROME PLATING

Chrome plating shall be in accordance with SABS ISO 1456.

6. GALVANISING

6.1. Galvanising shall be in strict accordance with SABS 763.

6.2. Tenderers shall include in their supply prices for the complete testing and approval of the galvanising by the SABS at the factory of the galvanising company. Steel members will be unacceptable without the stamp of the SABS or their written approval.

6.3. Galvanising shall be applied by the hot-dip process. Sheradising or other similar processes shall not be used.

6.4. All welding, drilling, punching, cutting and bending of parts shall be completed and all scale, flux, rust and burrs removed and fabrication completed, before the galvanising process is applied.

6.5. The minimum weight of zinc coating on structural steelwork and other fittings shall be in strict accordance with KARIWA A-SPES-30-02 a.a, unless other requirements are agreed upon, as in APPENDIX B to SABS 763.

6.6. The threads of bolts and screwed rods shall be cleared by spinning or brushing; a die shall not be used. In the case of nuts, the threaded portion shall be cleared after galvanising by the passing through of a tap, immediately after galvanising. To clear the threads, the ungalvanised portions shall be coated by dipping in hot grease. The grease used shall be to the approval of the Engineer. ----------Hld/pnt[1]

6.7. The zinc coating shall be adherent, smooth and continuous and shall be free of such imperfections as lumps, thin patches, blisters, gritty areas, uncoated spots, acid and black spots, and flux. The zinc coating shall not be so loosely adherent as to be removable by any reasonable handling during transport and erection. Light blows with a hammer shall not cause peeling of the coating adjacent to the area deformed by the hammer blows.

6.8. Globular and extra heavy deposits of zinc, which will interfere with the intended use of material, will not be permitted.

6.9. Faulty areas of galvanised steelwork may only be repaired by re-dipping in molten zinc before the sample cools or oxidises.

[1] Hld/pnt = See Project Specification in Section C3.2 of the Contract Document

Areas damaged by transportation to site shall only be repaired by zinc metal spray or hot solder patching, using a solder stick high in zinc, as specified in SABS 763.

6.10. Special care shall be taken not to injure the skin on galvanised or specially treated surfaces during erection.

6.11. Galvanising in coastal regions or within 50 km of the shore, shall, in addition, be protected as per Painting System Specification PS-8. (See Appendix to this document, P. A-9).

7. PAINTING

7.1. GENERAL

The clauses which appear under this heading shall be considered as forming part of each of the Painting System Specifications included in the Appendix hereto:

7.1.1. Paint shall not be applied over any surface containing traces of dirt, grease, oil, loose rust, loose mill-scale or corrosion products of any kind.

7.1.2. All metal surfaces to which paint is applied shall be moisture dry. Paint surfaces which are to be over coated shall be hard dry before over coating, unless the Specification states otherwise.

7.1.3. The surface prior to painting, dried and painted immediately thereafter shall be thoroughly washed clean of traces of soluble salts and corrosive air-borne contaminants.

7.1.4. Unless otherwise stated, no paint shall be applied within 50 mm of areas which are to be welded.

7.1.5. Welds and adjacent parent metal shall be exposed, inspected and approved, and all spatters shall be removed, prior to painting.

7.1.6. The weld area shall be wire-brushed and all contaminants shall be removed; they shall then be flushed with fresh water and allowed to dry. In the case of rust formation, the weld area shall again be wire-brushed, prior to painting.

7.1.7. Surfaces which are to rest on concrete or other floors shall receive the full paint system prior to erection.

7.1.8. Areas where the paint coating has been damaged during transportation, erection or by any other means, shall be repaired as follows:

Rust spots shall be removed by means of a wire brush or emery paper and the surrounding paint which is still intact shall be feathered for a distance of 20 mm beyond the damaged area. Spot priming shall consist of all the coats previously applied and shall overlap the undamaged area by 20 mm.

7.1.9. Where the shop coat has been allowed to age for a few months before painting, it shall be lightly sanded or rubbed with steel or wool or scrubbed with Polycell Sugar Soap solution, using a bristle brush. The surface shall then be rinsed with drinking water.

7.1.10. Mating contact surfaces shall be protected from corrosion by ensuring that the two surfaces brought into contact with each other are prepared and primed in accordance with the Specification.

7.1.11. Areas which will be inaccessible after erection shall receive the full specified coating system, before erection or assembly.

7.1.12. Unless otherwise specified, steel embedded within concrete shall not be painted except to 50 mm below the concrete/air interface.

7.1.13. All sharp edges and cut ends shall be filed smooth and shall then receive the specified dry film thickness (DFT) of paint.

7.1.14. When blast-cleaning, a satisfactory blast profile shall be achieved. If the abrasive used for blast cleaning is sand, then it shall be free of clay. Alternatively, an approved grit shall be used.

7.1.15. The Contractor shall ensure that the final finishing coat fully covers the previous coat.

7.1.16. Only the manufacturer's recommended thinners should be used for any particular paint.

7.1.17. The Contractor shall ensure that primed steelwork and piping which is to be delivered to Site is stacked on bearers and is clear of the ground. Wherever possible, channels, angles, etc. shall be stacked so that water cannot collect on the steel.

7.1.18. Surfaces which are to be friction bolted shall be prepared in accordance with the Specification (i.e., wire-brushed) but shall receive no paint coating.

7.1.19. Paint dry film thickness shall be measured using a non-destructive thickness gauge such as the Micro test or equivalent.

7.1.20. All mixing of paints shall be done by means of a mechanical mixer.

7.1.21. Where a specified volume ratio of components must be mixed together, provision shall be made on site for a practical yet accurate method of volume measurement.

7.2. PAINTING SYSTEMS

Although only some of the available painting systems are included in Appendix A, all of the following Standard Painting Systems are available on request and apply to this Specification:

8. ANNEXURE A: APPLICABLE STANDARDS

A-SPES-30-02	Standard Specification for Welding, Brazing and Soldering
Dulux Data Bulletin 7427	
Dulux Data Bulletin 7204	
Dulux Data Bulletin 7465	

SABS 064	Code of Practice : The preparation of steel surfaces for coating
SABS 1391	Thermally sprayed metal coatings
SABS 763	Hot-dip (galvanised) zinc coatings (other than continuously zinc-coated sheet and wire)
SABS 999	Anodised coatings on aluminium (for architectural applications)
SABS 0173	Code of Practice : The installation, testing, and balancing of air-conditioning ductwork
SABS 120	Tamping ampoules (gel-filled, for use in blasting)
SABS 1274	Coatings applied by the powder-coating process
SABS 783	Baking enamels
SABS SM767	Cleanliness of blast-cleaned steel surfaces for painting (assessed by putorial standards)
SABS SM772	Profile of blast-cleaned steel surfaces for painting (determined by mi-crometer profile gauge)
SABS SM 769	Cleanliness of blast-cleaned steel surfaces for painting (assessed by freedom from dust and debris)
SABS 1217	The production of painted and powder-coated steel pipes
SABS 780	Distribution transformers
SABS 1200-HC	Corrosion protection of structural steelwork
SABS 1091	National colour standards for paint
SABS 0140 – PART 3	Code of Practice : Contents of pipelines
SABS ISO 1456	Metallic coating – Electrodeposited coatings of nickel plus chromium and of copper plus nickel plus chromium
SIS 05/59/00	

PS-6	STEELWORK BURIED IN SOIL	A6
PS-7	PAINTING OF STEEL COLD AND HOT WATER STORAGE TANKS (MAX 120°C)	A7
PS-8	SITE PAINTING OF HOT-DIPPED GALVANISED STEEL STRUCTURE IN HIGHLY CORROSIVE ATMOSPHERE	A9
PS-9	EXTERNAL PAINTING OF STEEL PIPING OTHER THAN STEAM PIPING	A10
PS-10	EXTERNAL PAINTING OF ALL BLACK STEEL SURFACES IN AMMONIA INSTALLATIONS	A11
PS-11	EXTERNAL PAINTING OF ALL BLACK PIPING AND COMPONENTS AT TEMPERATURES BETWEEN 100°C AND 200°C	A14

9. PAINTING SYSTEM: NO. PS – 1

APPLICATION : SITE ENAMEL PAINTING OF GENERAL STEELWORK INSIDE BUILDINGS IN NON-CORROSIVE ATMOSPHERE. Alkyd–System Ref. 010 SABS 120

9.1. GENERAL

This Specification applies to steelwork which is not galvanised, metal-plated or factory painted.

Steel shall be protected by a shop coat prior to delivery to site, unless otherwise approved by the Engineer.

The paint manufacturer's prescription shall apply.

9.2. SURFACE PREPARATION

9.2.1. All surfaces shall be thoroughly degreased.

Acceptable products:Plascon Aquasolv Degreaser (GR 1)

9.2.2. Rinse with fresh water and allow to dry.

9.2.3. Wire-brush to remove loose rust and loose mill-scale to Std 3 finish to Swedish Standard SIS 05/59/00–1967 a.a.

9.3. PRIMER/SHOPCOAT

One coat zinc chromate base alkyd primer.

Thickness (DFT) = 25 - 35 micrometres

Application = Brush or spray

Acceptable products: Plascon Namelcoat Primer (UC53)

9.4. UNDERCOAT

One coat of universal undercoat

DFT = 25 - 35 micrometres

Application = Brush or spray

Acceptable products: Plascon Merit Universal Undercoat (UC 1)

9.5. FINISHING COAT

One coat of universal high gloss enamel

DFT = 25 - 35 micrometres

Application = Brush or spray

Colour = As specified and approved by Engineer and Architect.

Acceptable products: Plascon Super Enamel G series

9.6. The total DFT of the coating system shall not be less than 75 micrometres.

9.7. REQUIRED QUALITY CONTROL

9.7.1. Sample on site to Engineer's approval ----------Hld/pnt

9.7.2. Inspection of final coat by Engineer. ----------Hld/pnt

10. PAINTING SYSTEM: NO. PS – 2

APPLICATION : SITE ENAMEL PAINTING OF GENERAL STEELWORK EXPOSED TO CLIMATIC CONDITIONS IN MILD CORROSIVE ATMOSPHERE.

Vinyl – System Ref. 040 SABS 1200–HC

10.1. GENERAL

This Specification applies to steelwork which is not galvanised, metal plated or factory painted.

Steel shall be protected by a shop coat prior to delivery to site, unless otherwise approved by the Engineer.

The paint manufacturer's requirements shall apply.

10.2. SURFACE PREPARATION

10.2.1. All surfaces shall be thoroughly degreased.

Acceptable products:Plascon Aquasolv Degreaser (GR 1)

10.2.2. Rinse with fresh water and allow to dry.

10.2.3. Wire-brush to remove loose rust and loose mill-scale to Std 3 finish to Swedish Standard SIS 05/59/00–1967 a.a.

10.3. SHOPCOAT

One coat of primer.

Thickness (DFT) = 25 - 35 micrometres

Application = Brush or spray

Acceptable products: Plascon Chemcote H/B Primer (CHC – 1)

10.4. UNDERCOAT

One coat of undercoat.

DFT = 25 - 35 micrometres

Application = Brush or spray

Acceptable products: Plascon Chemcote H/B Intermediate (CHC – 101)

10.5. FINISHING COAT

Two coats of vinyl-based enamel.

DFT = 25 - 35 micrometres per coat

Application = Brush or spray

Colour = As specified and approved by Engineer and Architect.
----------Hld/pnt

10.6. The total DFT of the coating system shall not be less than 100 micrometres.

10.7. REQUIRED QUALITY CONTROL

10.7.1. Sample on site to Engineer's approval. ----------Hld/pnt

10.7.2. Inspection of final coat by Engineer. ----------Hld/pnt

11. PAINTING SYSTEM: NO. PS – 3

APPLICATION : FACTORY EPOXY PAINTING FOR EQUIPMENT.

Conventional Epoxy – System Ref. 050 SABS 1200–HC

11.1. GENERAL

This specification is applicable for the painting of equipment such as motors, gear-boxes, pumps, miniature substations, switchboards etc., not powder coated or baked enamel finished.

The paint manufacturer's requirements shall apply.

11.2. SURFACE PREPARATION

The surfaces to be painted shall be abrasively blast-cleaned to Grade C 5a to a Standard 2,5 of the Swedish Standard SIS 05/59/00–1967 a.a., with a blast profile of between 25 and 40 micrometres and D & D = 0,2%.

11.3. PRIMING

One coat

Thickness (DFT) = 25 - 35 micrometres

Application = Spray

Acceptable products : Plascon Epimide Epoxy (EPD 41)

AECI Hichem Primer (D198 - 1004)

If over coating the primer after two weeks, abrade to a matt surface with 220 - 350 grit waterproof paper and rinse with fresh water.

11.4. UNDERCOAT

One coat

Thickness (DFT) = 25 - 35 micrometres

Application = Spray

Acceptable products : Plascon Epilyte Undercoat (EPD 325/326)

AECI Hichem Undercoat (D198 - 0819)

11.5. FINISHING COAT

One coat

Thickness (DFT) = 25 - 35 micrometres

Application = Spray

Colour = As specified and approved by Engineer and Architect. ----------Hld/pnt

Acceptable products : Plascon Epiduct Enamel (EPD 700/699 series)

AECI Hichem Enamel (D355)

11.6. The total DFT of the coating system shall not be less than 90 micrometres.

11.7. REQUIRED QUALITY CONTROL

11.7.1. Colour sample to be approved by the Engineer. ----------Hld/pnt

11.7.2. Metalwork shall be inspected prior to application of an undercoat, in the case of switchboards. All final coats shall be inspected. ----------Hld/pnt

12. PAINTING SYSTEM: NO. PS – 4

APPLICATION : FACTORY POWDER-COAT PAINTING FOR EQUIPMENT.

12.1. GENERAL

This specification is applicable for the painting of equipment such as motors, gear-boxes, pumps, miniature substations, switchboards etc., not powder coated or baked enamel finished.

The paint manufacturer's requirements shall apply.

12.2. SURFACE PREPARATION

All oil and grease shall be removed before surface preparation.

The surfaces shall be abrasively blast-cleaned to Grade C 5a to a standard 2,5 of Swedish Standard SIS 05/59/00 – 1967 a.a., with a blast profile of between 25 and 40 micrometres and D & D = 0,2%.

Acid pickling and washing may be employed provided the metal to be coated is new steel without rust or mill-scale.

12.3. POWDER COATINGS

The following coating processes will apply, as specified in SABS 1274-1979 a.a.:

Type 1 : Heavy-duty durable coatings for interior use

Type 2 : Coatings for interior and non-corrosive conditions

Type 3 : Coatings for luminaries in non-corrosive interior conditions

Type 4 : Corrosion-resistant coatings for interior use

Type 5 : Corrosion-resistant coatings for interior and exterior use

Type 6 : Coatings for exterior use

The metal parts shall be pre-heated and then covered by a micro structured paint powder applied electrostatically.

The minimum paint thickness after baking shall be 50 micrometres and shall have a shock resistance of 25 kg/cm on 0,9 mm soft steel plate and a scratch resistance of 2 000 grams.

The colour shall be as specified and approved by the Engineer and Architect ----------Hld/pnt

12.4. The total DFT of the coating system shall not be less than 50 micrometres for applications Types 4 to 6, as described above.

12.5. REQUIRED QUALITY CONTROL

12.5.1. Colour sample to be approved by the Engineer ----------Hld/pnt

12.5.2. Metalwork shall be inspected prior to application of an undercoat, in the case of switchboards. All final coats shall be inspected ---------- Hld/pnt

13. PAINTING SYSTEM: NO. PS – 5

APPLICATION : FACTORY-BAKED ENAMEL FINISH FOR EQUIPMENT.

13.1. GENERAL

This specification is applicable for the painting of equipment such as motors; gear-boxes, pumps, miniature substations, switchboards, etc. not epoxy - or powder coated.

The paint manufacturer's requirements shall apply.

13.2. SURFACE PREPARATION

All oil and grease shall be removed before surface preparation.

The surfaces shall be abrasively blast-cleaned to grade C 5a to a Standard 2,5 of Swedish Standard SIS 05/59/00 a.a., with a blast profile of between 25 and 40 micrometres and D & D = 0,2%.

Acid pickling and washing may be employed, provided the metal to be coated is new steel without rust or mill-scale.

13.3. BAKED ENAMEL FINISH

Immediately after cleaning, all surfaces shall be covered by an electrolytically-applied, rust-inhibiting, tough, unbroken metal phosphate film and then thoroughly dried. Within forty eight hours after phosphating, a passivating layer consisting of a high quality zinc chromate primer shall be applied, followed by two coats of high quality baked enamel according to SABS 783 Type 1. The paint shall have a shock resistance of 25 kg/cm on 0,9 mm steel plate and a scratch resistance of 2 000 grams.

13.4. The total minimum paint thickness after baking shall be 60 micrometres.

13.5. REQUIRED QUALITY CONTROL

13.5.1. Colour sample to be approved by the Engineer ----------Hld/pnt

13.5.2. Metalwork shall be inspected prior to application of an undercoat, in the case of switchboards. All final coats shall be inspected ---------- Hld/pnt

14. PAINTING SYSTEM: NO. PS – 6

APPLICATION : STEELWORK BURIED IN DISTURBED SOIL OR GROUND.

Epoxy Tar - System Ref. 080 SABS 1200-HC

14.1. GENERAL

This Painting System must be applied to all steel buried in ground, or fixed to subsurface foundations, whether galvanised or not, such as power line or support structures.

This Painting System shall be applied to a height of at least 300 mm above ground level.

The paint manufacturer's prescriptions shall apply.

14.2. SURFACE PREPARATION

The surfaces to be painted shall be abrasively blast-cleaned to Grade C 5a to a Standard 2,5 of the Swedish Standard SIS 05/59/00-1967 a.a, with a blast profile of between 25 and 40 micrometres and D & D = 0,2%.

14.3. PRIMER

One coat

Thickness (DFT) = 70 - 90 micrometres

Application = Brush

Acceptable products : Plascon Epoxy Tar (EPD 100)

AECI Duretar, Black (D198 - 0829)

14.4. UNDERCOAT

One coat

Thickness (DFT) = 70 - 90 micrometres

Application = Brush

Acceptable products : Plascon Epoxy Tar (EPD 112)

AECI Duretar, Brown (D198 - 0830)

14.5. FINISHING COAT

One coat

Thickness (DFT) = 70 - 90 micrometres

Application = Brush

Acceptable products : Plascon Epoxy Tar (EPD 100)

AECI Duretar, Black (D198 - 0829)

Overcoats shall be applied within a minimum of 16 hours and a maximum of 48 hours of drying of the undercoat, or as per manufacturer's specifications.

The paint shall be baked and shall harden within ten minutes at a temperature of 190°C.

14.6. Total thickness of coats shall not be less than 200 micrometres.

14.7. REQUIRED QUALITY CONTROL

Inspection and approval per coat by Engineer ----------Hld/pnt

15. PAINTING SYSTEM: NO. PS – 7

APPLICATION : PAINTING OF STEEL COLD AND HOT WATER STORAGE TANKS, UNGALVANIZED (MAX 120°C).

15.1. GENERAL

This Specification covers the internal and external finish of ungalvanised welded steel water storage tanks not metal sprayed.

15.2. EXTERNAL SURFACE

The KARIWA Standard Specification for Painting and Coatings A-SPES-30-01, Painting System PS-2: Painting of Steelwork applies to the painting of the external surface of the tank (see Appendix p. A-2).

15.3. INTERNAL SURFACE

15.3.1. SURFACE PREPARATION

The unit is to be sandblasted internally and externally and the surface to be treated shall have all projections, sharp edges, laminations and tool marks removed to provide a smooth surface and shall be vacuum cleaned in accordance with Sections 2, 3 and 4 of SABS Code of Practice 064 to meet the following requirements:

- cleanliness not less than Sa 2,5, when tested according to SABS Test Method 767,
- surface profile not greater than 0,09 mm, when tested according to SABS Test Method 772, and
- freedom from dust and debris not less than 0,2%, when tested according to SABS Test Method 769.

15.3.2. PRIMER

No primer, since first finishing coat shall be applied within one hour after the surface is blast cleaned and vacuum cleaned.

15.3.3. UNDERCOAT

None

15.3.4. FINISHING COATS

Epoxy coatings and lining shall be in applicable with SABS 1217.

15.3.5. Acceptable products : Four coats of PLASCON COPON EP 2300 epoxy paint or, in the case of potable water, PLASCON COPON KS 16W.

The first coat shall be applied as a primer and each successive coat shall have a colour additive differing from the previous.

The dry paint thickness shall be 50 micrometres per coat, with a total minimum thickness (DFT) of 200 micrometres.

A minimum of 28 days shall be allowed prior to commissioning after the final coat has been applied.

Allow for good solvent release between coats.

Dissolved salts shall be between 0 and 100 mg/m².

15.4. REQUIRED QUALITY CONTROL

Allowance shall be made for a full quality assurance system and for inspections at each stage by a Painting Specialist approved by the Engineer ----------Hld/pnt

All field repairs shall be done only when instructed by the Engineer and shall be strictly according to the Specification to restore the original Specification ----------Hld/pnt

16. PAINTING SYSTEM: NO. PS – 8

APPLICATION : SITE PAINTING OF HOT-DIPPED GALVANISED STEEL STRUCTURE IN HIGHLY CORROSIVE ATMOSPHERE.

16.1. GENERAL

This Specification is for the painting of galvanised steel structures such as support steelwork in highly corrosive atmospheres, such as heavy industrial areas at the coast.

Preference will be given to supporting structures of either the lattice on I-beam design, since tubular designs are not favoured because they have no paint protection of internal surfaces.

16.2. SURFACE PREPARATION

Over and above the hot-dipped galvanising protection required in accordance with SABS 763, surfaces shall be completely cleaned and degreased with the applicable process described in SABS 780, (a process which does not damage the galvanising).

16.3. COATINGS

After cleaning all metal parts to the approval of the Engineer, all such parts shall be painted to the following Specification: ----------Hld/pnt

16.3.1. In the factory prior to shipment all such metal parts shall be degreased.

Acceptable products:Plascon Galvanised Iron Cleaner (GIC).

16.3.2. FIRST COAT

Apply one coat of epoxy to a DFT of 80 - 100 micrometres:

Acceptable products:Plascon Epylite Hifill Epoxy Mastic Aluminium (EPD 428)

AECI Hibuild Aluminium-filled Armour-Plated Epoxy.

16.3.3. After complete drying, all metal components shall be carefully stacked together and strapped to prevent accidental damage of the paintwork during transport.

16.3.4. After completion erection of the structures, any damage to paint work incurred during transport and erection, as well as all bolts and nuts, will be treated by applying an additional coat of first coat epoxy.

16.3.5. SECOND COAT

After allowing sufficient time for drying, the structures will be degreased to the approval of the Engineer, where after a final coat of 30 - 40 micrometres shall be applied. ----------Hld/pnt

Acceptable products:Plascon Recoatable Polyurethane (CPC)

The colour of the final coat shall be to the approval of the Engineer ----------Hld/pnt

16.4. REQUIRED QUALITY CONTROL

Inspections as required by the Engineer ----------Hld/pnt

17. PAINTING SYSTEM: NO. PS – 9

APPLICATION : EXTERNAL PAINTING OF STEEL PIPING (OTHER THAN STEAM PIPING).

17.1. GENERAL

This Specification covers the finish on the external surface of galvanised steel piping.

Insulated piping shall not be painted with the finishing coat.

17.2. ABOVE GROUND

17.2.1. SURFACE PREPARATION

The surfaces shall be wire brushed to remove loose rust and loose mill-scale to a Std. 3 finish to Swedish Standard SIS 05/59/00-1967.

17.2.2. PRIMING

One coat zinc chromate base alkyd primer.

Thickness (DFT)	=	25 - 35 micrometres
Application	=	Brush or spray
Acceptable product	:	Plascon Namelcoat Primer (UC53).

17.2.3. UNDERCOAT

One coat of universal undercoat.

DFT	=	25 - 35 micrometres
Application	=	Brush or spray
Acceptable product (UC 1)	:	Plascon Merit Universal Undercoat

17.2.4. FINISHING COAT

One coat of universal high gloss enamel.

(DFT)	=	25 - 35 micrometres
Application	=	Brush or spray
Colour the Engineer and Architect	=	As specified and approved by ----------Hld/pnt
Acceptable product	:	Plascon Super Enamel G series

17.2.5. The total dry film thickness for the coating system shall not be less than 90 micrometres.

17.3. UNDERGROUND OR IN TRENCHES

Piping installed underground or in trenches shall be painted to KARIWA Painting System Specification PS - 6 (see Appendix, p.A-6) and then wrapped with one 100% overlapping DENSO-tape layer ----------Hld/pnt

18. PAINTING SYSTEM : NO. PS – 10

APPLICATION : EXTERNAL PAINTING OF ALL BLACK STEEL SURFACES IN AMMONIA-INSTALLATIONS

18.1. GENERAL

This specification is for the painting of cold black piping, pressure vessels, surge drums and supporting steel used unless otherwise stipulated in Ammonia Refrigeration Plants, within the temperature range of minus 55°C to plus 100°C, and includes valves and fittings ----------P/Spec2

18.2. SURFACE PREPARATION

Abrasive blast clean to Sa 2,5 or hand clean to Std. 2 and, where necessary, degrease and remove all loose scale.

18.3. APPLICATION

While applying all coatings, shield from direct sunlight.

Acceptable products: Dulux Hichem 2 - D198-1XXX (Data Bulletin 7204)

18.3.1. PRIMARY (FIRST) COAT:

Use HICHEM 2 as a prime coat on steel surfaces which will operate at low temperatures, thinned up to 20% by volume when used as a primer. Leave to dry for 24 hours between coats.

18.3.2. Airless spray is preferred where possible, using a 0,38 to 0,53 mm orifice with an angle to suit the work piece.

18.3.3. Air spray may be used and the HICHEM 2 must then be thinned to 10% by volume for normal purposes and to 20% if used as primer.

18.3.4. Brush application is likely in the field and the viscosity will then increase towards the end of pot life, especially when applied above 25°C. Up to 5% thinners may be added.

18.3.5. Acceptable products:Thinner - Z 149-0808

Cleaner - Dulux HV Thinner Z 149-0818

18.3.6. Roller application with a short nap mohair roller is recommended.

18.3.7. All pipes shall be thoroughly cleaned (as specified in Clause 2) at the factory or in the Contractor's yard and then primed.

When dry, and only 48 hours after painting pipes shall be carefully strapped in bundles and shipped to site, with due precaution to limit any damage that may occur. On Site, pipes are to be cut and ends which are to be welded shall be ground or sandpapered to bone metal for a distance of 100 mm to permit welding.

18.3.8. All pressure vessels, surge drums, supporting steel and brackets shall be thoroughly cleaned and painted with two coats of HICHEM 2, 24 hours apart, and left to dry for 48 hours before these are shipped to Site. After completion of the installation, pressure and vacuum testing (and the Engineer's approval) the sandpapering and steel brush cleaning of damaged parts and unpainted welded pipes shall proceed, ensuring that paint previously applied is abraded over 20 mm to form a key for the new paint ----------Hld/pnt

18.4. QUALITY CONTROL

[2]P/Spec = See Project Specification in Section C3.2 of the Contract Document

18.4.1. This system shall be used in conjunction with the relevant Data Bulletins.

18.4.2. The dry film thickness of this system shall be a minimum of 180 micrometres.

18.4.3. All work shall comply with SABS 1200-HC and SABS 064.

18.4.4. All coats are to be in contrasting colours.

18.4.5. The Engineer must be notified and will inspect the paintwork at the factory/Contractor's yard and on Site. ----------Hld/pnt

19. PAINTING SYSTEM: NO. PS – 11

APPLICATION : EXTERNAL PAINTING OF ALL BLACK PIPING AND COMPONENTS OPERATING AT TEMPERATURES BETWEEN 100°C AND 200°C

19.1. GENERAL

This specification is for the painting of hot black mild steel piping, pressure vessels and oil separators on Ammonia Refrigeration Plants, specifically the compressors' discharge piping and all related components, including valves and fittings, in accordance with Dulux Specification Data Bulletin 7427 for pipelines and vessels.

19.2. SURFACE PREPARATION

Acceptable products: Dulux Sigmacover M10COAT (Data Bulletin 7427 and 7465)

Surfaces shall be blast-cleaned to Sa 2,5, immediately followed by the first airless spray coat at the Blast Cleaning Contractor's workshop to prevent any corrosion.

19.3. Subsequent coats of the same paint shall be applied in accordance with the manufacturer' specification, leaving the required time between coats and to a final dry film thickness of 240 micrometers, with the last coat applied on site by brush.

Acceptable products: Thinner - Dulux Sigma thinners 91 - 92

Cleaner - Sigma thinners 90-53.

19.4. QUALITY CONTROL

The Engineer must be notified and will inspect the paintwork at the blasting works and on site ----------Hld/pnt

4.1 This system shall be used in conjunction with the relevant Data Bulletins.

4.2 All work shall comply with SABS 1200 HC and SABS 064.

4.3 All coats shall be in contrasting colours.

In addition to the standardised and project specifications the following particular specifications shall apply to this contract and are bound hereafter

PART E: ENVIRONMENTAL MANAGEMENT SPECIFICATION

E.1 General

In order to ensure that the construction works is carried out in an environmentally sensitive matter, strict compliance to the Environmental Management Plan (EMP) guidelines is required. The purpose of the EMP is to:

- Encourage good management practices through planning and commitment to environmental issues,
- Provide rational and practical environmental guidelines to:
  - i. Minimise disturbance of the natural environment,
  - ii. Prevent pollution of land, air and water,
  - iii. Prevent soil erosion and facilitate re-vegetation.
- Adopt the best practicable means available to prevent or minimise adverse environmental impact,
- Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of wastes,
- Train employees and contractors with regard to environmental obligations.

E.2 Training and Induction of Employees

- The Contractor has a responsibility to ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes sub-contractors, casual labour, etc.). The EMP shall be part of the terms of reference for all contractors, sub-contractors and suppliers.

E.3 Complaints Register and Environmental Incident Book

Any complaints received by the project team from the public will be recorded. The complaint should be brought to the attention of the site manager, who will respond.

The following information must be recorded:

- Time, date and nature of the complaint,
- Type of communication (telephone, letter etc.),
- Name, contact address and telephone number of the complainant,
- Response and investigation undertaken and
- Actions taken and by whom.

All complaints received will be investigated and a response give to the complainant within 14 days.

All environmental incidents occurring on the site will be recorded. The following information will be provided:

- Time, date, location and nature of the incident,
- Actions taken and by whom.

E.4 Site Cleanliness and Neatness

- Location of a construction camp is to be approved by the Engineer and is to be restored to its previous condition after completion of construction.
- The construction camp should preferably be fenced with a 1.8m bonnox fence or similar approved.

- All materials, equipment, plant and vehicles must be stored within the construction camp.
- A dedicated area must be made available for construction staff to change and store their personal belongings.

E.5 Access

- Access to existing roads, schools, buildings, shop and residential properties must not be impeded during construction.
- Access roads utilised by the Contractor must be maintained in good condition.

E.6 Borrow Pits

- Mining authorisations (permits) for borrow pits must be obtained from the Department of Minerals and Energy (DME) in consultation with the Department of Water Affairs and Sanitation (DWS).
- Spoil dumps resulting from borrow pits must not interfere with any natural surface drainage.
- Borrow pits must be rehabilitated after use in accordance with the requirements of DME and DWAF.

E.7 Dust Control / Air Quality

- Dust suppression measures must be implemented during construction by ensuring that all surfaces prone to dust generation are kept damp (e.g. use of water tanker).
- Ensure that vehicles and equipment are in good working conditions and that emissions are not excessive.
- Ensure that vehicles and equipment are in good working conditions and that emissions are not excessive.
- Special care must be taken in areas where the route passes close to schools and residential areas.
- The speed of construction vehicles must be reduced.

E.8 Fauna

- Contractor staff may not chase, catch or kill animals encountered during construction.

E.9 Fire Prevention and Control

- Smoking is prohibited in the vicinity of flammable substances.
- The contractor must ensure that fire-fighting equipment is available on site, particularly where flammable substances are being stored or used, and that construction staff are aware of where it is kept and how it is operated.
- Fires started for comfort (warmth) are prohibited, due to the risk of veld fires and risk to adjacent property owner's lands.

E.10 Grave sites

- Gravesites in close proximity to the road must not be disturbed during construction.

E.11 Materials Handling and Spills Management

- Any hazardous materials to be used during construction (e.g. lime, fuel, paint, etc) are to be stored in a designated area at the campsite.
- The storage containers/facilities (including any diesel/petrol tanks) must be placed on an impermeable surface and surrounded by a bund wall, in order to ensure that accidental spillage does not pollute the environment.
- Workers must at all times be made aware of the health and safety risks associated with any hazardous substances used (e.g. smoking near fuel tanks), and must be provided with

appropriate protective clothing/equipment in case of spillages or accidents.

- Ensure all staff and contractors undergo relevant training in the maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants and other chemicals.
- Any spill of potentially hazardous materials must be cleaned up immediately (Potentially hazardous materials on site include paint, oil, grease, fuel, turpentine, etc).
- The area of contaminated soil or spill must be deposited into the hazardous waste container(s).
- The contractor should keep Peat Sorb or a similar absorbent on site to clean up any spills.
- The absorbent must be stored in a designated area and be available for inspection.
- All spills are to be recorded in the environmental incident book.

E.12 Noise

- Noise generating activities must be restricted to between 07h00 and 17h00 Monday to Friday, unless otherwise approved by the appropriate competent person in consultation with adjacent landowners/affected persons.
- All equipment, vehicles and machinery must be in good working conditions and be equipped with sound mufflers if necessary.
- Construction staff must be trained and made aware of not creating unnecessary noise such as hooting and shouting.

E.13 Pollution Control

- Soil and water pollution through usage of fuel, oil, paint, bitumen or other hazardous substances must be avoided.
- All construction vehicles are to be maintained in good working order so as to prevent soil or water pollution from oil, fuel or other leaks, and to reduce noise pollution.

E.14 Rivers and Streams

- During construction of bridge structures, there must be no obstruction of the water flow of rivers and streams.
- Excavated material must not be stockpiled on or near riverbanks, in order to prevent sedimentation occurring.
- Erosion control measures must be employed both during and after construction.
- No impediments to natural surface water flow, other than approved erosion control measures, must occur.

E.15 Safety

- Safety measures, such as detour signs, must be implemented during construction to ensure the safety of workers, pedestrians and drivers/passengers in vehicles in the vicinity of construction work.
- Special care must be taken in the vicinity of schools to ensure the safety of children wishing to cross the road under construction.
- The relevant signage (e.g. speed control signs) must be erected alongside the road during the operation phase in order to control traffic.
- Accommodation must be made for pedestrian pathways alongside the road during the construction and operation phases.

E.16 Soil Management

- Storm water drainage pipes must be installed alongside the road in all areas susceptible to soil erosion.
- Erosion should be minimised by the construction of meadow drains and the planting of indigenous vegetation on the side slopes and drains to reduce flow velocity of storm water.

- Spoil from cuts may be used in existing erosion galleys.

- Stone pitching and gabions should be constructed at pipe culvert outlets.
- Accidental spills of contaminants onto the ground e.g. oil, concrete, fuel and chemicals should be removed together with the contaminated soil.
- If necessary an absorbent such as Peat Sorb should be used the aid in cleaning up the spill. The contaminated soil should be disposed of in an appropriate container, depending on its classification.
- Servicing and re-fuelling of vehicles must only be carried out at construction camp.

E.17 Worker Conduct

Code of Conduct for Construction Personnel:

- Do not leave the construction site untidy and strewn with rubbish which will attract animal pests.
- Do not set fires.
- Do not cause any unnecessary, disturbing noise at the construction camp/site or at any designated worker collection/drop off points.
- Do not drive a construction-related vehicle under the influence of alcohol.
- Do not exceed the national speed limits on public roads or exceed the recommended speed limits on the site.
- Do not drive a vehicle which is generating excessive noise or gaseous pollution (noisy vehicles must be reported and repaired as soon as possible).
- Do not litter along the roadsides, including both the public and private roads.
- Do not pollute any water bodies (whether flowing or not).
- No member of the construction team is allowed to enter the areas outside the construction site.

E.18 Traffic Disturbances and Diversions

- Any traffic diversions must be undertaken with the approval of all relevant authorities and in accordance with all relevant legislation.
- Wherever possible, traffic diversion must only take place on existing disturbed areas and remain within the existing road reserve.
- Traffic diversion routes must be rehabilitated after use.

E.19 Vegetation

- Only vegetation falling directly on the route must be removed where necessary.
- Alien vegetation within the road reserve must be eradicated, and management measures must be implemented for future control of these species.
- Vegetation that has been removed from large areas (e.g. on traffic diversion routes) during construction must be replaced with indigenous vegetation after construction has been completed.

E.20 Waste Management

- All general, non-hazardous waste must be placed in a skip container and disposed of at a registered waste disposal site.
- The container is to ensure that the portable toilet facilities at the campsite are properly maintained and in working order.
- No disposal, or leakage, of sewage must occur on or near the site.
- All hazardous waste (e.g. oil, plant empty lime bags, contaminated wash water, etc) must be stored in leak-proof containers and disposed of a registered hazardous waste disposal site.
- The contents of waste storage containers must, under no circumstances, be emptied to the surrounding area. In general, littering, discarding or burying of any materials is not allowed on site or along the route.
- Adequate waste receptacles must be available at strategic points around the construction

camp and site for all domestic refuse and to minimise the occurrence of littering.

- Concrete rubble must be collected and disposed of as directed by the Project Manager.
- Each working area must be cleared of litter and building waste (e.g. rubble, wood, concrete packets etc) on completion of the day's work.
- Any spill around the container(s) should be treated as per Section C11 and C16.

PART F: OHSA 1993 HEALTH AND SAFETY SPECIFICATION

F1 SCOPE

This specification covers the health and safety requirements to be met by the Contractor to ensure a continued safe and healthy environment for all workers, employees and subcontractors under his control and for all other persons entering the site of works.

This specification shall be read with the Occupational Health and Safety Act (Act No 85 and amendment Act No 181) 1993, and the corresponding Construction Regulations 2003, and all other safety codes and specifications referred to in the said Construction Regulations.

In terms of the OHSA Agreement in Section C1.2.4 of the Contract document, the status of the Contractor as mandatory to the Employer (client) is that of an employer in his own right, responsible to comply with all provisions of OHSA 1993 and the Construction Regulations 2003.

This safety specification and the Contractor's own Safety Plan as well as the Construction Regulations 2003, shall be displayed on site or made available for inspection by all workers, employees, inspectors and any other persons entering the site of works.

The following are possible risks associated with this project:

- Potentially dangerous existing services, i.e. gas lines, water and sewerage mains, electrical high voltage cables, buried and overhead
- Deep excavations in soils requiring shoring or reducing of slopes
- Blasting of hard rock or demolition of concrete
- High pressure during testing of the pipe lines, which could result in potentially dangerous situations in the event of the pipeline or fittings failing
- Movement of construction vehicles on site, taking into consideration steep slopes, other traffic and existing services
- Exposure to possible injuries due to mishandling or failure of power and hand tools
- Non-conformance to specifications with regards to fasteners and materials
- Risks related to general safety and security on site

Additional risks may arise from specific methods of construction selected by the Contractor which are not necessary covered in the above.

F2. DEFINITIONS

For the purpose of this contract the following shall apply:

(a) **Employer**" where used in the contract documents and in this specification, means the Employer as defined in the General Conditions of Contract and it shall have the exact same meaning as "**client**" as defined in the Construction Regulations 2003. "**Employer**" and "**client**" is therefore interchangeable and shall be read in the context of the relevant document.

(b) "**Contractor**" wherever used in the contract documents and in this specification, shall have the same meaning as "**Contractor**" as defined in the General Conditions of Contract.

In this specification the terms "**principal contractor**" and "**contractor**" are replaced with "**Contractor**" and "**subcontractor**" respectively.

For the purpose of this contract the **Contractor** will, in terms of OHSA 1993, be the mandatory, without derogating from his status as an employer in his own right.

(c) "**Engineer**" where used in this specification, means the Engineer as defined in the General Conditions of Contract. In terms of the Construction Regulations the Engineer may act as agent on behalf of the Employer (the client as defined in the Construction Regulations).

F3. BIDS

The Contractor shall submit the following with his Bid:

(a) a documented Health and Safety Plan as stipulated in Regulation 5 of the Construction Regulations. The Safety Plan must be based on the Construction Regulations 2003 and will be subject to approval by the Employer;

(b) a declaration to the effect that he has the competence and necessary resources to carry out the work safely in compliance with the Construction Regulations 2003;

(c) a declaration to the effect that he made provision in his Bid for the cost of the health and safety measures envisaged in the Construction Regulations.

(d) Failure to submit the foregoing with his Bid, will lead to the conclusion that the Contractor will not be able to carry out the work under the contract safely in accordance with the Construction Regulations.

F4. NOTIFICATION OF COMMENCEMENT OF CONSTRUCTION WORK

After award of the contract, but before commencement of construction work, the Contractor shall, in terms of Regulation 3, notify the Provincial Director of the Department of Labour in writing if the following work is involved:

(a) the demolition of structures and dismantling of fixed plant of height of 3,0m or more;
(b) the use of explosives;
(c) construction work that will exceed 30 days or 300 person-days;
(e) excavation work deeper than 1,0m; or
(f) working at a height greater than 3,0m above ground or landings.

The notification must be done in the form of the pro forma included under Section 9 (Forms to be completed by Successful Bidder) of the Bid document.

A copy of the notification form must be kept on site, available for inspection by inspectors, Employer, Engineer, employees and persons on site.

F5. RISK ASSESSMENT

Before commencement of any construction work during the construction period, the Contractor shall have a risk assessment performed and recorded in writing by a competent person. (Refer Regulation 7 of the Construction Regulations 2003).

The risk assessment shall identify and evaluate the risks and hazards that may be expected during the execution of the work under the contract, and it shall include a documented plan of safe work procedures to mitigate, reduce or control the risks and hazards identified.

The risk assessment shall be available on site for inspection by inspectors, Employer, Engineer,

subcontractors, employees, trade unions and health and safety committee members, and must be monitored and reviewed periodically by the Contractor.

F6. APPOINTMENT OF EMPLOYEES AND SUBCONTRACTORS

6.1 Health and Safety plan

The Contractor shall appoint his employees and any subcontractors to be employed on the contract, in writing, and he shall provide them with a copy of his documented Health and Safety Plan, or relevant sections thereof. The Contractor shall ensure that all subcontractors and employees are committed to the implementation of his Safety Plan.

6.2 Health and safety induction training

The Contractor shall ensure that all employees under his control, including subcontractors and their employees, undergo a health and safety induction training course by a competent person before commencement of construction work. No visitor or other person shall be allowed or permitted to enter the site of the works unless such person has undergone health and safety training pertaining to hazards prevalent on site.

The Contractor shall ensure that every employee on site shall at all times be in possession of proof of the health and safety induction training issued by a competent person prior to commencement of construction work.

F7. APPOINTMENT OF SAFETY PERSONNEL

7.1 Construction Supervisor

The Contractor shall appoint a full-time **Construction Supervisor** with the duty of supervising the performance of the construction work.

He may also have to appoint one or more competent employees to assist the construction supervisor where justified by the scope and complexity of the works.

7.2 Construction safety officer

Taking into consideration the size of the project and the hazards or dangers that can be expected, the Contractor shall appoint in writing a full-time or part-time **Construction Safety Officer** if so decided by the Inspector of the Department of Labour. The Safety Officer shall have the necessary competence and resources to perform his duties diligently.

Provision shall be made by the Contractor in his rates, to cover the cost of this dedicated construction safety officer appointed after award of the contract.

7.3 Health and safety representatives

In terms of **Section 17 and 18 of the Act (OHSA 1993)** the Contractor, being the employer in terms of the Act for the execution of the contract, shall appoint a **health and safety representative** whenever he has more than 20 employees in his employment on the site of the works. The health and safety representative must be selected from employees who are employed in a full-time capacity at a specific workplace.

The number of health and safety representatives for a workplace shall be at least one for every 100 employees.

The function of health and safety representative(s) will be to review the effectiveness of health and safety measures, to identify potential hazards and major incidents, to examine causes of incidents (in

collaboration with his employer, the Contractor), to investigate complaints by employees relating to health and safety at work, to make representations to the employer (Contractor) or inspector on general matters affecting the health and safety of employees, to inspect the workplace, plant, machinery etc. on a regular base, to participate in consultations with inspectors and to attend meetings of the health and safety committee.

7.4 Health and safety committee

In terms of Sections **17 and 18 of the Act (OHSA 1993)** the Contractor (as employer), shall establish one or more **health and safety committee(s)** where there are two or more health and safety representatives at a workplace. The persons selected by the Contractor to serve on the committee shall be designated in writing.

The function of the health and safety committee shall be to hold meetings at regular intervals, but at least once every three months, to review the health and safety measures on the contract, to discuss incidents related to health and safety with the Contractor and the inspector, and to make recommendations regarding health and safety to the Contractor and to keep record of recommendations and reports made by the committee.

7.5 Competent persons

In accordance with the Construction Regulations the Contractor has to appoint in writing **competent persons** responsible for supervising construction work on each of the following work situations that may be expected on the site of the works.

(a) Risk assessment and induction training as described in Regulation 7 of the Construction Regulations;
(b) Fall protection as described in Regulation 8;
(c) Formwork and support work as described in Regulation 10;
(f) Excavation work as described in Regulation 11;
(g) Demolition work as described in Regulation 12;
(h) Scaffolding work as described in Regulation 14;
(i) Suspended platform operations as described in Regulation 15;
(j) Material hoists as described in Regulation 17;
(k) Batch plant operations as described in Regulation 18;
(l) Explosive powered tools as described in Regulation 19;
(m) Cranes as described in Regulation 20;
(n) Construction vehicle and mobile plant inspections on a daily basis by a competent person as described in Regulation 21(1);
(o) Control of all temporary electrical installation on the construction site as described in Regulation 22;
(p) Stacking and storage on construction sites as described in Regulation 26; and
(q) Inspections of fire equipment as described in Regulation 27.

A competent person may be appointed for more than one part of the construction work with the understanding that the person must be suitably qualified and able to supervise at the same time the construction work on all the work situations for which he has been appointed.

The appointment of competent persons to supervise parts of the construction work does not relieve the Contractor from any of his responsibilities to comply with **all** requirements of the Construction Regulations.

F8. RECORDS AND REGISTERS

In accordance with the Construction Regulations the Contractor is bound to keep records and registers related to health and safety on site for periodic inspection by inspectors, the Engineer, the Employer, trade union officials and subcontractors and employees. The following records and registers must be kept on site and shall be available for inspection at all times.

(a) A copy of the OHSA 1993 Construction Regulations 2003;
(b) A copy of this Health and Safety Specification;
(c) A copy of the Contractor's Health and Safety Plan (Regulation 4);

(d) A copy of the Notification of Construction Work (Regulation 3);
(e) A health and safety file in terms of Regulation 5(7) with inputs by the Construction Safety Officer (Regulation 6(7));
(f) A copy of the risk assessment described in Regulation 7;
(g) A full protection plan and the corresponding records of evaluation and training of employees working from elevated positions as described in Regulation 8;
(h) Drawings pertaining to the design of structures (Regulation 9(3)) and formwork and support work structures (Regulation 10(d)) must be kept on site;
(i) Pronouncement of the safety of excavations must be recorded in a register to be kept on site (Regulation 11(3)(h));
(j) A copy of the certificate of the system design for suspended platforms (Regulation 15(3));
(k) A notice must be affixed around the base towers of material hoists to indicate the maximum mass load, which may be carried at any one time by material hoists (Regulation 7(5));
(l) Maintenance records of material hoists and inspection results must be kept in a record book to be kept on site (Regulation 17(8));
(m) A record of any repairs to or maintenance of a batch plant must be kept on site (Regulations 18(9));
(n) A warning notice must be displayed in a conspicuous manner when and wherever an explosive powered tool is used (Regulation 19(2));
(o) A register for recording of findings by the competent person appointed to inspect construction vehicles and mobile plant (Regulation 21(1)(j)).

F9. CONTRACTORS RESPONSIBILITIES

For this contract the Contractor will be the mandatory of the Employer (Client), as defined in the Act (OHSA 1993), which means that the Contractor has the status of employer in his own right in respect of the contract. The Contractor is therefore responsible for all the duties and obligations of an employer as set out in the Act (OHSA 1993) and the Construction Regulations 2003.

Before commencement of work under the contract, the Contractor shall enter into an agreement with the Employer (Client) to confirm his status as mandatory (employer) for the contract under consideration.

The Contractor's duties and responsibilities are clearly set out in the Construction Regulations 2003, and are not repeated in detail but some important aspects are highlighted hereafter, without relieving the Contractor of any of his duties and responsibilities in terms of the Construction Regulations.

(a) Contractor's position in relation to the Employer (Client) (Regulation 4)

In accordance with Section 4 of the Regulations, the Contractor shall liaise closely with the Employer or the Engineer on behalf of the Employer, to ensure that all requirements of the Act and the Regulations are met and complied with.

(b) The Principal Contractor and Contractor (Regulation 5)

The Contractor is in terms of the definition in Regulation 2(b) the equivalent of Principle Contractor as defined in the Construction Regulations, and he shall comply with all the provisions of Regulation 5.

Any subcontractors employed by the Contractor must be appointed in writing, setting out the terms of the appointment in respect of health and safety. An independent subcontractor shall however provide and demonstrate to the Contractor a suitable, acceptable and sufficiently documented health and safety plan before commencement of the subcontract. In the absence of such a health and safety plan the subcontractor shall undertake in writing that he will comply with the Contractor's safety plan, the health and safety specifications of the Employer and the Construction Regulations 2003.

(c) Supervision of construction work (Regulation 6)

The Contractor shall appoint the safety and other personnel and employees as required in terms of

Regulation 6 and as set out in paragraph 7 above. Appointment of those personnel and employees does not relieve the Contractor from any of the obligations under Regulation 6.

(d) Risk assessment (Regulation 7)

The Contractor shall have the risk assessment made as set out in paragraph 7 above before commencement of the work and it must be available on site for inspection at all times. The Contractor shall consult with the health and safety committee or health and safety representative(s) etc. on a regular basis to ensure that all employees, including subcontractors under his control, are informed and trained by a competent person regarding health hazards and related work procedures.

No subcontractor, employee or visitor shall be allowed to enter the site of works without prior health and safety induction training, all as specified in Regulation 7.

(e) Fall protection (Regulation 8)

Fall protection, if applicable to this contract shall comply in all respects with Regulation 8 of the Construction Regulations.

(f) Structures (Regulation 9)

The Contractor will be liable for all claims arising from collapse or failure of structures if he failed to comply with all the specifications, project specifications and drawings related to the structures, unless it can be proved that such collapse or failure can be attributed to faulty design or insufficient design standards on which the specifications and the drawings are based.

In addition the Contractor shall comply with all aspects of Regulation 9 of the Construction Regulations.

(g) Formwork and support work (Regulation 10)

The Contractor will be responsible for the adequate design of all formwork and support structures by a competent person.

All drawings pertaining to formwork shall be kept on site and all equipment and materials used in formwork, shall be carefully examined and checked for suitability by a competent person.

The provisions of Regulation 10 of the Construction Regulations shall be followed in every detail.

(h) Excavation work (Regulation 11)

It is essential that the Contractor shall follow the instructions and precautions in the Standard Specifications and Project Specifications as well as the provisions of the Construction Regulations to the letter as unsafe excavations can be a major hazard on any construction site. The Contractor shall therefore ensure that all excavation work is carried out under the supervision of a competent person, that inspections are carried out by a Professional Engineer or Technologist, and that all work is done in such a manner that no hazards are created by unsafe excavations and working conditions.

Supervision by a competent person will not relieve the Contractor from any of his duties and responsibilities under Regulation 11 of the Construction Regulations.

(i) Demolition work (Regulation 12)

Whenever demolition work is included in a contract, the Contractor shall comply with all the requirements of Regulation 12 of the Construction Regulations. The fact that a competent person has to be appointed by the Contractor does not relieve the Contractor from any of his responsibilities in respect of safety of demolition work.

(j) Tunnelling (Regulation 13)

The Contractor shall comply with Regulation 13 wherever tunnelling of any kind is involved.

(k) Scaffolding (Regulation 14)

The Contractor shall ensure that all the provisions of Regulation 14 of the Construction Regulations are complied with. [Note: Reference in the Regulations to “Section 44 of the Act” should read “Section 43 of the Act”].

(l) Suspended platforms (Regulation 15)

Wherever suspended platforms will be necessary on any contract, the Contractor shall ensure that copies of the system design issued by a Professional Engineer are submitted to the Engineer for inspection and approval. The Contractor shall appoint competent persons as supervisors and competent scaffold erectors, operators and inspectors and ensure that all work related to suspended platforms are done in accordance with Regulation 15 of the Construction Regulations.

(m) Boatswain’s chains (Regulation 16)

Where boatswain’s chains are required on the construction site, the Contractor shall comply with Regulation 16.

(n) Material Hoists (Regulation 17)

Wherever applicable, the Contractor shall comply with the provisions of Regulation 17 to the letter.

(o) Batch plants (Regulation 18)

Wherever applicable, the Contractor shall ensure that all lifting machines, lifting tackle, conveyors, etc. used in the operation of a batch plant shall comply with, and that all operators, supervisors and employees are strictly held to the provisions of Regulation 18. The Contractor shall ensure that the General Safety Regulations (Government Notice R1031 of 30 May 1986), the Driven Machinery Regulations (Government Notice R295 of 26/2/1988) and the Electrical Installation Regulations (Government Notice R2271 of 11/10/1995) are adhered to by all involved.

In terms of the Regulations, records of repairs and maintenance shall be kept on site.

(p) Explosive powered tools (Regulation 19)

The Contractor shall ensure that, wherever explosive-powered tools are required to be used, all safety provisions of Regulation 19 are complied with.

It is especially important that warning notices are displayed and that the issue and return of cartridges and spent cartridges be recorded in a register to be kept on site.

(q) Cranes (Regulation 20)

Wherever the use of tower cranes becomes necessary, the provisions of Regulation 20 shall be complied with.

(r) Construction vehicles And mobile plant (Regulation 21

The Contractor shall ensure that all construction vehicles and plant are in good working condition and safe for use, and that they are used in accordance with their design and intended use. The vehicles and plant shall only be operated by workers or operators who have received appropriate training, all in accordance with all the requirements of Regulation 21.

All vehicles and plant must be inspected on a daily basis, prior to use, by a competent person and the findings must be recorded in a register to be kept on site.

(s) Electrical installation and machinery on construction sites (Regulation 22)

The Contractor shall comply with the Electrical Installation Regulations (Government Notice R2920 of 23 October 1992) and the Electrical Machinery Regulations (Government Notice R1953 of 12 August 1993). Before commencement of construction, the Contractor shall take adequate steps to ascertain the presence of, and guard against dangers and hazards due to electrical cables and apparatus under, over or on the site.

All temporary electrical installations on the site shall be under the control of a competent person, without relieving the Contractor of his responsibility for the health and safety of all workers and persons on site in terms of Regulation 22.

(t) Use of temporary storage of flammable liquids on construction sites (Regulation 23)

The Contractor shall comply with the provisions of the General Safety Regulations (Government Notice R1031 of 30 May 1986) and all the provisions of Regulation 23 of the Construction Regulations to ensure a safe and hazard-free environment to all workers and other persons on site.

(u) Water environments (Regulation 24)

Where construction work is done over or in close proximity to water, the provisions of Regulation 24 shall apply.

(v) Housekeeping on Construction sites (Regulation 25)

Housekeeping on all construction sites shall be in accordance with the provisions of the environment Regulations for workplaces (Government Notice R2281 of 16 October 1987) and all the provisions of Regulation 25 of the Construction Regulations.

(w) Stacking and storage on construction sites (Regulation 26)

The provisions for the stacking of articles contained in the General Safety Regulations (Government Notice R1031 of 30 May 1986) as well as all the provisions Regulation 26 of the Construction Regulations shall apply.

(x) Fire precautions on construction sites (Regulation 27)

The provisions of the Environmental Regulations for Workplaces (Government Notice R2281 of 16 October 1987) shall apply.

In addition the necessary precautions shall be taken to prevent the incidence of fires, to provide adequate and sufficient fire protection equipment, sirens, escape routes etc. all in accordance with Regulation 27 of the Construction Regulations.

(y) Construction welfare facilities (Regulation 28)

The Contractor shall comply with the construction site provisions as in the Facilities Regulations (Government Notice R1593 of 12 August 1988) and the provisions of Regulation 28 of the Construction Regulations.

(z) Non-compliance with the Construction Regulations 2003

The foregoing is a summary of parts of the Construction Regulations applicable to all construction projects.

The Contractor, as employer for the execution of the contract, shall ensure that all provisions of the Construction Regulations applicable to the contract under consideration are complied with to the

letter.

Should the Contractor fail to comply with the provisions of the Regulations 3 to 28 as listed in Regulation 30, he will be guilty of an offence and will be liable, upon conviction, to the fines or imprisonment as set out in Regulation 30.

***The Contractor is advised in his own interest to make a careful study of the Act and the Construction Regulations as ignorance of the Act and the Regulations will not be accepted in any proceedings related to non-conformance to the Act and the Regulations*.**

F10. MEASUREMENT AND PAYMENT

10.1 Principles

It is a condition of this contract that Contractors, who submit Bids for this contract, shall make provision in their Bids for the cost of all health and safety measures during the construction process. All associated activities and expenditure are deemed to be included in the Contractor's Bidded rates and prices.

(a) Safety personnel

The Construction Supervisor, the Construction Safety Officer, Health and Safety Representatives, Health and Safety Committee and Competent Persons referred to in clauses 7.1 to 7.5 shall be members of the Contractor's personnel, and no additional payment will be made for the appointment of such safety personnel.

(b) Records and Registers

The keeping of health and safety-related records and registers as described in 8 is regarded as a normal duty of the Contractor for which no additional payment will be considered, and which is deemed to be included in the Contractor's Bidded rates and prices.

PART C 4: SITE INFORMATION

C4.1: LOCALITY PLAN

C4.2 SCHEDULE OF DRAWINGS

C4.1 LOCALITY PLAN

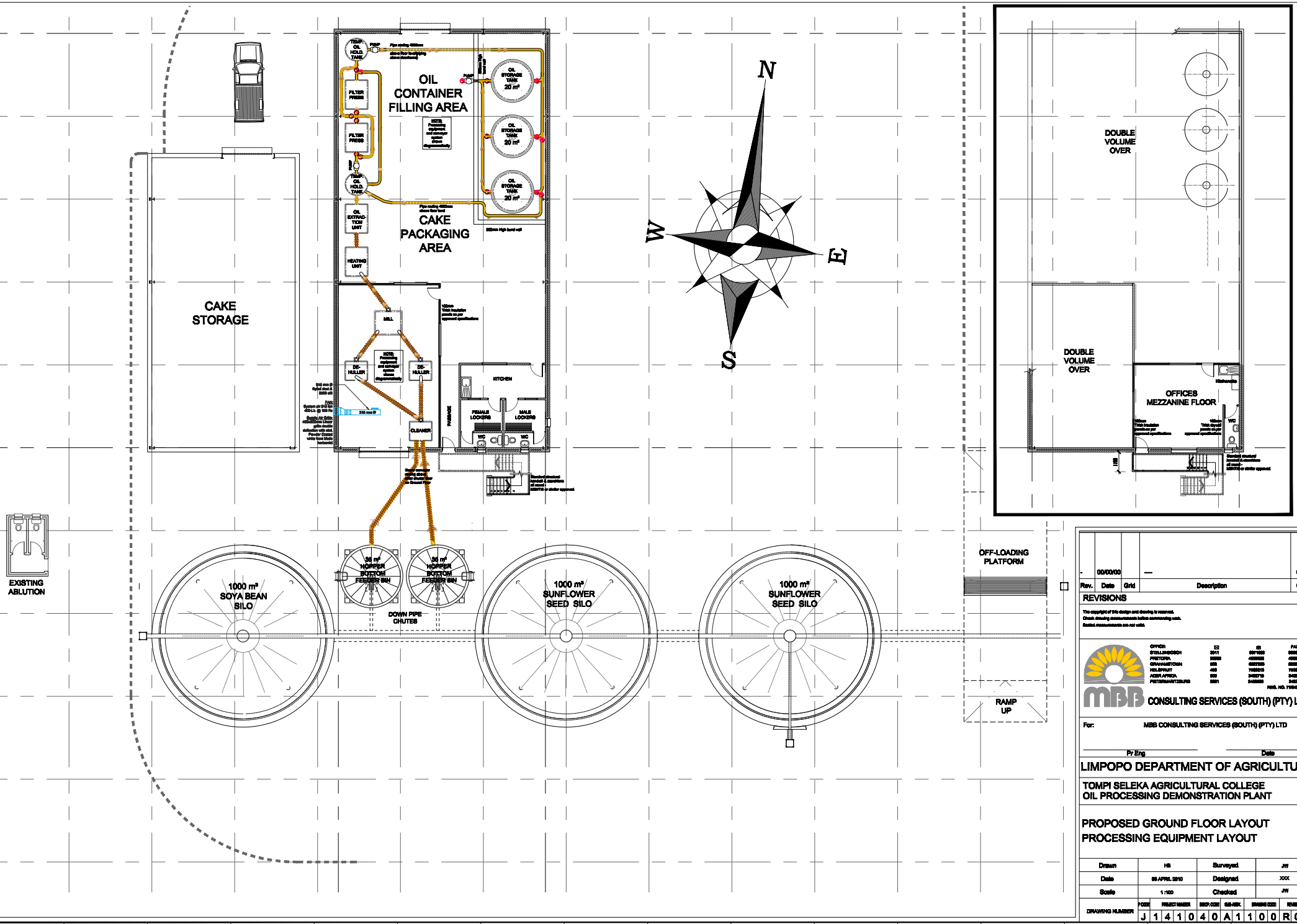
Figure 1 Location for Tompi Seleka Agricultural College

SCHEDULE OF TENDER DRAWINGS

The following drawings, which are bound in, form part of this Contract in terms of Clause 1(i) - (j) of the General Conditions of Contract:

DRAWING NO:	DESCRIPTION:
J1410_401_A1	Existing Processing plant layout

The Tenderer shall satisfy himself that the sets of drawings are complete in accordance with the above schedule, and if any are found to be missing or duplicated, or the writing or figures indistinct, he shall apply to the Engineer immediately and have the discrepancy rectified. No liability whatsoever will be admitted by the Employer in respect of errors in Tenders attributed to any such discrepancy.



Rev.	Date	Grid	Description	Q.A.
-	00/00/00	—		Q.A

REVISIONS

MBB CONSULTING SERVICES (SOUTH) (PTY) LTD
REG. NO. 1998/020521

For: MBB CONSULTING SERVICES (SOUTH) (PTY) LTD

Pr Eng _____ Date _____

LIMPOPO DEPARTMENT OF AGRICULTURE

TOMPI SELEKA AGRICULTURAL COLLEGE
OIL PROCESSING DEMONSTRATION PLANT

PROPOSED GROUND FLOOR LAYOUT
PROCESSING EQUIPMENT LAYOUT

Drawn	HB	Surveyed	JW
Date	08 APRIL 2010	Designed	XXX
Scale	1:100	Checked	JW

DRAWING NUMBER	PROJECT NUMBER	DISCIPLINE CODE	SUB-NUM.	DRAWING CODE	REVISION NR.
J14104	0	A	1100		R00