public works
& infrastructure

Department:
Public Works and Infrastructure
REPUBLIC OF SOUTHAFRICA

QUOTATION DOCUMENT

PROJECT DESCRIPTION: BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)

QUOTATIO NO:	**Q25/052**
Closing Date:	**22 October 2025**
Closing Time:	**11h00**
Bid Briefing Meeting Date:	**N/A**
Bid Briefing Meeting time:	**N/A**

***Tenderers CSD No*:** ……..

Name of the Tenderer: ……

Bid Box Address
Department of Public Works & Infrastructure
18 President Brand Street
Bloemfontein CBD
Bloemfontein
9301

SCM SPECIFIC ENQUIRIES:	**TECHNICAL / PROJECT SPECIFIC ENQUIRIES**
Enquires: **Lebakile Wolf**	Enquires: **AJ Visser**
Tel No: **051 408 7447** during office hours	Tel No: **051 408 7508** during office hours
Cell No: **N/A**	Cell No: **072 773 1524**
Email Address: Lebakile.Wolf@dpw.gov.za	Email Address: Abrie.visser@dpw.gov.za

Table of Contents

Page

SUMMARY OF QUOTATION INFORMATION

Bid Number	**Q25/052**	
Bid/ Project Description	**BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)**	
Bid Closing date & Time	**Wednesday, 22 October 2025**	**Closing Time: 11h00**
Bid Briefing Date & Time (If applicable)	*Date of Bid Briefing (if any)* **N/A**	*Time of Bid Briefing (if any)* **N/A**
Venue	**N/A**	
SCM SPECIFIC ENQUIRIES:	**Lebakile Wolf**	**Lebakile.Wolf@dpw.gov.za**
	051 408 7447	**N/A**
TECHNICAL / PROJECT SPECIFIC ENQUIRIES	**AJ Visser**	**Abrie.visser@dpw.gov.za**
	051 408 7508	**072 773 1524**
Bid Validity Period	**84 calendar days**	
Bid Document Price	**Free of Charge**	
Procurement Plan Reference Number	**Not Applicable**	

PA-03 (EC): NOTICE AND INVITATION FOR QUOTATION

THE DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE INVITES TENDERS FOR:

Project title:	**BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)**		
Bid no:	**Q25/052**	**Procurement Plan Reference no:**	**Not Applicable**
Advertising date:	**Tuesday, 07 October 2025**	**Closing date:**	**Wednesday, 22 October 2025**
Closing time:	**11h00**	**Validity period:**	**84 calendar days**

1. REQUIRED CIDB GRADING

It is estimated that tenderers should have a CIDB contractor grading designation of ***2 ME*** *or* ***2 ME**** or higher.
** Delete "or select tender value range select class of construction works" where only one class of construction works is applicable*

It is estimated that potentially emerging enterprises should have a CIDB contractor grading designation of ***Not applicable Not applicable*** **PE** *or* ***Not applicable Not applicable*** **PE*** or higher.
** Delete "or select tender value range select class of construction works PE" where only one class of construction works is applicable*

2. FUNCTIONALITY CRITERIA APPLICABLE

2.1 The Bid will not be evaluated on Functionality

Functionality criteria[1]:		**Weighting factor:**
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
TOTAL		N/A

(Weights for functionality must add up to 100. Weightings will be multiplied by the scores allocated during the evaluation process to arrive at the total functionality points)

Minimum functionality score to qualify for further evaluation:	N/A

(Total minimum qualifying score for functionality is 50 Percent, any deviation below or above the 50 Percent, provide motivation below)

[1]The points allocated to each functionality criterion should not be generic but should be determined separately for each tender on a case by case basis.

3. METHOD TO BE USED TO CALCULATE POINTS FOR SPECIFIC GOALS

3.1. **The following Evaluation Method for responsive bids will be applicable:**

☐ Method 1 (Financial offer)	☒ Method 2 (Financial and Preference offer)

3.2. **The 80/20 Preference points scoring system will be applicable for this bid**

4. RESPONSIVENESS CRITERIA

4.1 **Indicate substantive responsiveness criteria applicable for this tender. Failure to comply with the criteria stated hereunder shall result in the tender offer being disqualified from further consideration:**

1	☒	Only those tenderers who satisfy the eligibility criteria stated in the Tender Data may submit tenders.
2	☒	Tender offer must be properly received on the tender closing date and time specified on the invitation, completed either electronically (if issued in electronic format), or by writing legibly in non-erasable ink. (All as per Standard Conditions of Tender).
3	☒	Use of correction fluid is prohibited.
4	☒	Submission of a signed bid offer as per the DPW-07 (EC).
5	☒	Submission of DPW-09 (EC): Particulars of Tenderer's Projects.
6	☐	Bidders must comply with DPW-21 (EC): Record of Addenda to tender documents, if any.
7	☒	The tenderer shall submit his fully priced Bills of Quantities / Lump Sum Document (complete document inclusive of all parts) together with his tender.
8	☐	Submission of DPW-16.1 signed by the authorised official and completion of bid briefing attendance register. **insert motivation why the tender clarification meeting is declared compulsory**
9	☐	The tenderer shall submit his fully priced and completed sectional summary- and final summary pages with the tender.
10	☐	
11	☐	
12	☐	

3.3. **Indicate administrative requirements applicable for this tender. Tenderers may be required to submit the below documents where applicable.**

The Employer reserves the right to request further information regarding the undermentioned criteria. Failing to submit further clarification and/or documentation within seven (7) calendar days from request or as specifically indicated, will disqualify the tender offer from further consideration.

1	☒	Any correction to be initialled by the person authorised to sign the tender documentation as per PA 15.1 or PA 15.2 resolution of board/s of directors / or PA15.3 Special Resolution of Consortia or JV's.
2	☒	Submission of applicable (PA-15.1, PA-15.2, PA-15.3): Resolution by the legal entity, or consortium / joint venture, authorising a dedicated person(s) to sign documents on behalf of the firm / consortium / joint venture.
3	☒	Submission of (PA-11): Bidder's disclosure
4	☒	Submission of PA-16.1 (EC): Ownership Particulars
5	☐	Submission of documentation relating to **risk assessment criteria** as contained in C 2.1 of T1.2 Tender Data.
6	☐	Data provided by the Service Provider (C1.2.3) completed.
7	☒	Submission of proof of Registration on National Treasury's Central Supplier Database (CSD). Insert the Supplier Registration Number on the form of offer, including proposed sub-contractors if any
8	☒	All parts of tender documents submitted must be fully completed in ink and signed where required.
9	☒	Upon request, submission of fingerprints obtainable from local SAPS including any other additional documentation and information required for vetting purposes.
10	☐	Upon request, submission of a fully completed security clearance application form with supporting documentation and information as required. The security clearance form will be provided by the Employer for projects requiring a security clearance.
11	☒	**Submission of (PA 40): Declaration of Designated Groups**
12	☒	**Submit a valid, original or certified copy of the B-BBEE certificate/sworn affidavit or DTI certificate together with the bidding documents at closer**
13	☒	**Bidders must comply with DPW-21 (EC): Record of Addenda to tender documents, if any.**
14	☐	**Specify other responsiveness criteria**
15	☐	**Specify other responsiveness criteria**

3.4. **Indicate administrative requirements applicable for specific goals, Tenderers will not be required to submit the below document if not provided in the original tender proposals, Failure to comply with the criteria stated hereunder shall result in the tenderer not allocated points for specific goals.**

1	☒	Submission of (PA-16): Preference Points Claim Form in terms of the Preferential Procurement Regulations 2022

5. EVALUATION METHOD

5.1 The following Evaluation Method for responsive bids will be applicable:

☐ Method 1 (Financial offer)	☒ Method 2 (Financial and Preference offer)

5.2. This bid will be evaluated according to the 80/20 Preference points scoring system

6. METHOD TO BE USED TO CALCULATE POINTS FOR SPECIFIC GOALS

6.1. For procurement transaction with rand value greater than R2 000, 00 and up to R1 Million (Inclusive of all applicable taxes) the specific goals listed below are applicable.

Serial No	Specific Goals	Preference Points Allocated out of 20	Documentation to be submitted by bidders to validate their claim
1.	An EME or QSE which is at least 51% owned by black people	10	• SANAS Accredited BBBEE Certificate or Sworn Affidavit where applicable.
2.	Located in a specific Local Municipality or District Municipality or Metro or Province area for work to be done or services to be rendered in that area (Mandatory) **FREE STATE**	2	• Official Municipal Rates Statement which is in the name of the bidder. Or • Any account or statement which is in the name of the bidder. Or • Permission To Occupy from local chief in case of rural areas (PTO) which is in the name of the bidder. Or • Lease Agreement which is in the name of the bidder.
3.	An EME or QSE which is at least 51% owned by black women	4	• SANAS Accredited BBBEE Certificate or Sworn Affidavit where applicable.
4.	An EME or QSE which is at least 51% owned by black people with disability	2	• SANAS Accredited BBBEE Certificate or Sworn Affidavit where applicable. and • Medical Certificate indicating that the disability is permanent. Or • South African Social Security Agency (SASSA) Registration indicating that the disability is permanent. Or • National Council for Persons with Physical Disability in South Africa registration (NCPPDSA).
5.	An EME or QSE which is at least 51% owned by black youth	2	• SANAS Accredited BBBEE Certificate or Sworn Affidavit where applicable.

7. BID EVALUATION METHOD

This bid will be evaluated according to the preferential procurement model in the PPPFA and the 80/20 preference point scoring system will be applicable

8. ELIGIBILITY IN RESPECT OF RISK TO THE EMPLOYER:

Standard risk management assessment criteria in respect of tenders received for routine projects in the engineering and construction works environments:

Tender offers will be evaluated by an Evaluation Committee based on the technical and commercial risk criteria listed hereunder. Each criterion carries the same weight / importance and will be evaluated individually based on reports presented to the Bid Evaluation Committee by the Professional Team appointed on the project. A tender offer will be declared non-responsive and removed from any further evaluation if any one criterion is found to present an unacceptable risk to the Employer.

In order for the evaluation reports to be prepared by the Professional Team, the Tenderer is obliged to provide comprehensive information on form DPW-09 (EC). Failure to complete the said form will cause the tender to be declared non-responsive and removed from any further consideration. The Employer reserves the right to request additional information over and above that which is provided by the Tenderer on said form. The information must be provided by the Tenderer within the stipulated time as determined by the Bid Evaluation Committee, failing which the tender offer will *mutatis mutandis* be declared non-responsive.

7.1 Technical risks:

Criterion 1: Experience on comparable projects during the past 5 years.
The tendering Service Provider's experience on comparable projects during the past 5 years. The number of current and previous comparable projects performed by the Tenderer as per the evaluation report prepared by the Consultant Team, based on its research and inspection of a representative sample of the Tenderer's current and previous work as reflected on form DPW-09 (EC), as well as, if necessary, of any additional work executed by the Tenderer, not reflected on form DPW-09 (EC). Failing to provide contactable references will result in the tender offer will be *mutatis mutandis* declared non-responsive.
Aspects to be regarded as "comparable" includes (but may be extended according to circumstances): size of projects (measured against monetary value or other project quantifying parameters), nature of projects (building, engineering, high/low rise, etc.), locality/area of execution (site-specific influences, knowledge of local conditions, etc.), complexity of project, projects for similar client department irrespective of end purpose of buildings/facilities created or in progress of being created and time scales of projects (normal, fast track, etc.) and stage of its/their development.

Criterion 2: Contractual commitment and quality of performance on comparable projects during the past 5 years.

Adherence to contractual commitments and quality of performance of comparable current and previous projects performed by the Tenderer during the past 5 years as per the evaluation report prepared by the Consultant Team, based on its research and inspection of a representative sample of the Tenderer's current and previous work as reflected on form DPW-09 (EC), as well as, if necessary, of any additional work executed by the Tenderer, not reflected on form DPW-09 (EC). Failing to provide contactable references will result in the tender offer be *mutatis mutandis* declared non-responsive.

Aspects to be considered include, but are not limited to the following:

1. The level of progress on current projects in relation to the project programme or, if such is not available/applicable, to the contractual construction period in general;
2. The degree to which previous projects have been completed within the contractual completion periods and/or extensions thereto, and the extend of penalties imposed;
3. Project performance: time management & programming of works, timeous ordering of materials and appointment of subcontractors;
4. Financial management: payment to suppliers and cash flow problems;
5. Quality of workmanship: extent of reworks and timeous attention to remedial works;
6. Personnel resources: suitably qualified and experienced, turnover in site staff and labour force, specifically site manager and foreman;
7. Personnel management: extent of labour disputes and ability to resolving labour disputes amicably;
8. Sub-contractors: extent of turnover in subcontractors, general liaison and payment problems experienced;
9. Contract administration: contractual aspects such as complying to laws and regulations, insurances, security, submission of required documentation timeously, reaction to written contract instructions, appointments of subcontractors, etc. as can generally be expected in standard/normal conditions of contract.
10. Health & Safety: adherence to regulations and compliance, and number of transgressions & serious incidents.
11. Plant & equipment: sufficient resources on site and in time.
12. Delays: extent of causing delays, submission of claims timeously, and abuse of or exaggerated delay claims.
13. Final account: extent to which the contractor assisted in finalising the final account.

Criterion 3: Suitably qualified and appropriately experienced human resources

Allocation of suitably qualified and appropriately experienced human resources, both in respect of principals and/or other staff (contract manager, site agent, site foreman including other professional, technical and/or administrative) of the tendering Service Provider to the project, as proof that the tendering Service Provider will be able to react/respond appropriately to the Services required herein. The Company Organogram with CV's and certified ID's of all principals and employed workforce as well as proof of Professional Registration will be verified. Current and future workload of the tenderer in relation to capacity and capability will also be considered. The tenderer should demonstrate that he or she possesses the necessary professional and technical qualifications and -competence in relation to the scope of work and work to be undertaken.

Criterion 4: Attendance of compulsory bid clarification meeting, if applicable

If applicable, submission of confirmation of DPW-16.1 (PSB) attendance of compulsory bid clarification meeting or proof of attending the compulsory virtual meeting by a suitably qualified and experienced representative of the tenderer in terms of PA-04 (EC): Notice and Invitation to Tender.

7.2 Commercial risks:

The financial viability assessment evaluates the risk over the life of the construction period, as to whether the tenderer will be able to deliver the goods and services which are specified in the contract and / or be able to fulfil guarantees or warranties provided for in the contract in order to complete the project successfully for the amount tendered.

Aspects to be considered include but are not limited to, the respective rates tendered, bank rating, financial capability and capacity whether the tenderer has or has access to sufficient financial resources to deliver the goods or services described in the tender documentation (including fulfilling any guarantees or warranty claims), whether the tenderer is not subject to any current or impending legal action (either formal proceedings or notification of legal action) which could impact on the financial standing of the tenderer or the delivery of the goods or services, financial report from auditors as proof of current liquidity, and company or any parent company or investor guarantee/s and financial statements.

9. CONTRACT PARTICIPATION GOAL TARGETS AND CIDB B.U.I.L.D. PROGRAMME

The contractor shall achieve in the performance of the contract the following Contract Participation Goals (CPGs) as described in PG-01.2 (EC): Scope of Work and PG-02.2 (EC): Pricing Assumptions and in accordance with the feasibility study, which forms part of the specifications in the CPG Section of the Specification of this contract.

(a)	Minimum Targeted Local Manufacturers of Material Contract Participation Goal, in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**
(b)	Minimum Targeted Local Building Material Suppliers Contract Participation Goal in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**
(c)	Minimum Targeted Local Labour Skills Development Contract Participation Goal in accordance with the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts as published in the Government Gazette Notice No. 41237 of 10 November 2017, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**
(d)	**CIDB BUILD Programme**: Minimum Targeted Enterprise Development Contract Participation Goal in accordance with the cidb Standard for Indirect Targeting for Enterprise Development through Construction Works Contracts, No 36190 Government Gazette, 25 February 2013, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**
(e)	**cidb BUILD Programme:** Minimum Targeted Contract Skills Development Goal in accordance with the cidb Standard for Developing Skills through Infrastructure Contracts as published in the Government Gazette Notice No. 43495 of 3 July 2020, as amended in cidb Best Practice Project Assessment Scheme Notice No. 43726 of 18 September 2020 – Condition of Contract.	**Not applicable**
(f)	DPWI National Youth Service training and development programme (NYS) – Condition of Contract.	**Not applicable**
(g)	Labour Intensive Works – Condition of Contract.	**Not applicable**

10. COLLECTION OF TENDER DOCUMENTS

☒ Bid documents are available for free download on the e-Tender portal www.etenders.gov.za

☒ Alternatively, Bid documents may be collected during working hours at the following address: NDPWI, 18 President Brand Street, Bloemfontein 9301
A non-refundable bid deposit of **Free of Charge** is payable (cash only) on collection of the bid documents.

11. SITE INSPECTION MEETING

Details of Bid Briefing meeting (if any)
There will be no bid briefing meeting.

Venue:	**N/A**		
Virtual meeting link:	N/A		
Date:	*Date of Bid Briefing (if any)* **N/A**	**Starting time:**	*Time of Bid Briefing (if any)* **N/A**

12. ENQUIRIES

12.1 Technical enquiries may be addressed to:

DPWI Project Manager	**AJ Visser**	**Telephone no:**	**051 – 408 7508**
Cellular phone no	**072 773 1524**	**Fax no:**	**NONE**
E-mail	Abrie.visser@dpw.gov.za		

12.2 SCM enquiries may be addressed to:

SCM Official	**Lebakile Wolf**	**Telephone no:**	**051 408 7447**
Cellular phone no	**N/A**	**Fax no:**	**N/A**
E-mail	Lebakile.Wolf@dpw.gov.za		

13. DEPOSIT / RETURN OF TENDER DOCUMENTS

Telegraphic, telephonic, telex, facsimile, electronic and / or late tenders will not be accepted.

Requirements for sealing, addressing, delivery, opening and assessment of tenders are stated in the Tender Data.
All tenders must be completed in non-erasable ink and submitted on the official forms – (forms not to be re-typed).

Closing Date: Wednesday, 22 October 2025
Closing Time: 11h00

Tender documents may be posted to: The Director-General Department of Public Works and Infrastructure Private Bag X 20605 Bloemfontein 9300 Documents must be deposited in The Bid Box before the closing date of the bid	**OR**	**Deposited in the tender box at:** The Bid Box at Ground Floor Department of Public Works & Infrastructure 18 President Brand Street Bloemfontein 9301

EVALUATION ON FUNCTIONALITY

N/A

DPW-07: FORM OF OFFER AND ACCEPTANCE

The Employer, identified in the acceptance signature block, has solicited offers to enter into a contract for the procurement of:

Bid no: Q25/052

Bid/ Project Description: BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)

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 responsibilities of the Service Provider 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 (All applicable taxes" includes value- added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies) IS:

Rand (in words):	
Rand in figures:	**R**

The award of the tender may be subjected to price negotiation with the preferred tender(s). The negotiated and agreed price will be considered for acceptance as ***a firm and final offer***.

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 Service Provider in the conditions of contract identified in the contract data.

THIS OFFER IS MADE BY THE FOLLOWING LEGAL ENTITY: (cross out block which is not applicable)

Company or Close Corporation: …… …… And: Whose Registration Number is: …… And: Whose Income Tax Reference Number is: …… CSD supplier number: ……	**OR**	Natural Person or Partnership: …… …… Whose Identity Number(s) is/are: …… Whose Income Tax Reference Number is/are: …… CSD supplier number: ……

AND WHO IS (if applicable)**:**

Trading under the name and style of: ……

AND WHO IS:

Represented herein, and who is duly authorised to do so, by: Mr/Mrs/Ms: …… In his/her capacity as: ……	**Note:** **A Resolution / Power of Attorney, signed by all the Directors / Member / Partners of the Legal Entity must accompany this Offer, authorising the Representative to make this offer.**

Bid No: Q25/052

Bid/ Project Description: BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)

SIGNED FOR THE TENDERER:

Name of representative	Signature	Date

WITNESSED BY:

Name of witness	Signature	Date

This Offer is in respect of: (Please indicate with an "X" in the appropriate block)
The official documents …… ☐
The official alternative …….…….. ☐
Own alternative (only if documentation makes provision therefore) ☐

SECURITY OFFERED: (Not required for this quotation/ bid)

The Service Provider will provide one of the following forms of security:

(1) Cash deposit of 2.5% of the Contract Sum (excl. VAT) Yes ☐ No ☒

(2) Variable guarantee of 2.5% of the Contract Sum (excl. VAT) (DPW-10.5: FM) Yes ☐ No ☒

(3) Retention of 2.5% of the Contract Sum (excl. VAT) Yes ☐ No ☒

(4) 1.25% cash deposit and 1.25% retention of the Contract Sum (excl. VAT) Yes ☐ No ☒

NB. Guarantees submitted must be issued by either an insurance company duly registered in terms of the Short-Term Insurance Act, 1998 (Act 35 of 1998) or by a bank duly registered in terms of the Banks Act, 1990 (Act 94 of 1990) on the pro-forma referred to above. No alterations or amendments of the wording of the pro-forma will be accepted.

The Tenderer elects as its *domicilium citandi et executandi* in the Republic of South Africa, where any and all legal notices may be served, as (physical address):

……

Other Contact Details of the Tenderer are:

Telephone No…….. Cellular Phone No. ……

Fax No. ……..

Postal address……

Banker …… Branch……..

Bank Account No. …… Branch Code ……..

Registration No of Tenderer at Department of Labour……

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 Service Provider 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.

Bid No: Q25/052

Bid/ Project Description: BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)

The terms of the contract, are contained in:

Part 1 Agreements and contract data, (which includes this agreement)
Part 2 Pricing data
Part 3 Scope of work.
Part 4 Site information

and drawings (where applicable) and documents or parts thereof, which may be incorporated by reference into Parts 1 to 4 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) to arrange the 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, if delivered by hand on the day of delivery, or if delivered by courier within two working days after submission by the Employer to the courier services for a door-to door delivery to the tenderer, provided that the Employer notifies the tenderer of the tracking number within 24 hours of such submission. Unless the tenderer (now Service Provider) within seven working days of the date of such submission notifies the Employer in writing of any reason why he cannot accept the contents of the schedule of deviation to this agreement if applicable), this agreement shall constitute a binding contract between the parties.

For the Employer:

Name of signatory	Signature	Date

Name of Organisation:	Department of Public Works
Address of Organisation:	

WITNESSED BY:

Name of witness	Signature	Date

SCHEDULE OF DEVIATIONS

Bid no: Q25/052

Bid/ Project Description: BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)

1.1.1. Subject:
Detail:

1.1.2. Subject:
Detail:

1.1.3. Subject:
Detail:

1.1.4. Subject:
Detail:

1.1.5. Subject:
Detail:

1.1.6. Subject:
Detail:

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.

TERMS OF REFERENCE/ SPECIFICATIONS

Bid no: Q25/052

Bid/ Project Description: BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)

public works
& infrastructure
Department:
Public Works and Infrastructure
REPUBLIC OF SOUTH AFRICA

MECHANICAL INSTALLATION SPECIFICATION FOR THE CLOSE OUT OF THE NEW BLOEMFONTEIN GOVERNMENT BUILDING DIHLASE REFERENCE NO: B 3748 ML

DIHLASE CONTACT DETAILS:
Suit 7, 57 Kellner street
Westdene
Bloemfontein
9301
Postnet, Suite 258, Private Bag X01
Brandhof 9324
Tel: +27 (87) 078 1657

Error! Not a valid bookmark self-reference.**CONTENTS**

Description **Page**

Error! Not a valid bookmark self-reference. Notes to tenderers

TENDER REQUIREMENTS

Tenders are invited for the air conditioning installation at the The New Bloemfontein Government Building, Bloemfontein. These tender documents are issued on behalf of the employer.
One set of tender documents and relevant drawings will be made available to each of the tenderers for tendering purposes.
No alterations, erasures, omissions or additions are to be made to the text of this document. Should any such alteration, erasure, omission or addition be made, it will not be recognized and the reading of the items, will be adhered to. Tenderers may, however, qualify their tenders or offer alternatives by means of a covering letter.
Tenderers shall check that they have been provided with all documents and drawings. Tenderers must advise the Consulting Mechanical Engineer immediately if there is any duplication or obscure typing or if there is any doubt as to the meaning of any word, clause, sentence, paragraph, drawing, works information or any other particulars and have the matter rectified in writing by the Consulting Mechanical Engineer.
No liability whatsoever will be admitted in respect of errors in the tender, due to the foregoing.

Tenderers must tender on specified trade names and must complete equipment schedules. Alternatives can be offered as separate tender and must be accompanied by complete Technical Specifications and a cover letter. Failure to adhere to the above will invalidate the tender.

ENQUIRIES

All enquiries regarding this tender must be addressed to Dihlase Consulting Engineers, Postnet Suite 258, Private Bag X01, Brandhof, 9324, Tel. 051-4471636, for the attention of Mr Benjamin Lombard.

TYPE OF CONTRACT

To be in accordance with main contractor.

THE SCOPE OF THE WORKS

The scope of this project entails the close out of the existing system and minor alteration to the system.
It is important to note that this project will ensure the system adheres to the design as originally intended. The contractor shall be responsible to ensure functionality of the system in accordance with original specifications, please refer to Addendum A for original project specifications.
Items not specified in Addendum A will be installed in accordance with this specification. Addendum A serves as the basis and this specification will be deemed supplementary to complete the project.
The scope of the works described in detail in this document and drawings covers the supply, delivery, off-loading, hoisting, storage, installation, commissioning, testing, handing over and free maintenance for the period stated in the tender document of all specified equipment and materials.
The scope of work for this project implies the close out of the existing system.

- Pre-construction report
- Replacement of existing chiller to original specifications.
- Completion and repairs to basement ventilation system
- Installation of several split type under ceiling units in the server rooms.
- Air-conditioning alteration and repairs to all floor, from ground floor to sixth floor. Alteration include
    - All field wiring required
    - Installation of wall mounted controllers (24V)
    - Supply and installation of volume control dampers.
    - Identification of faulty reheat elements
    - Installation of new VAV diffuser and associated equipment to accommodate

architectural changes.
    - Servicing of Air Handling Units (AHU).
    - Replacement of existing chilled water pipes.
- Upgrade and recommissioning of Building Management system (BMS). **To be done by Atbro Systems.**
- Upgrade the existing Johnson Controls Metasys Software to latest version of software and hardware.
- Service testing and recommissioning of existing hot water generation plant.
- Servicing of hot water circulation pump.
- Supply and installation of new submersible grey water pumps.
- Servicing, repairs and testing to existing fire suppression system.

It is important to note that the contractor will furnish a pre-construction report detailing the existing services and material.

THE SCOPE OF THE CONTRACT

Tenderers must thoroughly acquaint themselves with all aspects of the work to be executed, prior to the submission of the tender, as no claim whatsoever shall be entertained in the event of any unforeseen difficulties arising during the execution of the contract which could have been foreseen by a thorough investigation of the buildings, all drawings and specifications and conditions pertaining to the execution of the work.

SCHEDULE OF THE DOCUMENTS MAKING UP A SET OF TENDER DOCUMENTS

The pages of this tender document are numbered consecutively and tenderers shall compare them with those reflected under the heading of "Index", to ascertain their legibility and inclusion in this document. Should there be any page missing, descriptions ambiguous or discrepancies found, tenderers are to advise the Consulting Mechanical Engineer immediately for corrections, as no claim arising out of failure to do so shall be considered.
The original tender specifications are attached in Addendum A, this document consists of 69 pages and number consecutively.

DRAWINGS

Tenderers attention is drawn to the fact that tender drawings have been issued with this tender document, and no claim whatsoever arising out of failure of tenderers to acquaint themselves fully with all relevant drawings, shall be considered.

ACQUAINTANCE WITH TENDER DOCUMENTS

By submission of a tender, the tenderer shall be deemed to have acquainted himself fully with the terms of this tender document, the main contract between the employer and main contractor, local requirements, laws and all aspects of the work envisaged in these documents.

SITE

The site is located on the corner of President Brand Street and St Andrews Street, Bloemfontein, Free State.
Before tendering, tenderers should visit the site and satisfy themselves as to local conditions, accessibility of the site, the full extent and nature of the operations, supply of and conditions affecting labour, cartage, off-loading, storage and safe custody of the materials, workshop accommodation, scaffolding, tackle and tools necessary, the execution of the contract and the nature of the ground which has to be excavated, etc. Claims founded on lack of knowledge in these respects will not be entertained. The Contractor shall make certain that all materials offered for employed anywhere in the construction of the works are suited to the conditions experienced in this area.

ALTERATIONS TO TENDER DOCUMENTS

All authorised alterations to the tender documents will be communicated to the tenderers via the system of "Notice to Tenderers" by e-mail.

MODEL PREAMBLES AND SUPPLEMENTARY PREAMBLES

Tenderers prices for all items incorporated within the Bill of Quantities, must take full cognisance of and include for all the obligations, requirements and specifications contained within the Model Preambles for Trades (1999 Edition), as published by the Association of South African Quantity Surveyors.
Supplementary preambles to the Model Preambles covering clauses of a general nature, clauses pertaining to specific materials and amendments to clauses in the Model Preambles are incorporated in this document which is intended to satisfy the requirements of this specific project.

MAIN CONTRACTOR

Tenderer

COMPLETION DATE

In accordance with main contractor contract.

SUBMISSION OF TENDERS

In accordance with main contractor contract.

AUTHORISED REPRESENTATIVES

If the tenderer is a company or firm the tender must be accompanied by a certified resolution of the board authorising the signature to sign on behalf of the company or firm.

PRICES

All prices must be quoted in Rand.

DISCOUNTS

It is a specific provision of this contract that tenders are to be net and must not contain (directly or indirectly) any allowance, cash discount, builders discount, special discount, payment or refund in favour of any persons, company or concern whatsoever other that the Employer.

COST PRICE ADJUSTMENT

In accordance with main contractor contract.

COMPLETION OF TENDER

In addition to the information referred to in relevant clauses all prices schedules and all other schedules shall be properly completed in ink must be submitted together with the tender form. Non-compliance with this requirement may invalidate a tender.

ACCEPTANCE OF TENDER

The lowest or any tender will not necessarily be accepted. The owner reserves the right to accept any tender price or part thereof, and the agreed tender price will be adjustable accordingly. Any tender which does not comply with the requirements stated in these enquiry documents and instructions to tenderers may be considered invalid. Tenderers may include with their tenders any descriptive matter which, if referred to in the tender, will form part of the tender. In case of any discrepancy, however, the issued form of tender, together with these enquiry documents will be considered as the valid and binding tender.

FOREIGN TENDERERS

Tenderers not domiciliate in the Republic of South Africa shall state the name and address of their accredited or intended agents in the Republic. Failure to do so may invalidate the tender.

FOREIGN EXCHANGE RISKS

It is advisable that tenders buy forward cover against foreign exchange fluctuations, as no escalation whatsoever will be applicable on this contract. This will also apply to escalation, resulting from fluctuations in exchange rate of the domestic currency.

VALUE ADDED TAX

Tender rates and prices shall be calculated on a **net** basis, (i.e. excluding value added tax), with value added tax being incorporated, as a separate single amount on the summary page and calculated using the current percentage rate at the time of the tender.

VALIDITY OF TENDERS

The tender shall be held valid for a period of forty five (45) calendar days after the closing date for the receipt of tenders and shall not be altered, amended nor withdrawn during that period. The lowest, or any, or portion of any tender shall not necessarily be accepted.

PRE-ORDERING

The Tenderers are hereby informed that the Employer will accept no financial liability whatsoever should the Tenderer(s) or prospective Tenderer(s) commit or execute any work or place orders on their supplier(s) and/or sub-contractor(s) **prior** to receiving the **written** official letter of appointment.

CONVERSION TO CONTRACT DOCUMENT

The submitted formal complete tender document shall, upon award, become the contract document between the Employer and the successful Tenderer, together with the priced Bills of Quantities, annexures, instructions, specifications, drawings, supplementary preambles and conditions presently contained herein and shall be further amended to incorporate any modifications, instructions and re-submissions that may be mutually agreed by the Employer and the successful Tenderer. The successful tenderer must make provision for providing all necessary assistance in the formulation of this Contract Document.

SECURITY REQUIREMENTS

The Tender must adhere to the security requirements of the Employer at all times.

BILLS OF QUANTITIES

The Bills of Quantities shall have all items properly priced and extended. If any items in the Bills are not priced, it shall be deemed that either no costs are involved or the costs are covered elsewhere.
Total tender price in the Form of Tender shall constitute the contract price of the successful tenderer inclusive of VAT. Tenderers are advised to check their item extensions and total additions, as no claims for arithmetical errors shall be considered.
No alterations, erasures or additions shall be made in the text of these Bills of Quantities. Should any alterations, erasure or addition be made, it will not be recognised but the original wording of these Bills of Quantities shall be adhered to.
The priced Bill of Quantities of the successful tenderer will be checked and the Consulting Mechanical Engineer reserves the right to call for reasonable adjustments to any individual price and to rectify any discrepancy whilst the total price, as submitted, remains unaltered.

SUFFICIENCY OF TENDER

The Tenderer shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the Works and of the rates and prices he has stated in the Schedules, which rates and prices shall cover all his obligations under the Contract and all matters and things necessary for the proper completion of the Works.

CONTRACTOR DATA REQUIRED

It may be required that the Contractor, prior to appointment and contracting, submits full details in respect of the following:

Previous work

References to previous clients

Physical address and details

Financial position

Company directors

Work load

Performance history

Anticipated requirements for this project

Resources

EQUIPMENT OFFERED/ alternatives

The specified products are the minimum requirements and any other product offered as an alternative shall be the same quality and have the same capabilities or better than that specified. If any other product is offered as an alternative, detailed technical information must be submitted with the tender. The decision of the Consulting Mechanical Engineer will be final.
All alternative offers shall be included in separate tender forms clearly stating the manufactures.

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Standard Mechanical Specification

1. GENERAL REQUIREMENTS

This installation shall be suitable in all respects for operation under the atmospheric conditions and electricity supply as outlined in the schedules. The onus is on the tenderer to ascertain any other local conditions or peculiarities which might affect the working of the plant, and no allowance in price or standards of materials or workmanship will be made for any ignorance on the part of the tenderer in this respect.
All materials and workmanship supplied under this contract shall be of the highest quality. The Engineer shall have the right to reject and demand satisfactory replacement at the Contractor's cost, or any part of it, which, is his opinion, does not conform to the highest standards of material and workmanship. The installation shall be required to run for long continuous periods, and it is essential that all installations shall be capable of operating continuously and satisfactorily over such periods.

STANDARD SPECIFICATIONS

GENERAL STANDARD SPECIFICATIONS, REGULATIONS AND CODES

The latest edition, including all amendments up to date of tender, of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof.
Where a specification or standard is not specifically referred to, it will be assumed that the relevant SANS, ISO, BSS, DIN or equivalent American standard, listed in order of preference will apply:

SANS and other specifications and codes:

CKS 332		Specifications for industrial V-belts
SANS 10400	1990	The application of the building regulations
SANS 10142	2001	Code of practice for the wiring of premises
SANS 10140	2000	Identification colour marking
SANS 1044 Parts 1-4	1963	Welding
SANS 10103	1994	The measurement and rating of environmental noise with respect to annoyance and speech communications
SANS 10147	2002	Refrigeration systems including plants associated with air-conditioning systems.
SANS 10173	1980	The installation, testing and balancing of air-conditioning duct work
SANS 1238	1979	Air-conditioning duct work
SANS 1287	1980	Ventilation practices and ducting
SANS 1424	1987	Filters for use in air-conditioning and general ventilation
SANS 1530 Part 1	1991	Panels with two impervious facing sheets

Occupational Health and Safety Act

All regulations and statutory requirements as laid down in the latest edition of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) shall be adhered to.

Manufacturers' specifications, codes of practice and installation instructions

All equipment and materials shall be installed, serviced and repaired strictly in accordance with the manufacturers' specifications, instructions and codes of practice.

Municipal regulations, laws and by-laws

All municipal regulations, laws, by-laws and special requirements of the Local Authority shall be adhered to unless otherwise specified.

VISIT TO SITE

Tenderers must acquaint themselves with local site conditions such as access area available on site, type of ground, space available for onsite fabrication, storage, transport, loading and unloading facilities, scaffolding, tackles and tools needed, as no claims by the Contractor, which may arise from ignorance of the site conditions, will be considered.

MATERIAL AND WORKMANSHIP

The contract works shall be executed in accordance with the specified standards and level of workmanship, to the satisfaction of the Engineer.
All materials shall be of the quality specified and the Contractor shall, upon request of the Engineer, furnish him with proof to his satisfaction that the materials are of the specified quality. In this regard, the Contractor shall submit documentary evidence and details of the plant, equipment and diagrams to the Consulting Engineer prior to ordering the equipment.
All materials and equipment used for the installations shall be new and undamaged.
The Contractor shall, if requested by the engineer, provide samples of material and equipment for approval. If judged necessary by the Engineer, such samples, may only be returned after the completion of the installation, in order to ensure that the quality of the installed product is the same as that of the approved sample.

PART OF THE SPECIFICATION

The Standard Mechanical Specification covers the general technical requirements of the mechanical installation. These specifications shall be read in conjunction with the document in its entirety. If the conditions and/or specifications contained herein are at variance with anything contained in the detail specification, the latter shall take preference, otherwise these Standard Mechanical Specifications shall apply as if duly included.

MINIMUM REQUIREMENT

The conditions and/or specifications in this section shall be regarded as the absolute minimum requirement. More stringent similar conditions and/or specifications stated in the detail specification shall take preference to those in these Standard Mechanical Specifications.

PROPRIETARY MATERIALS

The Tenderer's attention is drawn to the Detail Specification and Bills of Quantities generally which forms an integral part of the specification, specifically to the following clauses:
Where the term "or other approved" is used in connection with proprietary materials or articles, it is to be understood that approval shall be at the discretion of the Employer.
Where brand or trade names are referred to in the Detailed Specification and Bills of Quantities, these shall indicate the quality and type of material or fitting required and no substitution of materials so specified will be permitted unless the authority of the Employer has been obtained in writing before tender close.

APPROVAL OF EQUIPMENT

The Contractor shall, prior to ordering or manufacturing of equipment and materials, submit details of the intended materials and equipment for approval by the Consulting Engineer. These details shall include engineering data sheets, drawings and any other documentation that the Engineer asks for to enable the Engineer to assess that equipment offered meets the requirement of the specification.
Once installation has commenced with the appropriate approvals for using any type and make of article or equipment, the same type and make of article or equipment shall be used throughout the project for that specific application unless otherwise specified.

REFERENCE SPECIFICATIONS AND STANDARDS

The latest revision of any Specification referred to in this specification, will be applicable.
Where a specification or standard is not specifically referred to, it will be assumed that the relevant SANS, ISO, BSS, DIN or equivalent American standard, listed in order of preference will apply.
The SI ("Le Systeme International d' Unites") – Metric System of Units will apply.

DRAWINGS

ENGINEER'S DRAWINGS

Unless otherwise specified, the Engineer's Tender drawings are not manufacturing drawings and the dimensions given are only sufficient for tendering purposes or to enable the contractor to complete manufacturing drawings. It is the responsibility of the contractor to verify all dimensions.
The Engineer shall make available to, at the request of the contractor, any available record drawings of the present installation.

CONTRACTOR'S DRAWINGS

General

The contractor will be furnished, on request, with the Engineer's drawings and a complete set of "as built" drawings identified as available in this document.
The contractor shall supply two (2) copies of each detail design drawing for approval. The contractor shall allow the Engineer one (1) week for drawing approval. After a marked-up copy with all the Engineer's comments has been returned, the contractor shall update the original, which shall then be submitted to the Engineer for signature. This will ensure that all prints used for construction will be certified as approved
Two (2) copies of the certified drawing shall be issued to the Engineer for distribution.
The contractor will be required to produce the following detail design drawings:

Builder's Work Drawings.

Mechanical Drawings

These are all Workshop and Equipment Layout Drawings required for the manufacture and erection of the installations.

Instrumentation Drawings, such as:

Schematic Control Diagrams.

General Arrangement Drawing of Control Board

Electrical Panel Construction Drawings

Workshop drawings:

Indicating the following shall be approved by the *Engineer* before manufacture commences:

Boards - General

Front, side and back elevations of the boards

Typical sections through the boards

Construction details

Dimensions and construction details of board

Colour of board sections

Placing of switchgear on boards

Detail and position of legend card holder

Details and position of schematic drawing holder

Wording, position, size and colours of name strips and notices

Assembly and holding down details of each board

Full schematic wiring diagrams showing terminal wire and component numbers and circuit designations.

Busbars

Current rating

Fault current rating

Positions and spacings of busbars and access to busbars

Dimensions of busbars

Details, positions and spacing of supports

Type of material of busbars and supports

Busbar identification

Switchgear

Minimum fault capacity of switchgear

Type and manufacture of switchgear used

Current and voltage transformer ratio and V A-ratings

Meters

Maximum capacity of meter in A, V. kWh, etc.

Type and manufacture of meter

Full scale of meter

Multiplication factor, if applicable.

All wiring diagrams and symbols used shall be in accordance with DIN or other approved and nationally or internationally acceptable Standards. Unless otherwise specified, cable routes shall be superimposed on the Mechanical Layout Drawings, showing the runs and fixing details.

Any work done by the contractor without an approved signed drawing, will be at the risk of the contractor.

The Contractor shall update all drawings (“record drawings”) once the installation has been completed. One (1) set of paper prints and one (1) set in an acceptable electronic format shall be supplied to the Engineer as part of the O & M Manual.

CONSTRUCTION AND SITE ISSUES

CONSTRUCTION, PLANT, ETC.

Tenderers shall include an amount for the supply of all scaffolding, ladders, trestles, dust sheets and everything necessary for the proper performance of the contract, for clearing and removal of all rubbish due to the work, for the protection of the work from damage due to the building operations, other contracts and the weather. In existing buildings contractors shall in particular take adequate precautions to the satisfaction of the engineer to prevent damage to existing apparatus during erection operation.

MATERIAL, OFF-LOADING AND STORAGE

Tenderers must take due allowance in their tenders for the off-loading of materials and the storage and safe custody thereof according to manufacturer’s specifications on or off site until such can be accommodated or is required on site.

INSPECTION OF LOCALLY MANUFACTURED SUPPLIES

Where locally manufactured plant or materials are offered, the Employer reserves the right to inspect such plant or goods during manufacture and to reject items that do not conform to the owner’s requirements. Where a number of units are ordered by the owner the contractor shall notify the representative of the Employer when one unit has been completed so that the representative of the Employer may inspect and approve it.

ORDERING MATERIALS

The contractor is warned to place all orders for materials or special articles as early as possible as he will be held solely responsible for any delay in the delivery of such goods.

PACKING

The contractor will be held responsible for packing all plant and other goods in such a manner as to ensure freedom from any loss or damage in transit. Unless otherwise specifically agreed upon, receptacles will not be returned or paid for and no additional charges will be allowed for packing or packing materials.

SAMPLES FOR TEST

The contractor shall furnish, without delay, such samples for testing, or other purposes, as called for, or may be called for, by the Engineer, who may reject all materials or workmanship not corresponding with the approved sample.
Notwithstanding that samples and approved brands of materials, etc. are exhibited or included in classified lists at the offices of the owner, the Engineer may retest any samples, brands of materials, etc. included in the contract and reject articles and materials, etc. that do not strictly comply with the specification.

DAMAGE TO BUILDINGS AND THE MISUSE OF FACILITIES

Any damage done to the buildings, roads and landscaped areas by the contractor, or his workmen, shall be made good by the contractor. Should the contractor, or his personnel, be granted leave by the Employer to utilise on-site facilities and such facilities be misused or damaged, the facilities shall be cleaned and/or repaired to the satisfaction of the Employer (It should be understood however, that the provision of facilities (toilets, etc.) in terms of the Preliminary and General costs called for in the tender document, are the responsibility of the contractor). If the contractor fails to attend to such damage, the Employer will take care of remedial work required and shall deduct the cost of such work from the contract monies due to the contractor.

PROTECTION OF OWNER'S EQUIPMENT

The contractor shall ensure that any computers or other valuable equipment of the owner is sufficiently protected against work or dust by means of temporary coverings or sealed-off partitions.

ARRANGEMENTS WITH SUPPLY AUTHORITIES

The contractor shall apply for and complete all the formalities necessary for compliance with any statutory requirements as necessary. He shall also make himself available for all statutory authority inspections in order to complete all the formalities and tests. Inspection fees shall be allowed for in the tender.

TAKING RESPONSIBILITY FOR THE INSTALLATION (For normal electrical or electrical within mechanical installations)

With first delivery, the contractor shall accept in writing the responsibility for the total installation as installed by him by certifying the correctness of the installation in accordance with and on the certificates of compliance of the work as per the Specification.

INSPECTIONS AND TESTING

INSPECTIONS (PART III, SAACE – 1978)

The Engineer shall have general supervision and direction of the Contract Works. Supervision shall comprise such periodic visits as the Engineer may consider necessary to inspect the Contract Works for conformity with the Contract documentation and to provide clarification and further information as necessary.
The Engineer shall have the power at any time to inspect and examine any part of the Contract Works or any materials intended for use in or on the Contract Works, either on the site or at any factory, workshop or other place where such parts or materials are being constructed or manufactured or at any place where such parts or materials are lying or from where they are being obtained and the Contractor shall give all such facilities as the Engineer may reasonable require to be given for such inspection and examination.
The Contractor shall not be liable for the cost of inspecting materials at the place of manufacture, construction or storage nor be responsible for any travelling or accommodation costs arising out of the execution of such inspection, etc.

TESTING

Test Equipment

The Contractor shall supply all test equipment, test facilities and everything necessary, at his cost, to perform tests. The following testing and commissioning equipment as applicable shall be required:

Pitot tube and manometer.

Hot wire anemometer.

Crane type manometer for balancing valves.

Thermometer for insertion into pipe and duct pockets alongside temperature detectors.

Sling psychrometer.

Revolution counter suitable for measuring fan and motor shaft rotation.

Megger equipment.

Clamp on ammeter.

Voltmeter.

Power factor meter.

Ohmmeter suitable for continuity testing.

Neon type ON/OFF test lamp.

Maximum indicating ammeter suitable for measuring peak motor starting currents.

The contractor shall record all measurements taken during testing and shall do the necessary adjustments until the Engineer is satisfied with the results.

The Engineer shall be notified one (1) week in advance of any tests so that he may witness such tests.

Unless otherwise specified, the contractor will be required to perform the following tests:

Electrical Switchboards

Each board and its components shall be subjected at the Manufacturer's works to the routine tests, called for in the appropriate SANS and BS Specifications and this Specification.
The following tests shall be performed on all circuits:

7 Full operational tests of opening and closing each circuit breaker and the contactor from their respective protection relays and control devices inclusive of sequence controls where required.

8 Pressure tests between phases and between phases and earth.

9 Primary injection test of all protective relays.

10 Secondary injection test of motor overload devices.

11 Pressure test of all secondary wiring at 2kV for one minute.

12 Polarity tests of current.

Ducting.

Pressure test medium and high pressure ducting in terms of SANS 10173-2003: Code of Practice for the Installation, Testing and Balancing of the Air Conditioning Ductwork.

Water Piping

Pressure test of all piping at a test pressure of 1,5 times the maximum working pressure at the lowest point in the system, but not less than 700 kPa. All instrumentation or other equipment, which could be damaged during the pressure test, shall be removed from the pipe system. The relevant system shall be filled with water and all high points shall be vented at least 24 hours before the test. The duration of the pressure test shall be 24 hours, after which no water leaks shall be visible and no pressure drop shall occur after corrections have been made for changes in ambient temperature during the test period.

Pressure tests shall be completed in sections, which adhere to the schedule as specified in this specification, prior to insulating or covering piping.
If leaks are found, welded connections shall be cut out and rewelded and screwed joints shall be dismantled, cleaned and reconnected. Rectified piping shall be retested.

Pressure Vessels

Refer to the requirements set out in the Occupational Health and Safety Act of 1993.

Refrigerant Piping

Factory charged systems shall first be pressure tested and thereafter be vacuum tested. Field charged systems shall only be pressure tested.
Refrigerant pipes and equipment shall be tested under vacuum at a pressure of 0,68 kPa absolute, maintained for a period of one hour with the vacuum pump uncoupled. Any leaks under these conditions are not acceptable.
Refrigerant pipes and equipment shall be tested in terms of SANS 10147 – 2002: Code of Practice for Refrigeration and Air Conditioning Installations. All connections shall be inspected for leaks by means of a sensitive leak detector and soap bubble test.

COMMISSIONING AND HANDING OVER

PROCEDURE

Physical Completion

After physical completion of the erection phase of the installations, the Engineer will issue a Snags List certifying that commissioning can proceed. Items which would not influence the commissioning process could, at the discretion of the Engineer, be attended to during commissioning stage.

Commissioning Stage

After commissioning the Engineer will issue a second Snags List (the Commissioning Snags List).
Any outstanding work will be recorded on this list.

Engineer's Certificate

After completion of all outstanding items and receipt of all manuals and drawings as recorded on the Commissioning Snags List the Engineer will issue a First Delivery Certificate. This certificate will accompany a certificate of acceptance by the Client's representative.
The one year maintenance and guarantee period will commence on the date of the First Delivery Certificate.

COMMISSIONING

The Commissioning of the entire installation shall be carried out timeously. The workshop drawings, to be produced by the Contractor, are to be perused and approved, in principal, by the Contractor's Commissioning Engineer who is to confirm that the installation as indicated can be commissioned.
The commissioning of the installation shall be in terms of the following codes, or any other code approved by the Engineer:

1	Air Distribution Systems:	SANS 10173 – 2003: Code of Practice for the Installation, Testing and Balancing of Air Conditioning Ductwork.
2	Refrigeration Systems	CIBS: Commissioning Code: Series R: Refrigeration Systems.
3	Control System:	Commissioning Code: Series C: Automatic Controls.
4	Water Distribution Systems:	CIBS: Commissioning Code: Series W: Water Distribution Systems.

The Contractor shall submit the Commissioning program to the Engineer, at least four (4) weeks prior to the commencement of commissioning.
The power connections to the various installed equipment must be energized to facilitate commissioning of the installation.
To enable this switch-on to take place the installation must be substantially complete.

The Contractor shall inform the Engineer within (4) weeks of his appointment, what time allocation has been allowed for commissioning purposes. This must be reflected on the Critical Path Schedule to be submitted by the Contractor.

TRAINING AND MAINTENANCE

The Contractor shall provide a suitably qualified and trained person to train the Employer's staff in the correct operation and maintenance of the installation. The Contractor shall allow for this person to be full time on site as called for in the maintenance contract conditions.

OPERATING AND MAINTENANCE MANUAL

The contractor shall, at his cost, prepare and supply manuals for the successful operation and maintenance of the installation.
Six weeks prior to the commencement of commissioning, the contractor shall supply a draft of the manual to the engineer for approval. Two weeks after commissioning, the contractor shall supply three (3) additional manuals, which have been updated and included all commissioning data and "record" drawings.
These manuals shall contain the following information:
INDEX OF CONTENTS
SECTION 1: SYSTEM DESCRIPTION
A comprehensive description of the installation.
SECTION 2: OPERATING INSTRUCTIONS
2.1 Starting and stopping instructions.
2.2 Prestart checks.
2.3 Equipment running checks.
SECTION 3: MECHANICAL EQUIPMENT
The following information shall be provided in full for each item of equipment:
3.1 General information
Description, Make, Model Number, Name and Address of Supplier, Manufacturer,
3.2 Design information
Design Data Sheet containing all design and selection parameters, calculations, selection curves, etc.
3.3 Settings and values recorded during commissioning.
3.4 Manufacturer's Brochures and Pamphlets.
3.5 Maintenance Data and Schedules
The lapse of time between services and the description of the service required of each part, lubrication requirements, etc.
3.6 Schedule of Spares.
SECTION 4: WORKSHOP AND CONSTRUCTION DRAWINGS
One hard copy of each drawing, as well as all drawings in the appropriate electronic format.

COMPLIANCE WITH REGULATIONS

The entire installation shall be carried out in accordance with the latest revision and amendments of the following:

7 The Code of Practice for the Wiring of Premises issued by the South African Bureau of Standards, SANS 10142-1:2003.

8 The Occupational Health and Safety Act, Act 85 of 1993, including the Construction Regulations of 2003.

9 The municipal by-laws and any special requirements of the supply authorities of the area and district concerned.

10 The local fire-brigade regulations.

11 The applicable SANS specifications, or the BS specifications where no SANS specifications exist.

No claims for extras in respect of failure by the mechanical contractor to comply with any of the above regulations will be considered.

Where conflict exists between any of the above regulations and the specification, the said conflict must be referred to the Engineer in writing for his ruling.
The contractor shall be responsible for serving all notices and paying all fees due in terms of the laws and regulations mentioned.

DESIGN PARAMETERS

The following design parameters shall apply:

Ambient Conditions

Altitude	Approximately 1380 m above sea level
Barometric Pressure	85.8 kPa
Summer DB Temperature	35°C
Summer WB Temperature	20°C
Winter DB Temperature	-7°C
Winter WB Temperature	-2°C

Indoor Conditions

Summer Inside Temperature	DB	22.5°C ± 1°C
Winter Inside Temperature	WB	20.0°C ± 1°C

AVAILABLE SERVICES

Details of available services on site:

Electrical Supply	Volt, Hz
Steam Supply	Pressure
Municipal Water Supply	Pressure

NOISE AND VIBRATION CONTROL

The Contractor shall be responsible for maintaining noise and vibration transmission from his equipment to the building structure and adjacent rooms within the limits suggested in the SANS "Code of Practice for the Rating of Noise for Speech Communication and with the respect to Annoyance, Code Number 10103 - 2004.
In order to attain the noise levels specified, the Contractor shall provide the necessary spring type vibration mountings under all rotating equipment, flexible pump piping connections, etc.
All noise and vibration control equipment must be clearly shown on the Contractor's drawings which are to be submitted for approval.
Noise levels specified above may be amended in the supplementary specification if a specific part of the contract works so requires. This shall not however relieve the Contractor of the responsibility of meeting the requirements of the above clauses as far as the remainder of the contract work is concerned.

The following table is an excerpt from the abovementioned SANS code.

Type of indoor space	**Intruding noise level dB(A), max**
Hospital ward, theatre, church,cinema, concert hall, small office,reading room, conference room,lecture room	25 - 35
Large office, business store,department store, meeting room,small quiet restaurant	35
Large restaurant, secretarial office(with typewriter), gymnasium	45
Large typing halls	55
Workshop (according to intended use)	45 - 75

Noise generating equipment such as fans, compressors, pumps, motors etc. shall be selected to operate as close to the point of maximum efficiency as possible. It is the responsibility of the Tenderer to check operating noise levels of the equipment before tendering. Tenderers offering equipment with low noise ratings may receive preference.
Tenderers are advised to calculate sound levels on the system offered before tendering. Where it is not possible to meet the specified sound levels due to the noise generated by the equipment, or due to inadequacies in the building structure, or the design of the plant, such deficiencies shall be stated in the tender together with the Tenderer's recommendations and cost implications.
The Contractor shall submit noise estimating sheets for all systems as well the insertion loss ratings of sound attenuators for approval before ordering. Failure to do so may result in additional costs to the Contractor if noise levels in any area should exceed the specified limits.
If the noise levels exceed the values specified above, the Contractor shall be responsible to carry out all the necessary rectifications at his own expense.

CODING, LABELLING AND NOTICES

GENERAL

The Contractor shall supply and install all coding, labelling and notices as required under this Clause.
The wording shall be in English.
To reduce the possibility of incorrect labels and/or notices, the Contractor shall submit a schedule of labels and notices to the Engineer for approval. Costs to rectify inscriptions, resulting from the failure by the Contractor to obtain approval, will be for his account.

CODING

General

Codes and numbers for wiring shall be CRITCHLEY IZ-type, or other approved, Cable Marker interlocking endless expanding markers, as supplied by CABLE ACCESSORIES (PTY) LTD. CRITCHLEY C-type, or other approved, Cable Markers shall only be used with the approval of the Engineer where wires and piping have already been terminated.
Lettering shall be marked in black on a white background.

Electrical

Provide and install the following coding:

Numbering of both ends of power and control conductors in switchboards.

Numbering of both ends of field cables.

Numbering of both ends of individual field conductors within cables of control circuits only, where such conductors are not uniquely identified by means of insulation colour codes.

LABELLING

General

Labelling shall be CRITCHLEY UNILABEL, or other approved, Cable Marker, as supplied by CABLE ACCESSORIES, or engraved “IVORENE” or “TRAFOLITE” labels.

Black letters on a white background shall be used.
Labels shall be fixed with screws or acceptably glued to all equipment.

Equipment

All mechanical, electrical and instrumentation equipment shall be identified by means of an equipment code.
Minimum height of letters: 10mm.

NOTICES

Supply and install all notices required in terms of Statutory Regulations.
In terms of the Occupational Health and Safety Act, Act of 1993, the following notices are required:

(C.52) At the entrance to each plantroom, the following notice shall be provided:

Prohibiting unauthorized persons from entering.

Prohibiting unauthorized persons from handling or interfering with electrical apparatus.

Directions as to procedure in case of fire.

Directions as to restoration of persons suffering from the effects of electrical shock.

(C.73) Manufacturer's Plate on Pressure Vessels:

Manufacturer's name.

Country of Origin.

Maker's Number.

Year of Construction.

Maximum permissible working pressure in Pascal.

Capacity in cubic metres

Name and Number of Code of Manufacture.

PAINTING AND MARKING

GENERAL

All steelwork, piping, lagging, etc. supplied under this contract shall be painted as required under this clause:
Exposed portions of boilers, calorifiers, cylinders, etc. in the plant room shall be properly cleaned, primed and painted two coats of heat resistant paint.
All other exposed metal parts such as pumps, belt guards, all piping, pipe lagging, fittings, dampers, fans, coils, motors, pumps, packaged units, control panels, steelwork, exposed ducts and lagging, expansion tanks, make-up tanks, cooling tower, unit shelters, etc. shall be cleaned, primed, undercoated and finished in a high quality gloss paint of approved colour.
All external equipment exposed to the weather must be cleaned, primed and painted with two coats of epoxy paint.
The lagged surface of calorifier, headers and pipes shall be primed, undercoated and finished in a high quality gross of approved colour. Unlagged steam piping shall be painted with heat resistant paint.All plants shall be generally painted as indicated below:

Machinery, Structural steelwork etc		
1	All exposed metal parts, Checker plates, Pipe supports Handrails, Base plates	Black
2	Body portions of machines	Olive Green
3	All machinery external to the building (except piping and valves and fittings)	Dove Grey
4	All moving parts which are visible when operating. In-side surfaces of all machineguards, belt guards etc.	Orange
5	All handles, levers, handwheel centres adjustment knobs, etc.	Yellow

6	All lagging on boilers, calorifiers, tanks, cylinders etc. (except on piping and pump sets and ducting)	Aluminium
7	Electrical distribution boards (except where transparent covers are used) Control panels Indicator panels	Light Grey
8	Water treatment plant(excepton piping). Air Conditioning plant (except on piping).	Light Blue
9	All points which constitute a physical hazard, e.g. (stay-wires, low pipes, access doorways, etc.).	Yellow and Black Cross Hatch
10	Drainage piping	Black

PIPING, PUMPS, VALVES, FITTINGS ETC

The colour code for pipelines and machines is based on the following:

SANS, 10140-3 : Identification colour marking; Contents of Pipelines

BS 1710-1975 : Identification of pipelines

All unlagged black piping, holderbolts, supports anchors fittings, etc. shall be painted in accordance with British Standard Specification No. BS 1710.
In enclosed horizontal or vertical ducts, surfaces, mezzanine spaces and basements where pipelines are already painted or galvanised or are lagged, painting may be restricted to 150 mm long lengths at a maximum spacing of 4 m, and at all branches, tees, valves, and at the entry from such ducts, spaces, etc.
Except where otherwise specified all piping on surfaces shall be painted with a primer, an undercoat and a finishing coat in an approved high quality gloss paint. to the colour indicated in the schedule. This also applies to all holderbolts, supports, anchors, fittings and valves. Where only 150 mm lengths of the pipe are painted the colour and specification of the painting shall be in terms of this clause.
Pump sets, valves, fittings, etc. shall be painted the same basic colour as the pipelines, except those of fire fighting services, which shall be painted red.

Bands

The length of the band shall be same as the final pipe diameter, but not less than 100 mm. Where three strips are required per band, each strip shall be one third of the final pipe diameter but not less than 35 mm. Where 150 mm lengths alone are colour painted, the 50 mm band shall be centrally placed on the 150 mm length.

ARROWS

The direction of flow shall be indicated with a 25 x 100 mm long black arrow at intervals of approximately 4 m and at valves and junctions. Flow lines shall be marked with an F and return lines with an R at each arrow.

SERVICE OUTLETS

Where outlets require identification the colour identification shall take the form of coloured centre pieces on handwheels or cocks, and/or other suitable approved marking on the neck of the outlet fittings as specified. The colour shall primarily be that of the pipe colour and where banding is used, the colour shall be that of the band and stroke.

RADIATORS AND PIPES IN FINISHED AREAS

All radiators, pipes, fittings etc. in finished areas such as wards, offices, passages, etc. shall be cleaned, primed, undercoated and finished in a high gloss paint to match the existing finish.

IDENTIFICATION COLOURS

Basic Pipe Colour	**Banding Colour**

Cold water supply (drinking water)	Brilliant green	Cornflower
Condenser water	Brilliant green	White
Boiler feed water	Brilliant green	Crimson / White
Boiler condensate lines	Brilliant green	Crimson / Emerald Green
Chilled water lines	Brilliant green	White / Emerald Green
Domestic hot water	Brilliant green	Crimson /Cornflower
Fire fighting mains	Signal red	
Central heating hot water	Brilliant green	White / Yellow
Steam	Pastel grey	
Gas (except air and medical gas)	Light stone	
Compressed air	Artic blue	
Ducts and conduits for electric services	Light orange	
Diesel	Golden brown	White
Acids and alkalis	Jacaranda	

IDENTIFICATION COLOUR CODES

Colour name	**Colour classification no**.
Artic blue	F28
Brilliant green	D10
Cornflower	F29
Crimson	A03
Emerald green	A14
Golden Brown	B13
Jacaranda	F18
Light stone	C37
Light orange	B26
Pastel grey	G54
Signal red	A11

COLOUR CODING FOR DUCTWORK

All ducting in plantrooms is to be colour coded according to the schedule below. If the duct is internally lined, then the whole duct surface shall be painted in accordance with the schedule blow. If the duct is externally lined with insulation, then the ducting must be painted with a symbol to the relevant colours. The form of these symbols are to be as follows:

In order to make the colour clearly visible it may be necessary to paint the symbol colour onto a neutral colour background. This background colour is to be agreed upon by the Consulting Engineer.

The colour symbols are to be 150 mm wide band, running around the duct. The background colour is to extend 300 mm on either side of the colour symbol strip.

In the case of conditioned air where the colour symbol is both red and blue, one colour strip is to be used (150 mm wide) but the two colours shall alternate each being 200 mm long.

Duct/Air type	**Colour**	**Colour No.**
Ventilation Air Supply	Blue with Yellow Band	F11 and C61
Exhaust Air	Brown	B07
Reticulated air	Grey	G25

Outside air	Green	P14
Hot deck (on dual duct)	Blue with Red Band	F11 and A14
Cold deck (on dual duct)	Blue with Dark Blue Band	F11 and F02

The colours as defined as above are according to SANS 1017

Error! Not a valid bookmark self-reference.STANDARD AIR CONDITIONING SPECIFICATION

DUCTWORK AND DUCT TESTING

It is important to note that the original project specifications will take preference. This specification is deemed supplementary to the original project specifications, please refer to Addendum A for original project specifications.

General

Unless otherwise specified or noted, ductwork casings and plenum chambers shall be made of galvanized sheet metal.
All ductwork indicated on drawings is schematic. Therefore, changes in duct sizes and/or location must be made where necessary to conform to space conditions without additional cost to the owner. Dimensions given on drawings, including all acoustically lined ducts shall be actual sheet metal sizes.
Galvanized and stainless steel ductwork shall not be fitted with any copper or copper alloy parts unless the junctions between ductwork and such parts are so insulated that electrolytic inter-action is prevented.
Contractors shall ensure that maximum head room is obtained, especially in plantrooms.

Ductwork Classification

All ductwork shall be manufactured and erected according to standards as set down by the **SANS Standard Specification for Air conditioning Ductwork SANS 1238.**
This specification must be read in conjunction with the SANS standard and the section on ductwork, fittings etc. that follows, act as a guide only.
Ducting is to be classified as follows:

Low Pressure:	When the air velocity is less than 10 m/sec the duct system total static pressure is less than 500 Pa.
Medium Pressure:	When the air velocity is less than 10 m/sec and the duct system total static pressure is below 1,5 kPa.
High Pressure:	When the air velocity is higher than 10 m/sec and the duct system total static pressure is between 2,5 kPa and 1,5 kPa.

Schedule of SHEET METAL Thickness for Rectangular Ducts

Low pressure

Longer Side of Duct Cross-Section (mm)	**Sheet Thickness(minimum)**
	Steel (mm)
Up to 400	0,6
401 to 600	0,6
601 to 800	0,8
801 to1000	0,8
1001 to 1600	1,0
1601 to 2000	1,0

Schedule of SHEET METAL Thickness for Circular Ducts

LOW PRESSURE DUCTS

Size (mm)	Nominal Thickness
	Steel (mm)
Up to 300	0,5
301 to 450	0,6
451 to 800	0,8
801 to1000	1,0
1001 to 1200	1,2

Low velocity ducts shall be strongly and rigidly constructed and joints shall be mechanically tight as well as substantially **air-tight**. Sheet metal for slips and drive caps shall be of the same material and thickness as the ducts. The ducts shall **be cross-broken** between joints where necessary to give more rigidity to the ductwork.
All transverse joints, duct stiffening, beading, seams etc. must conform to the SANS standard as laid down.

CONNECTION OF DUCTING

Contractors shall use "MEZ" flanges for rectangular ducting, provided they are installed in strict accordance with the manufacturer's recommendations and that they are completely air-tight. Between the flanges the Contractor is to apply an inseal rubber gasket or any other approved seal.

MEZ type joining clamps shall be installed at 300mm centres.

Flexible Connections

Flexible connections shall be provided in **all connections between fans and ducts or casings** where required to prevent excessive movement or vibration being transmitted through the ducts and where specified elsewhere in this specification or where indicated on a drawing.
All flexible duct connections shall be sized by the Contractor to suit the spigot sizes or outlet sizes of fans, air conditioning units etc. and the length of **the flexible joint shall not exceed 250 mm.**
The material, when fitted, shall be free from folds and shall not be under tension.
Flexible connection material must comply with the SANS standard.
The Contractor is to note however, that no flexible connection material may be joined together with adhesive only, but **must also be neatly stitched**.
The flexible connections shall be earthed using **4mm^2 earth wire** complete with lugs.

Branch Duct and Outlet Spigot Take-offs

Contractors are to make use of the clinch lock detail when securing branch ducts or spigots or collars to main ducts.
As an alternative the branch duct, spigot or collar may be attached to the main duct by means of a turned over flange plus a 1,6 mm galvanized sheet metal flange, sealed and pop-riveted every 150 mm. No other method of fixing will be permitted unless approved by the Consulting Engineer. These methods will be strictly adhered to.
Ceiling diffuser spigots are to be installed where indicated only when there is a false ceiling. When there is no false ceiling the method indicated for branch ducts shall be used. Whatever method is used, the Contractor is to ensure that no fibreglass ends are exposed to the air stream. If he needs to seal off the fibreglass, he shall use linen tape and recommended duct sealer or "Foster Seal" or any other approved sealer.

Air Flow Balance and Test

Air quantity measurements in main and branch ducts shall be performed by pitot tube, traverse of the entire cross sectional area of the duct. Ducts having velocities of 5 or more metres per second shall be measured by inclined manometers (draft gauge) or magnehelic gauges. Openings in ducts for pitot tube insertion shall be sealed with snap-in plugs after air balance is complete. Outlet and inlet air quantities shall be determined by direct reading anemometers in accordance with outlet and inlet manufacturer's recommendation.
Corrected total air quantities shall be obtained by adjustment of fan speeds. Branch duct air quantities shall be adjusted by volume dampers where called for in the supplementary specification. **Dampers shall be permanently marked** after air balancing has been completed so that they can be returned to

their correct position if disturbed at any time. All dampers are to be clearly marked to indicate their open and closed positions.
Volume adjusters may be used to balance air quantities at outlets and inlets provided that final adjustments do not produce sound levels in excess or heretofore specified limits, or objectional drafts.
NB: Air quantity adjustments by outlets, deflectors, grids or air scoops will not be permitted.
All flow systems shall be adjusted and balanced so that air quantities at outlets are as specified and the distribution from supply outlets do not cause drafts and the airflow is uniform over the face of each outlet.
Total diffuser volume for low pressure duct systems, measured by means of an anemometer, shall be at least 95% of actual fan supply (measured by means of a duct traverse taken with a pitot tube and water manometer).

Under ceiling SPLIT TYPE ROOM AIR CONDITIONING UNITS

It is important to note that the original project specifications will take preference. This specification is deemed supplementary to the original project specifications, please refer to Addendum A for original project specifications.

GENERAL

Mid-wall heat pump split type unit shall be supplied and installed in the position shown on the drawing and shall be of the heat pump inverter type.
The contractor is to note that the indoor unit shall be mounted in terms of the suppliers' recommendations.

Schedule of Minimum Requirements

Fan Coil Unit No.	Total Cooling Load (kW)	Heating Load (kW) at -2^{0}Cdb
UC 1	7	5

The load capacities are corrected capacities for ambient conditions as stated in the Standard Specification.
The units shall be of the Mitsubishi Inverter type or other equal approved by the Consulting Engineer.

The units offered will have the following safeties and functions:

Operation in cooling	10°C to 46°C db
Operation in heating	-15°C to 20°C db
Auto fan speed	Yes
Automatic defrost	Yes
Air purifier filter	Yes
Anti mould filter	Yes
Auto restart	Yes
Self-diagnosis	Yes
Service function in wired remote	No
Filter indicator	Yes
Outside air thermistor	Yes
Condenser thermistor	Yes
Discharge thermistor	Yes
Anti-frost thermistor	Yes
Compressor over-current thermistor	Yes
Compressor over-heat thermistor	Yes
Return air thermistor	Yes
Heat Recovery	Yes

The indoor unit shall conform to the following specification:

The unit shall discharge the air **horizontally.**

The unit shall be equipped with a direct coupled silent running centrifugal fan equipped with a two or three speed motor. The switching and setting of the fan speed shall be accomplished from a remote fan switch which is to be installed below the unit, **1500 mm** from floor level, in a position indicated by the Consulting Engineer.

The unit shall be equipped with a condensate drain pan and the condensate must be drained to each drain point indicated on the drawing through a **minimum 20 mm uPVC Class 6 pipe**, i.e. to the gullies on the ground floor.

The temperature controls shall be accommodated in the remote fan switch housing and shall consist of a temperature adjustment facility and temperature scale. The unit shall be equipped with a time delay safety circuit which shall delay the restart of the compressor for approximately 3 minutes even if the air conditioner is manually restarted too quickly. The wiring to the remote controls from the unit shall be chased into the walls.

The outdoor unit shall conform to the following specification:

The unit shall be mounted against the outside walls at high level using standard galvanized “O”-line brackets or unistrut, the bracket forms part of this contract or on a 50mm high concrete plinth on the roof slab, whichever is applicable. The plinth also forms part of this contract.

The unit shall accommodate the refrigerant compressor, the condenser fan and air cooled condenser coil. The compressor shall be installed on anti-vibration mountings as provided by the manufacturer.

The condenser coil shall be protected against damage by a removable wire mesh screen.

PIPING

The system must be charged with **R 401 A** refrigerant.

The indoor and outdoor unit must be interconnected with copper refrigerant piping in terms of the suppliers' recommendation. The tenderer is to note the distances between the indoor and outdoor units and the relevant pipe sizes have been indicated on the drawing. The return of oil to the compressor is to be ensured by the installation of traps at regular intervals.

All piping through walls shall pass through sleeves which shall be **properly sealed** after installation. Insulation through sleeves shall be continuous.

All surface mounted piping shall be installed in suitably sized rectangular P2000 or P8000 galvanised "Unistrut", complete with removable cover plate, securely fixed to the walls. **All exposed trunking shall be painted**. The colour shall be finalised at a later date.

All piping and cabling above ceilings shall be installed on factory manufactured **galvanised steel cable tray or medium duty wire mesh cable tray**, hung from the roof trusses or slab.

All refrigerant, liquid and suction, shall be separately insulated with 15 mm thick **armaflex** insulation.

Insulation exposed to weather conditions shall be covered with cloth and be painted with "Foster seal".

Insulation exposed to weather conditions shall be covered with cloth and be painted with "Foster seal".

All refrigerant piping shall be seamless cold drawn copper piping.

Oil traps shall be installed in the piping where condensers are installed above the indoor units.

ELECTRICAL INSTALLATION

A 230 V electrical weatherproof isolator shall be provided within one metre of the outdoor unit in the position shown on the drawing. The electrical connection between the isolator and the air conditioner as well as all interconnecting wiring between indoor and outdoor unit forms part of this specification.

The onus lies with the air conditioning contractor to ensure what location and detail of the electrical power point that has been provided and to include in this tender price for any adjustments, fittings etc., that may be additionally required.

OPERATION AND CONTROLS

The unit shall be provided with an **adjustable remote controller** as supplied by the manufacturer of the air conditioning unit in order to control the room temperature. The sensing element shall be located in the controller housing or in the air handling unit of the air conditioner.
The system shall be equipped with automatic anti freeze-up protection to prevent icing up of the condensing coil in winter.

DRAINS

The contractor shall install and connect **uPVC Class 6** drain pipes to the drip trays and extend them to the gullies to ground level. **The first 3m shall be insulated with armaflex**.

Water chiller – screw

It is important to note that the original project specifications will take preference. This specification is deemed supplementary to the original project specifications, please refer to Addendum A for original project specifications.

Compressor and Motor

The compressor shall be of the helical rotary screw type. Compressor shall be semi-hermetic, field rebuildable and shall utilise horizontal rotors. All the rotating parts shall be statically and dynamically balanced.
The chiller shall be able to unload to 25% of design capacity. Tenderers shall fully indicate in their tender any requirements to achieve this condition and shall allow for anything necessary to meet this requirement.
The motor shall be either suction or liquid refrigerant cooled and shall be suitable for operating on a 400 V 50 Hz supply. Motors shall have adequate thermal protection in the motor windings, one per phase, to protect against high motor temperature or overloading.
The impellers shall be fully shrouded and made of a high strength aluminium alloy. Impellers shall be statically and dynamically balanced and over-speed tested at 1.25 times impeller shaft speed. Rotors shall be of high grade steel alloy.
The compressor shall be equipped with an oil heater and a crankcase heater to evaporate refrigerant returning to the crankcase during shut down.
Every compressor shall be equipped with electronically thermistor protection on the motor, an oil pump, a sight glass and an internal safety valve.
Every compressor shall be equipped with a shut-off valve on both the suction and hot gas connections and each compressor shall be mounted on anti-vibration mountings on a base frame.
The compressor shall be equipped with an oil lubrication system with oil charging valve and oil filter to ensure adequate lubrication during starting, stopping and normal operation.
The compressor be equipped with automatic capacity reduction equipment consisting of capacity control slide valve.
Compressors shall start unloaded.

Evaporator and Condenser

The evaporator and condenser shall be built in accordance with ANSI/ASHRAE 15- Safety Code for Mechanical Refrigeration. Water boxes shall be designed for 1050 kPa maximum working pressure (gauge) and shall be flanged and gasketed for easy removal and access to the tubes. The water boxes shall have grooved type water connections for easy field chilled water and condenser water connections.
Evaporator and Condenser tubes shall be internally enhanced and externally finned to achieve maximum efficiency. The nominal tube wall thickness shall be 0,70mm for both evaporator and condenser tubes.
Expansion valves shall be of the electronic type. Adjustable or float type refrigerant metering devices and thermal expansion valves (TXV) shall only be accepted if it will be inspected and adjusted by the manufacturer annually for the first five years of operation to assure equivalent reliability to an electronic

expansion valve (EXV) system. A written report shall be forwarded to the owner each year over the first five years to confirm completion of calibration.
Units with multi-stage compressors shall incorporate an interstage flash vessel economizer in the refrigerant cycle.
Factory insulation will be 20mm foam insulation and cover all low temperature surfaces to include the evaporator and water boxes, suction line, and motor housing.
Units shall have the capability of storing the entire refrigerant charge in the condenser or shall have a pump-out system for each machine complete with a separate transfer pump, condensing unit and tank constructed in accordance with ASME Code for unfired pressure vessels bearing the National Board stamp. Pumpout systems shall be supplied and warranted by the chiller manufacturer. Pump-outs shall comply with the following:
Pump-out tank(s) with ASME stamp capable of holding refrigerant charge when 80 percent full at 32°C.
Separate charging connections for liquid and gas refrigerant.
Piping and valves between pumpout and chiller to be supplied and installed by installing contractor. Contractor shall provide all piping, electrical equipment, and wiring required. Refrigerant piping shall be Type K hard-drawn copper with wrought copper fittings. Valves shall be packless type suitable for refrigerant use.

Refrigerant circuit

Each refrigerant circuit shall be provided with the following:
Liquid line and discharge shutoff valves.
Filter dryer (replaceable core type).
Liquid line sight glass and moisture indicator.
Electronic or thermal expansion valve sized for maximum operating pressure.
Charging valve.
Discharge and oil line check valves.
Compressor suction and discharge service valves.
High side pressure relief valve.
Full operating charge of HFC 134a and oil.
Unit factory leak tested at 1400 kPa.
Liquid line solenoid valve if the expansion valve does not close automatically on loss of power.
Capacity Modulation: Provide capacity modulation by either slide valve or unloader valves. Unit shall be capable of operation down to 25% of the full load work.

Controls

The chiller(s) shall be controlled by a stand-alone direct digital control (DDC) system. A dedicated chiller control panel with a clear language display is to be supplied with each chiller by the chiller manufacturer. The controller shall provide chiller capacity control in response to the leaving chilled water temperature. The chiller control panel shall utilize an Adaptive Control Microprocessor which will automatically take action to prevent unit shutdown due to abnormal operating conditions associated with: evaporator refrigerant temperature, high condensing pressure and motor current overload.
In all of the above cases, the chiller will continue to run, in an unloaded state, and will continue to produce some chilled water in an attempt to meet the cooling load. However, if the chiller reaches the trip-out limits, the chiller controls will take the chiller off line for protection, and a manual reset is required. Once the "near trip" condition is corrected, the chiller will return to normal operation and can then produce full load cooling.
The chiller control panel shall provide control of chiller operation and monitoring of chiller sensors, actuators, relays, and switches. The panel shall be a complete system for stand-alone chiller control and include controls to safely and efficiently operate the chiller.
The chiller control panel is to be provided with the following digital type pressure readouts:
Evaporator refrigerant pressure
Condenser refrigerant pressure
The front of the chiller control panel shall be capable of displaying the following in clear language as standard:
Entering and leaving evaporator water temperature
Entering and leaving condenser water temperature
Chilled water set point

Electrical 3 phase current limit and percent RLA set point
Electrical 3-phase amp draw
Chiller operating mode
Condenser refrigerant temperature
Elapsed time and number-of-starts counter
Chiller compressor run status relay
Diagnostics with time and date stamp
Last 20 diagnostics with time and date stamp
External chilled water set point input 2-10VDC/4-20mA
External current limit set point input 2-10VDC/4-20mA
Voltage readout
Percent RLA output 2-10VDC
The chiller control panel shall provide an alarm relay output that shall energize whenever a fault requiring manual reset is detected by the panel.

The chiller control panel shall provide a limit relay output that shall energize whenever the unit is operating in a limit mode (for extended time periods).
The chiller control panel shall provide a programmable soft load to prevent the chiller from achieving full capacity during the pull down period by imposing a ramped current limit, or a temperature pull down rate. Either can be adjusted to limit how fast the chiller can load after an initial startup.
The chiller control panel shall provide a chilled water pump output relay that closes when the chiller is given a signal to start.
The chiller control panel shall provide control of leaving chilled water set point with a minimum variation of chiller capacity.
The chiller control panel shall provide an RS-232 for printer interface to a printer.
The chiller control panel shall provide input for leaving chilled water temperature set point based upon a 4-20Ma or 0-10 VDC signal from a building automation system.
Each chiller shall be equipped with an interfacing electronic module with which the following functions can be communicated with the presently installed BMS system:
Chilled- and condenser water inlet and outlet temperatures.
Absorbed motor amps.
Fault diagnostics.
Run/stop starter indication.

Starters

The motor starter shall be a Star-delta closed transition. Motor starter shall have NEMA 1 gasketed enclosure. Enclosure shall be constructed of 12 gauge steel minimum with the exception of doors, which shall be 14 gauge steel minimum.
Starter shall be unit mounted with ventilating louvers.
Motor starters shall include incoming line provisions for the number and size cables shown on the drawings. Incoming line lugs shall be aluminum mechanical type. Connection directly to the contactors is not permissible.
Contactors shall be sized properly to the chiller full load and locked rotor currents. Contactors shall have double break main contacts with weld resistant silver cadmium faces. Auxiliary interlocks that interface with the control panel shall be low resistance having palladium silver contacts.
Each motor starter shall include a control power transformer with fused primary and secondary. Current transformers of the proper size, ratio and burden capacity shall be provided to provide a signal to the control panel and optional devices. Control relays shall be provided within the motor starter to interface with the control panel.
Power wiring within the starter shall be type MTW copper stranded 90 degree C. Power wire bends shall show no evidence of nicking or insulation degradation. Control wire shall be type MTW copper stranded 90 degree C 14 gauge minimum.
Starter shall include an advanced motor protection system incorporating electronic three phase overloads and current transformers. This electronic motor protection system shall monitor and protect against the following conditions:
Three phase overload protection
Overload protection during start-up

Phase imbalance
Phase loss
(Phase reversal
Low voltage
Distribution fault protection consisting of three-phase, current sensing devices that monitor the status of the current. Distribution faults of 1-1/2 electrical cycle duration's shall be detected and the compressor motor shall be disconnected within six electrical cycles.
(nder/over voltage protection.
Alternately the advanced motor protection system can be furnished in the chiller control panel.
The starter/control shall be designed and able to operate in temperatures up to 50 C.
All field supplied wires, bus bars, and fittings shall be copper only.
The following optional starter options shall be provided:
Circuit Breaker - Starter shall contain a circuit breaker capable of breaking currents up to its interruption capacity. The disconnect handles, both internal and external, shall be capable of being padlocked in the off position.
Amps and volts shall be displayed at the control panel or ammeters and voltmeters provided. Three ammeters shall be provided, one per phase. Ammeters shall be calibrated to indicate the inrush current. Three voltmeters shall be provided, each reading a phase-to-phase voltage.
If solid state starter is provided a Shunt-Trip Circuit Breaker shall be provided. Starter shall contain circuit breaker with shunt trip device capable of breaking currents up to its interruption capacity. Operating handle shall be located on the starter panel. The disconnect handles, both internal and external, shall be capable of being padlocked in the off position.

Water piping and fittings

General

The drawings are generally diagrammatic and indicative of work to be done. The runs and arrangements of piping shall be as indicated, subject to modifications as required to suit conditions at the building, to avoid interference with work of other services and for proper convenient and accessible location of all parts of the piping system. All required offsets, fittings, valves, traps, drains, etc. may not be indicated but allowance must be made in tenders for all such necessary items to be furnished.
Piping shall be installed as straight and direct as possible, neatly spaced and in general forming right angles with, or parallel to walls or other piping.
Piping shall be installed so that there is a clearance of at least 25 mm between the finished coverings of piping and adjoining structures. Piping shall be hung at or in the ceilings from the construction above and as close as possible to the soffits of slabs, beams etc. maintaining maximum head room at all times.
All piping shall be run so to avoid passing through ductwork, recessed light fixtures or interference with electric light outlets.
Sleeves shall be provided by the successful tenderer where piping passes through partitions, slabs, etc. Sleeves shall be flush with each side of the surface penetrated. Insulation shall be continuous through sleeves.
All piping shall be reamed after cutting. Connections with valves necessary for complete drainage of the piping system shall be provided at all low in the piping systems.
During construction all open ends of pipes shall be temporarily closed with sheet metal caps to prevent debris from entering the system.
To facilitate maintenance, repair or replacement, unions (screwed or flanged as required) shall be furnished for all apparatus requiring disconnection for repairs. Shut off valves shall be installed where indicated and at the inlet and outlet of individual items of equipment to permit removal, without interfering with the rest of the system.
Piping shall be arranged for maximum accessibility for maintenance and repair and valves shall be located for easy access and operation.
Provision shall be made in the tender for testing of welds as directed by the Engineer. A number of joints may be required to be cut out for examination purposes. After removal of these joints, the piping shall be made good by the Contractor. Should any of the welds prove unsatisfactory, the Contractor will be called upon, at his own expense, to have all welds X-rayed and examined by an approved authority. On completion of the test, the Contractor shall submit test and inspection reports before the installation will be accepted.

Specification of Piping

All water piping on closed piping systems shall be medium class steel pipe in accordance with SANS 62 : 2003 - Part 1 and pipe fittings shall be medium class in accordance with Part II.
All water piping shall on open piping systems only be galvanized medium class and shall be in accordance with SANS 62 and be galvanized inside and outside according to SANS 32 : 1997. Screw threads on galvanized water pipes shall be cut before galvanizing and no welding will be allowed on galvanized pipe. All welded pipe sections shall be flanged and individual sections shall be hot dipped galvanized after welding.
Water pipes sizes up to 40 mm shall be screwed, over 40 mm shall be flanged on every 12 m length of pipe.

Assembly of Pipe work

Welded connections shall be of the best quality and shall comply with BS 2971-1961: Class 11 – "Metal Arc welding of steel pipelines or other pipe assemblies for carrying fluid".
All flanges shall be in accordance with SANS 1123 : 2003 or BS 4504 Part 1 (one) and shall be plain faced and welded to the pipes. Flanged joints shall be made with thin metallic corrugated joint rings and jointing paste. Welding sockets shall be used for all welded pipe connections. **All bolts on flanges must be accompanied by washers on both sides of the flange.**
The length of bolts shall suit the flange thickness and only between 2 and 3 threads shall be visible behind the nut, with the nut fixed and torqued.

Air vents

All vents, manual or automatic shall be piped to a common collection point and shall enter into a sheet-metal funnel. The funnel shall then be piped with a galvanized pipe to the nearest drain. In the case of manual air vents a shut off valve shall be installed in the pipe leading to the funnel at a height of not more than 1800 mm from the floor.
Manual air vents shall be provided generally to vent all systems during filling and normal operation. Automatic air vents shall be used at all points in the systems, where air will accumulate continuously.

Expansion joints

Bellows-type expansion joints, together with the necessary pipe guides and clamps, shall be supplied and installed where it is considered that the normal pipe direction changes will not be sufficiently flexible to take up the expansion and contraction of the pipe.
The Contractor shall ensure that the pipe-supports will permit movement as may be necessary to take up expansion.

Pipe hangers

Pipe hangers, supports and brackets shall be installed at the following maximum centres:

Pipe Bore	Maximum Distance Between Supports
Up to 25mm	1,5m
32mm to 50mm	2,1m
65mm to 80mm	3m
88mm to 150mm	3,5m
151mm to 300mm	4,0m
Above 300mm	4,8m

Pipe insulation shall run full size through hangers and supports and shall be replaced with a suitable hard insulation material such as wood, where clamped in hangers or supports. This hard insulation material is to be approved by the Consulting Engineer before installation.
Pipe anchors shall be lined with the insertion rubber or felt and shall be clamped solid to the pipe, the anchor and pipe shall be insulated together.
Particular care shall be exercised during and after installation to ensure that no stress is imposed on any equipment or joints.

Drains

It shall be the responsibility of the Contractor to include for all drain piping from apparatus on which condensate will form or drip to the indicated drain points. In no instance shall drain piping be less than 20 mm in diameter unless otherwise agreed upon between the Consulting Engineer and Contractor.
The Contractor is to install unions in drain piping for the purpose of pipe cleaning.
Drain points will be provided by others where shown on the drawings. If additional drains are required, the Contractor shall indicate in his tender, the number and location of any additional drain points. This will be provided by others, to suit the requirements.

Valves

Check Valves
Check valves shall be of the swing or lift type with seats of neoprene, gunmetal or stainless steel, discs of bronze or stainless steel and bronze or cast iron bodies. Valves with metal to metal contact shall be provided with replaceable O-rings.
Isolating valves on piping systems 65mm and smaller
Ball cocks shall be used as general purpose isolating valves on all pipelines up to and including 65 mm in diameter. Ball cocks shall be of the full way type manufactured from brass and equipped with plastic coated mild steel lever handle with screwed connections to SANS 1056 : 2000 – Part 3 and pressure tested to 2000 kPa.
Isolating valves on piping systems 80mm and larger
Isolating valves on pipe sizes above 65 mm in diameter shall be butterfly valves.
The valves shall conform to BS 5155 PN 16 and to American Standards MSS SP 67 and API 609. The valves shall be designed to fit between flanges drilled to the BS10 Table D.
The valve body shall be cast iron BS1452 grade 220. The liner shall be high nitrile rubber moulded to the valve body to form a resilient seal. The liner shall be lapped over into the body recess to provide a self-sealing joint with mating pipe flanges.
The disk shall be manufactured from spheroidal graphite iron to SANS 936/937 – 1969 grade SG42 with a nylon coating.
The shaft shall be Grade 431 stainless steel to BS970.
The primary and secondary shaft seals shall be integral with the body liner. The replaceable tertiary O-rings shall be shaft mounted.
The valve shall be manually operated and closed using a trigger lever which will incorporate a spring loaded trigger enabling the disk to be set in a number of intermediate positions from fully opened to fully closed.
The valve shall be finished in a protective red oxide primer followed by a green protective coating.
Balancing Valves
Balancing valves shall be fitted where necessary whether specified or not and shall be manufactured from cast iron and bronze with stainless steel moving parts.
Balancing valves up to 65mm diameter shall have screwed connections. Larger valves shall have flanged connections. All valves shall be supplied with pressure tappings for pressure drop measurements.
The functions of the balancing valves are for balancing the water flow and for use as shut-off valves. Balancing valves shall be of the type STA-T valves as manufactured by TOUR-ARGENTURER of Sweden or other equal approved type for sizes up to 65mm diameter. Type STH and STHT shall be used for the larger sizes.

Measuring ports

Instrumentation for the measuring of water pressure and water temperature shall consist of a system of measuring ports with a matching portable thermometer and pressure gauge. The measuring ports shall be of the self-sealing “Super Seal P/T Port” or any other approved type measuring port. The positions of the measuring ports are shown on the drawings. The length of the measuring port shall be determined by the thickness of the pipe insulation. The pressure gauge shall be a 90mm circular type calibrated in kPa from 0 to 1100 and shall be equipped with a feeler bulb that can penetrate through the measuring point into the water.
The thermometer shall be an electronic digital thermometer of the major MT600 type calibrated in °C with a measuring range of –10°C to +100°C. The thermometer shall be equipped with a probe that can penetrate into the water. The pressure gauge and thermometer shall be handed over to the Engineer at date of hand over.

The price in the bill must include for the supply and installation of the measuring port, as well as for the supply and installation of a suitable socket in the pipe in which the measuring port can be accommodated.

Strainers

Strainers shall be of the pot or Y-type. Strainers up to 40mm dia. shall be supplied with a union connection and larger strainers shall be equipped with flange connections. The sleeves shall be manufactured of bronze or cast iron and shall be suitable to work at a pressure of 1200 kPa. The covers shall be manufactured from bronze or stainless steel.

Flow switches

Flow switches shall be of the Johnson Penn Series F61 or other equal approved type which shall be mounted in a socket welded onto the pipe. The flow switch shall be suitable to operate in water between the temperature of 2 – 50°C and up to a pressure of 1000 kPa. The part of the flow switch which is in contact with the water shall be manufactured from bronze or stainless steel. The switch must switch a 220 volt signal and must be adjustable. The electrical equipment must be housed in a watertight compartment.

Rubber flexible pipe connectors

Rubber flexible pipe connectors on pumps inlet and outlet connections shall be of the RFE type, supplied by Vibration Mounting Inc. or other equal approved. The main purpose of this equipment is to absorb the mechanical vibration between the piping and the mechanical equipment. Each connector shall consist of 2 flanges with a butyle reinforced pipe clamped between the flanges. The connectors must have the same diameter as the adjoining pipe work and must be able to withstand pressures up to 1000 kPa.

Pipe Testing and Commissioning Procedure

Apart from other tests that may be required to prove proper system operation, the following tests shall be done:
All pipes to be filled with water.
It shall be the Contractor's responsibility to ensure that all piping is internally absolutely clean before being put into commission.
Drain system.
Clean strainers.
Fill system again removing all air and pressure test to 700 kPa or 1.5 times the operating pressure, whichever is the highest. This pressure is to be maintained for at least 24 hours. All gauges and other equipment with pressure limits are to be disconnected for protection.
Check pump performance by closing discharge valve and reading pressure on gauge. Then open valve and read pressure again. Two points are not obtained on pump curve.
Once satisfactory, proceed to set individual control valves by using a manometer or through water temperature measurement.

Refrigerant piping

Refrigerant tubing shall generally be in accordance with SANS 1453 : 1988: Copper tubes for medical gas and vacuum services with preferred sizes in accordance with SANS : 460 Class 2 and shall be de-oxidised and dehydrated.
The tubing shall be seamless cold drawn copper tubing with soldered copper capillary fittings.
Pipe line joints shall be silver soldered with any approved hard solder. All soldered joints, on factory supplied equipment, shall be carefully checked before commissioning and remade if found damaged in transit. Silver solders shall be in accordance with SANS 24 : 1994.
Piping shall be supported as follows:

Pipe Size mm	Max. distance between supports in metres
28 - 35	2,0
42	2,5
54	2,75

Refrigerant piping shall be arranged so that normal inspection and servicing of the compressor and other equipment is not hindered. Locations where copper tubing will be exposed to mechanical damage shall be avoided.
Compressor and other equipment is not hindered. Locations where copper tubing will be exposed to mechanical damage shall be avoided.
Hangers and supports where piping penetrates through walls shall be designed to prevent transmission of vibration to the building.
The liquid piping from the condenser to the chiller shall allow free drainage of the liquid. A refrigerant charging connection shall be provided in the liquid line. Before charging the system with refrigerant the circuit shall be leak tested and dehydrated.
Solenoid valves shall be normally opened to continue operation of the system in case of solenoid coil failure.
All pipes, vessels, etc. operating below ambient dew point shall be insulated and a vapour barrier provided.
An isolating valve shall be installed in the liquid line where connected to the chiller.
Where these pipes are run in areas exposed to sunlight or mechanical damage, they shall be installed inside suitable galvanised mild steel or PVC trunking or other approved method of covering.
When completed the installation shall ensure a complete vapour barrier and any signs of sweating or dripping shall cause the installation to be rejected.

Filling of the system

The chilled water as well as condenser water systems shall be filled with a mixture of water and chemicals. The chemicals used shall be Nalprep III chemicals obtainable from Messrs Nalco Chem Serve. The water shall then be circulated for a period of 36 hours with all the valves fully open and all pumps in operation. After proper circulation, the water shall be drained from the system as much as practically possible. The contractor shall, if need be, provide additional temporary drainage points in the piping system to wash the chemicals and water out as quickly as possible. Re-fill system again with clean water and circulate for 24 hours. After circulation, the system shall be drained completely.
Re-load the system with water and add a chemical called Nalcool 2000 to thesystem.
The ratio of chemicals to water shall be as follows:
Nalprep III : 3kg/m^3 of water
Nalcool : 30 kg/m^3 of water
Both the chilled water and condenser water systems shall be treated this way.
Chemical cleaning shall only apply to the new re-installed chilled water system and shall be done prior to reconnection of this system into the existing system. The contractor shall supply temporary loop into the new chilled water reticulation system to accomplish the above.

Pressure Testing of Pipework

The contractor shall perform a pressure test on the entire chilled water system for investigation into the tightness of the system. The test shall be performed on
different sections of the pipework and during the tests all joints shall be exposed. The system shall be filled with water after initial cleaning with Nalprep III and all pumps shall be switched on. During this time all air shall be removed from the system.
The circulating pumps shall be switched off and the system shall be connected to a piston type hand operated pump with pressure gauge and non-return valve.
The water pressure inside the piping system shall be raised to 500 kPa and shall be left for 12 hours. Afterwards all the joints shall be inspected and signed off by the Engineer.
If any leaks are found, the leak shall have to be repaired and test shall have to be redone, until the piping system is certified leak free.

Water piping insulation and cladding

The Contractor shall supply and install insulation to the entire chilled water, hot water, steam and steam condensate distributing piping and valve bodies.
Supports of insulated piping shall be lined with suitably hard insulation, such as wooden blocks, of same thickness as the general insulation material. Pipe insulation shall extend up to the wooden blocks, but the vapour seal shall extend over the blocks.
All piping, pipe fittings etc. shall be thoroughly cleaned from rust, oil grease etc. before any insulation material is applied.

All piping , pipe fittings etc. shall be thoroughly cleaned from rust, oil grease etc. before any insulation material is applied and shall be done as follows:
The pipes are to be sandblasted to remove all scale.
The pipes are to be cleaned inside and out from all grit.
The pipes are painted with two coats ACP28 primer.
The pipes are then painted with 2-3 coats of Dulux heavy duty enamel TRACTOR PAINT.
After cleaning, the pipes, pipe fittings, etc. shall be covered with one layer of "Flintcote" or similar type paint before the insulation is applied. In the case of steam, red roof paint shall be used.
No pipe insulation shall be applied unless the piping system has been pressure tested to the satisfaction of the Consulting Engineer.
The insulation material used shall conform to the following specification:
It shall be preformed to fit the relevant pipe size.
It shall be manufactured from resin bonded glass fibre or mineral wool and shall have a density of not less than 60 kg/m^3.
It shall be suitable to be applied to systems with a temperature range from –10°C to +300°C.
It shall have a thermal conductivity coefficient of not more than 0,08 watt/m°C.
All pipe insulation sections shall be of the snap-on type and shall be covered with canvas.
Insulation materials shall be completely incombustible regardless of the operating temperature. The insulation material shall carry a NBR1 classification class A (BS 476) for the Propagation of Flame Spread and the smoke contribution in fire shall be nil.
The insulation material shall be applied, treated and painted as follows:
All insulation sections shall be clamped onto piping, using special aluminium or galvanised steel bands. Bands shall be spaced at not more than 300 mm centres. The canvas shall be wrapped around the insulation section and the overlap ends shall be glued. Insulation ends shall also be covered with canvas to prevent deterioration.
All insulation sections, on chilled water pipes only, must then be vapour proofed with two layers of "Decadex sealer", "Foster seal" or resin or approved type of vapour proofing.
Concealed chilled water piping and pipe fittings shall be vapour sealed over the insulation as specified above without any further cladding.
In addition to the above all pipe insulation exposed e.g. in plantrooms and below ceilings and in all insulation which will be subjected to outside weather conditions must be covered with galvanised sheet metal cladding of 0,7 mm thickness. The cladding must be secured with 15 mm wide, 0.4 mm thick GI bands at 300 mm centres, applied with strapping machine or pop-riveted.
The cladding is to be installed only after the vapour barrier has been completed on the pipe work and fittings where applicable. Before the cladding is installed, the Contractor shall notify the Engineer so that inspections can be carried out.
All clad and unclad pipe insulation shall be painted in accordance with the Standard Mechanical Specification, except on piping which is installed in shafts and concealed areas, which shall only be colour banded.
Pipe bends shall not be insulated as described above. These are to be covered with a layer of fibre-glass around which wire mesh is secured. This is then to be plastered to a smooth finish with asbestos plaster mixed with 20% building cement to act as a hardening agent. The vapour barrier is to extend around such bends and be continuous.
Hot water and steam piping and fittings shall be insulated as above but without a vapour barrier. The insulation joints of concealed hot water piping and fittings shall be covered with a 50 mm canvas, sealed down with suitable adhesive.
Insulation thickness shall be as follows:

Pipe Size (mm)	Insulation Thickness
12 – 80	25mm
Above 80	38mm

Steam and Condensate Pipes	Insulation Thickness
Pipe Size (mm)	
12 - 80	38mm
Above 80	50mm

Note: Visual direction arrows (at maximum 2 metre intervals) indicating water flow must be neatly painted using a stencil, onto the final coat of paint on the insulation or piping whichever is applicable. This must be done in plantrooms, tunnels, shafts and ceiling voids.

ELECTRICAL WORK IN AIR CONDITIONING PROJECTS

It is important to note that the original project specifications will take preference. This specification is deemed supplementary to the original project specifications, please refer to Addendum A for original project specifications.

POWER SUPPLY

A three phase, 50 hertz electrical supply will be provided by others at the points shown on the drawings. The supply will terminate in a bare ended cable. This tender shall include for all other cabling, conduits, cable racks, trays, switchgear, panels, distribution boards, etc., necessary for the satisfactory operation of every part of the installation as well as for the connection of the supply cable into this panel. Three-pin socket outlets will be provided for 220 volt equipment where necessary.

LOW VOLTAGE DISTRIBUTION BOARDS

General

This specification provides for the design, manufacture, delivery, installation, testing and commissioning of low and medium-voltage distribution boards for voltages up to 660V AC and 500V DC.
Low voltage distribution boards, switchboards and control panels shall be provided and installed as indicated on the drawings and as specified in the specification and schedules.
As it is not intended to penalise a *Sub-Contractor* on account of distribution boards offered, it is essential that the costs of all distribution boards be indicated in the Schedules in order to facilitate the determination of costs of alternatives.
The *Sub-Contractor* shall note the dimensions of the rooms or openings in which the panels will be mounted and also the dimensions of the access routes and doors. Panels shall be so constructed that they may be taken through the doors after doors have been placed in position.
The *Sub-Contractor* shall level, fix all distribution boards to the satisfaction of the *Engineer*.
The *Sub-Contractor* shall note sizes and positions of cable trenches and vertical shafts and shall include in his tender all supporting steel work to straddle trenches and vertical shafts to support distribution boards securely.

Standards and Protection

Equipment shall be in accordance with the applicable SANS specifications and Codes and with this Specification.
Selection of materials, finishes, equipment, etc shall also be based on the conditions where the boards and equipment are to the installed, e.g. corrosive, hot, wet, damp, dusty, etc.
Boards, equipment and materials which are exposed to sunlight shall be coated with a UV resistant surface finish.

Construction and Finishes

General

The type of board (i.e. flush, surface, floorstanding) and position is described in detail in the drawings and/or in the Schedules of Particulars.
Boards shall be constructed as indicated on the relevant general arrangement drawings, if applicable.
All boards shall be installed at the specified height, with the top edge of the tray not exceeding 2000mm above finished floor level.
Lifting eyes shall be provided on large boards and shall be manufactured in modular sections so that they may be easily transported and then assembled in position on site.
Cables and conduit entry to be as indicated on drawings or as required by their locations.
Glanding and terminating cubicles and busbar chambers are to have screwed or bolted covers. Quick release covers will not be acceptable.
The gauge of the metal shall be suitable for the size of board and construction employed. Suitable bracing shall be employed to ensure adequate stiffness of panels, etc.

Barriers running the full height and depth of each board shall be provided between adjacent panels.

Gland Plates for Cables

A suitable gland plate shall be provided in the cable glanding compartment of each tier of the board.
Gland plates shall be bolted down in sections not wider than 600mm and have a minimum thickness of 3mm. Any gland plate shall be removable without interfering with the adjoining gland plates.
Gland plates shall be a minimum of 400mm from cable terminals.
Where cable gland plates are drilled or punched on site for cable entry, the gland plates shall be straightened if deformed during these operations.
Gland plates must be positioned to suit cable entry and termination.
A cabling through or duct shall be provided from the glanding compartment to each cubicle or piece of equipment to allow for the running of the cables, both power and control.
All wiring, connections, instruments and other equipment shall be mounted inside the board and not on the outside, unless otherwise specified. Wood or artificial wood products shall not be used inside switchboards as mounting for terminals or partitions. Sidanyo, Delaron, or equal not less than 6mm thick, or other materials as prescribed or approved by the *Engineer* shall be used.
Space for 30% future expansion on MCCB's and CFS units and 50% future expansion on contactors, time switches and isolators shall be allowed on all boards in addition to any spare accommodation indicated on the diagrams unless otherwise specified.

Free-standing Boards

Free-standing boards shall be of the free-standing pedestal type with or without doors as specified and shall be so designed as to enable the boards to be extended without undue difficulty.
Boards shall comply with BS 5486 : 1977 (Factory Built Assemblies of Low Voltage Switchgear).
The boards shall be constructed of minimum 1,6mm sheet steel suitably stiffened and reinforced by a 2mm sheet metal framework and shall be complete with all equipment, internal wiring and labelling.

Flush and Surface-mounted Boards

Both flush and surface-mounted boards shall consist of an architrave frame which shall carry the chassis for equipment, panel and door and a bonding tray onto which the architrave frame shall be secured.
Bonding trays for flush-mounted boards shall be designed to be built into the wall, shall have expanded metal spot-welded to the rear and sufficient metal straps on the sides and shall be strong enough to carry the weight of the wall above it.
The tray shall be galvanised.

Weatherproof Construction

Weatherproof construction shall be effected by double-turn construction of the architraves with flanged doors and bolt-on panels.

Extendibility

The boards shall be extendible and have an initial spare cubicle capacity of 10% or as specified on the drawings.

Standby Power Section

The section of a board accommodating circuits on a standby supply shall be mechanically and electrically separated from the normal section.
All panels associated with the standby section shall be clearly labelled and identified, and shall be painted as specified on the drawings.
Sufficient removable panels shall be provided to afford access to all equipment for maintenance, service and replacement purposes.
The back panels where specified shall be of similar construction to the front panels.

Clearances

Sufficient space shall be left inside panels for incoming and outgoing cable connections and for interconnections and control wiring, taking into account the sizes and quantities of cables and wires involved.
Equipment on boards may be installed butting. Undue cramping of equipment and wiring shall, however, not be permitted and the following minimum clearances must be maintained:

Clearance of not less than 75mm between sides, top and bottom of architrave and any equipment mounted on the chassis.
Clearance of not less than 75mm between rows of equipment (measured between terminals).

Doors

Doors shall be provided as required and prescribed. Where doors of sheet steel finished in the colour specified are required, they shall be manufactured of the same gauge material as the remainder of the panels.
Doors shall be suitably braced to ensure stiffness and shall have smooth, flat finish.
Door hinges shall be heavy-duty and shall be constructed to permit easy removal of doors. Piano hinges are not acceptable.
Where hinges are used they shall preferably be concealed. If a surface mounted hinge is used it shall be chromium plated. Provision shall be made for adjustment of hinges to facilitate lining up of distorted doors.
Locks shall be Yale type and shall have master key facilities for the entire installation and separate key facilities for each board. Two individual keys shall be provided with each board and four master keys shall be provided for the entire installation.
Doors shall be fitted with approved handles and spring-loaded catches without locks where specified.
Doors shall be fitted with approved handles and square key locks where specified.

Removable panels

Panels of sheet steel, finished in the colour specified, shall be suitably finished, with machine-punched slots to allow for flush mounting of equipment.

Dust and Vermin Proofing

All boards shall be completely vermin proofed.
No holes other than those required for cable or conduit entry shall be allowed. Should extra holes be required for temporary installations, these holes shall be suitably blocked off on the removal of these temporary installations.
Where doors or removable covers are situated and are required to be dustproofed, they shall be dustproofed by means of a minimum 10mm thick non-perishable gasket, resistant to deterioration from heat, chemicals and moisture and capable of being compressed to half its original thickness.
Where doors are flush fitting, gaskets shall be glued to the fixed flange.
In the case of projecting doors, gaskets shall be glued to the door and not the associated framework.
Similarly suitable gaskets shall be used wherever push-buttons, indicator lights, isolator handles, etc. pass through a door or panel.
Switchgear shall be verminproof both in the service and isolated positions.

Ventilation

Boards fitted with heat generating equipment shall be arranged to prevent heat building up to a temperature which could damage any of the equipment or cabling on the board.

Painting and Protection

The interior of all board and panel cases shall be finished in any one of the following finishes as specified or as approved.

Labelling

All statutory safety warning notices shall be in English.
All boards shall be labelled as shown on the drawings and approved.
Black letters on white background shall be used for all normal labels and red letters on white or yellow background for danger notices.
The main isolating switch or switches shall be clearly labelled in accordance with the regulations.
Size and origin of supply cables and busbars shall be clearly labelled on all boards.
All grouped single, double and three pole circuit breakers on distribution boards shall be properly labelled, indicating number of circuit controlled.
All equipment situated inside the board, e.g. contactors, relays, fuses, timers and time switches shall be clearly marked, indicating function, circuit controlled and fuse rating.
The board designation label shall be fitted at the top centre of the board. Individual labels are to be fitted to each compartment door and corresponding fixed portion of rear panel (if accessible).
All circuit labels shall be the same size for boards or similar equipment supplied under this Contract.

Labels shall be white/black/white composition engraved traffolite secured by self-tapping screws or channelling.
Letter size: Main label - 20 mm, other labels - 6 mm.
Labels on power cables shall be attached with approved type plastic adjustable clips.
The labels for power cables shall be provided with holes for the clips to pass through for fastening. Each power cable label shall be fastened with at least two clips.
A legend card, covered by removable 2mm thick transparent acrylic plastic ("PERSPEX") or equivalent panel, shall be installed on the inside of the door of the boards or cubicles and circuits shall be designated on this card.

Accessories

Any special door keys (in duplicate), special tools, slinging eye bolts and foundation bolts, shall be supplied with each board.

Installation and Erection

The boards shall be properly fixed to the floors or supporting steelwork.
The *Sub-Contractor* shall note sizes and positions of cable trenches and vertical shafts and shall include in his tender all supporting steelwork to straddle trenches and vertical shafts to support boards securely. Steelwork supporting the switchgear shall be installed and positioned as indicated on the relevant drawings or as approved. The steelwork shall be painted as specified before the gear is installed. No gear shall be installed until the steelwork has been formally inspected and approved by the *Engineer*.
The prices for the erection of distribution boards shall include the making off and terminating of all cables and wires unless these are separately indicated for pricing.
The boards shall be properly earthed to the substation and/or building earthing system.
When aluminium core cables are used, suitable tinned copper or aluminium lugs with Densal paste shall be used for the terminations.
The *Sub-Contractor* will be required to balance the load as equally as possible across multiphase supplies. Balancing of loads across the three phases must be finally approved by the *Engineer* after commissioning.
The costs for the supply and delivery of the erection tools, materials, equipment and consumables shall form part of the price for the erection of the boards.
All board finishes shall be made good to the satisfaction of the *Engineer* before final handover.

ELECTRICAL MOTOR CONTROL AND SWITCHGEAR PANEL

A motor control and switchgear board shall be supplied and installed in each plantroom at the position indicated.
Each board shall be fitted with the following:-

A Main circuit breaker.

A set of copper busbars of adequate size, if the peak current on the board exceeds 50 amperes per phase.

Individual motors shall be supplied through a circuit breaker and suitable D.O.L., automatic Star-Delta, or slip ring starter.

All other equipment shall be supplied through a circuit breaker.

In the case where the rupturing capacity of a circuit breaker is lower than the rupturing capacity of the electric feed system at the specific point, the circuit breaker shall be protected by H.R.C. fuses of adequate size.

All starters shall be equipped with auxiliary contacts, which shall be brought to an easily accessible terminal block for the purpose of remote control (if specified). An ammeter with suitable scale shall be fitted to each motor above 7,5 kW output on at least one phase, and shall be installed in the panel next to the relevant switchgear.
Switchgear panels and boards shall be factory pre-wired so that the only "on site" connections to be made will be the main connection, the supply to each motor, and the control system connections to the terminal block.
All switchgear and distribution boards shall be of the metal clad surface type, with a framework, which is electrically continuous and properly bonded to earth.

The boards shall be equipped with hinged steel doors adequately braced each with a flush lock and two keys.
All boards shall be treated with two layers of rust inhibiting paint.
Switches, push-buttons, and indication lamps and gauges shall be so installed that they remain fastened to the doors when doors are opened.
All boards, which are to be mounted outdoors, shall be weather proof and guaranteed by the manufacturers for such outdoor operation.
The layout of each board as well as the wiring diagrams and details of the switchgear provided shall be approved by the Consulting Engineer before any manufacture is commenced.
All wiring in distribution boards shall be labelled to ease the later tracing of circuits, these shall correspond to drawing labelling.

WIRING OF PANELS AND BOARDS

General

All internal wiring to the boards shall be carried out in PVC insulated to SANS 1507 having a minimum of 7 strands per conductor, 660/1000 volt graded and colour coded to BS 158.
All terminals used shall be in accordance with the relevant clause of this specification.
All wiring shall be neatly grouped and laced. Wiring shall not be run at random but shall follow board construction features as far as is possible.
Only wires of the same phase shall be grouped or bunched together.
No excessive bunching of wiring, which will impair the current carrying capacity will be accepted.
All wiring is to be kept free and away from any exposed terminals or other uninsulated current carrying parts.
No joints will be allowed in internal wiring, and all connections to busbars or earth bars shall be made with tinned copper cable lugs soldered or crimped to the ends of the conductors and bolted to busbars by means of cadmium-plated high tensile steel bolts and nuts provided with spring washers.
Connections to terminals shall suit the connectors used, but in any case terminal clamp screws shall not bear directly on the conductor.
Crimp lugs or ferrules shall be used on all conductors exceeding $10mm^2$.
Wiring of any one cubicle shall not run through other cubicles unless the wiring is run in conduit or ducting.
Wires shall be clearly marked at all termination points in accordance with the numbering of the wiring diagram, by means of numbered ferrules, or other approved method.
When the board main switch is switched off, no live incoming or other wiring shall be accessible. The incoming terminals must be screened. Where connections are taken from the incoming side of the main switch, they shall be covered by a screen marked "isolate Feeder before Removing Screen". If any circuits are energised from other sources, clear warning notices to that effect shall be fined and such terminals shall be clearly marked.
Control circuit wiring shall be run in PVC trunking where feasible and elsewhere in a strapped harness with sufficient slack at panel doors. PVC trunking with slotted sides shall be used.
Where control circuits are interlocked for sequence control the interlocking circuits shall be made through auxiliary contacts on the circuit isolator to prevent live feed back in panels that are isolated.

Busbars

Busbars shall be installed in all boards and may be installed either horizontally or vertically and in main boards shall be run in a separate compartment, isolated from the rest of the board.
All terminations onto busbars and interconnections shall be bolted with cadmium-plated high tensile bolts, washers, spring washers and nuts.
Spacing of busbars shall be calculated in accordance with SANS 1195, but shall not be less than 50mm.
Busbars shall be mounted on substantial porcelain or other approved insulators. Bare conductors must be so spaced that with all clamps, lugs and lead-offs in position, the spacing between any conductor and earth shall not be less than 40mm.
Connections to the busbars must be effected by means of the correct clamps or lugs with soldered connections or with connections crimped with the correct equipment.
Busbars shall each be identified by means of 100mm long painted (or other approved) phase colouring bands spaced not more than 300mm apart.

The following colours shall be used:

Number of Phases	Phase Colour	Neutral Colour	Earth Colour	Special Purpose Colour
1	Red	Black	Green/Yellow	Orange
2	Red and White	Black	Green/Yellow	Orange
3	Red, White and Blue	Black	Green/Yellow	Orange

Where busbars are mounted horizontally the longer dimension shall be in the vertical plane. The busbars shall be designed to withstand the mechanical and thermal stresses of any possible short-circuit that could occur at that point in the system.
Rating of busbars shall not exceed 1.55m A/mm^2 for copper and 1,0A/mm^2 for aluminium.
A solid copper earth bar with sufficient ways for all the earth conductors and 50% spare space shall be provided in an easily accessible position near the cable gland tray.
Where small leads are connected directly onto the busbars. such as voltmeters, fuses, etc, they shall be provided with a 20 ampere fuse mounted at the busbar and a 2 ampere fuse at the item of equipment.
Busbar chambers and droppers shall be segregated from each other. Also busbars shall be completely screened from any other compartment by removable bolted covers. Furthermore, the busbar supports shall divide the busbar chamber into discrete sections.
All busbar contact surfaces shall be tinned.
All bracing and other insulating material shall be non-hydroscopic.
Droppers from the busbars to the terminals of fuses or isolators must be of adequate section for the maximum rating of the isolator irrespective of the circuit rating. Colour coding will be as for main busbars. All droppers shall be fully insulated.

Lamp Test Circuits

A lamp test circuit shall be provided for each board if specified.

Alarm Circuits

Wiring to the numbered terminal strip shall be provided if indicated on the drawings or if specified for remote alarm and indication functions.

Earthing

All boards shall be fitted with earth bars.

Free-standing boards shall be fitted with a continuous full length earth busbar.

All sections of the board and all equipment on it shall be earthed.

Hinged doors having electrical equipment mounted on them shall be earthed to the board by means of a flexible earth strap.

Terminals

Terminal assemblies shall consist of a metal mounting rail onto which terminal modules are fixed.

For cables up to and including 10mm^2, clamp type terminals may be provided, but the type where the clamp screws bear directly on the conductor will not be accepted.

For conductors exceeding 10mm^2, terminal modules suitable for crimping lugs or ferrules shall be used.

Terminal modules shall have rigid insulating barriers between poles to provide an adequate creepage path for use at 440V between adjacent poles for 380V application.

The terminals of the modules shall be large enough to accommodate the cable sizes specified.

All terminals shall be clearly marked in accordance with the working drawings and wiring diagrams and as approved.

Additional spare terminals shall also be provided as specified or indicated on the drawings for the purpose of looping additional remote circuits, with a minimum of 20%.

Lighting Arresters

Lighting arresters shall bear the SANS mark and shall be earthed directly onto the main earth bar with a copper strapping.

SITE WIRING

General

The wiring of the plant shall be carried out by the contractor in surface work in the plantrooms and concealed work in all finished spaces. Wiring shall be done by means of solid drawn or lap-welded screwed tubing and PVC insulated copper conductors, or in multicore PVC/SWA/PVC cable. The main runs of conduit or cable shall preferably be carried out at high level (if possible in false ceiling spaces). Distribution shall be vertically down to the required points. All electric conduit and conduit fittings must be thoroughly inspected for defects before installation, and all sharp edges and burrs removed. Bushes and locknuts are to be used where conduit enters switch boxes.

The proposed location of tubing and cables shall be approved by the Consulting Engineer before commencement of work.

Conduit to be installed under plaster finish shall be installed in good time so as not to delay the Building Contractor or cause finished plaster to be chased.

All electrical cables shall be fastened to cable racks or shall be laid in cable ducts. Cables carried in racks shall as far as possible be laid parallel and shall be neatlyinstalled. Descents shall be firmly secured with provision for the swinging of flexible tubing or cables where attached to moving machines and electrical motors.

Sizes of conduit, conductors and cables shall be at least equal to those laid down in the relevant tables of the Code of Practice.

Flexible conduit and cables shall be provided wherever it is necessary to avoid transmission of vibration. No joints in cables or wires will be permitted in a conduit. The ends of cables shall be properly made off. Terminal lugs shall be used wherever special clamp-washers or sleeve terminals are not provided on equipment. Conductor strands may not be cut away or reduced in size, and care must be taken to select switchgear, etc., with terminals of adequate size for looping, etc., where necessary.

No open wiring will be permitted at any point in the system, with the exception of the copper bus-bars in the switchgear boards. These shall be taped up with PVC tape with the relevant phase colours.

Wiring in Conduit

No joints shall be allowed and all looping must be done through approved connectors at fitting points. The live phase shall be connected at the switching point. All wiring in conduit shall conform to the requirements of table 4 of SANS 10142-1 as amended. Not more than one circuit shall be accommodated in one circuit unless special permission is obtained from the Engineer. Before any wires are drawn into the conduit, a swab is to be drawn through to clear any water, dirt etc.

PVA Insulated Cables

LT cables with PVC insulation must conform to the requirements of SANS 1507 as amended, and must be laid according to the requirements of paragraph 1.16 of this Section B of this specification.

Solid Conduit

All conduit shall be of heavy gauge steel, screwed and conform to SANS 1065-2 as amended. No conduit shall be less than 20 mm in diameter.

All joints shall be screwed and all outlets fitted with rustproof iron boxes. Conduit must be either

screwed and lock-nutted on both sides and bushed on the inside of the box or board to which it is attached.

The whole conduit system shall be electrically and mechanically continuous over all joints by means of screwed couplings, well bonded and efficiently earthed by means of earthing terminals and earth continuity conductors. The contractor must keep in touch with the builder and install all conduit so as not to delay his work and to ensure the closest co-operation. Every effort must be made to avoid running conduit in "U"-form, but where this is unavoidable, provision should be made, if possible, to drain the conduit.

All chasing of brickwork, etc., for conduit shall be carried out under this contract.

Fuses

Where circuits are scheduled to be fed through fuses, these shall be mounted directly on the panel. All rewireable fuses shall be of the porcelain bridge type, of approved manufacture, connected through bushed insulated holes in the panel. An I.C. fuseboard unit may be used instead of separate fuses. Connections shall be made through the back of the panel so that no surface wiring results. Tinned copper fuse wire shall be fitted to suit the loading indicated in the schedules, where rewireable fuses are used, and cartridge fuses shall be fitted with the appropriate cartridges.

Earthing

The whole installation shall be efficiently earthed to the satisfaction of the Engineer, the Inspector of Factories, the Supply Authority, and strictly in accordance with the Code of Practice for the Wiring of premises. Any points proposed as earthing points by the Contractor shall first be approved by the Engineer before connection.

Boxes

Where boxes are used in concrete or masonry, approved removable cover plates shall be supplied. For 100 mm x 100 mm boxes, standard blank metal switch-type cover plates may used, but for larger boxes, removable cover plates of metal or other approved material must be supplied with bevelled edges and must be neatly painted.
Cover plates shall be large enough to overlap and cover any gaps between the draw box and the masonry or concrete, and must be finished off to match the surroundings so as not to mar the architectural appearance of the building.

CABLE TRAYS AND LADDERS

The contractor shall supply and install all cable trays or ladders as specified or as required by the cable routes including the necessary supports, clamps, hangers, fixing materials, bends, angles, junctions, reducers, T-pieces, etc.
Metal cable trays shall be manufactured from perforated rolled steel. Only the following metal cable tray types may be used:

Less than 250mm wide 1,6mm minimum thickness with 12mm minimum return.

250mm and Wider equivalent to trays supplied by “PERFORATION AND CONDIDURE”, or other approved, manufactured from 2mm thick steel with folded over returns and a minimum up stand of 50mm.

250mm and Wider 2,4mm minimum thickness with 76mm minimum return as alternative to (b) above.

The return of trays shall not be perforated and the top of the return shall be smooth. The same cable tray type shall be used in long parallel tray runs.
Metal cable ladders shall consist of a 76mm high side rail of 2mm minimum thickness. Cross pieces consisting of P3300 “SANKEYSTRUT”, or other approved, channel sections shall be spaced at maximum intervals of 250mm. Where cables of 10mm^2 or cross pieces shall be 125mm. Cables shall be clamped in position by means of purpose made cable clamps that fit into the cross pieces. Cross pieces consisting of slotted metal rails which accommodate plastic or metal cable binding bands, may be used in vertical cable runs against walls, etc. where the prior approval of the Engineer has been obtained. These cross pieces are not acceptable in horizontal cable runs.
Rigid unplasticised PVC trays are acceptable. Only the following tray types may be used:

Less than 50mm 3,0mm minimum wide and 40mm minimum return.

250mm and wider 4,0mm minimum thickness and 60mm minimum return.

Metal cable trays and ladders shall be finished as follows:

. In coastal areas (for all applications): Hot-dipped galvanised to SANS 121 or epoxy powder coating.

a. False ceiling voids: Electro-galvanised or epoxy powder coating.

b. Vertical building ducts : Hot-dipped galvanised to SANS 121.

c. Plant Rooms, Substations, service tunnels or basements : Electro-galvanised or epoxy powder coating.

d. Damp areas, exposed to weather : Hot-dipped galvanised to SANS 121 or epoxy powder coating.

e. Undercover industrial applications : Hot-dipped galvanised to SANS 121 or epoxy powder coating.

The abovementioned finishes shall apply unless specified to the contrary. Hot-dipped galvanised or electro-galvanised trays and ladders shall be cold galvanised at all joints, sections that have been cut and at places where the galvanising has been damaged. Powder coated trays and ladders shall likewise be touched up at joints, cuts and damaged portions using spray canisters recommended by the manufacturer of the trays and ladders.

Trays shall be supported at the following maximum intervals:

1,6mm thick metal trays with 12mm return	1,22m maximum spacing
Metal trays with folded over return and 50mm up stand	1,22m spacing
2,4mm thick metal trays and 75mm return	1,5m spacing
Metal cable ladders	1,5m spacing
3,0mm thick PVC trays with 40mm return	1,0m max. spacing
4,0mm thick PVC trays with 60mm return	1,5m max. spacing

In addition, trays and ladders shall be supported at each bend, off-set and T-junction.

Joints shall be smooth without projections or rough edges that may damage the cables. The Specialist Controls Contractor will be required to cover joints with rubber cement or other hardening rubberised or plastic compounds if in the opinion of the Engineer, joints may damage cables. Joints shall as far as possible be arranged to fall on supports. Where joints do not coincide with supports, joints shall in the case of trays with single returns be made by means of wrap-around splices of the same thickness as the tray ends shall butt tightly at the centre of the splice and the splice shall be bolted to each cable tray by means of at least 8 round head bolts, nuts and washers. Splices shall have the same finish as the rest of the tray. Where joints which do not coincide with supports occur in trays with folded over returns, tight fitting metal guide pieces, at least 450mm long, shall be inserted in the folded returns to provide the necessary support to the two cable tray ends. Splices as described above shall be provided if trays sag.

Trays shall be bolted to supports by at least two round head bolts per support. Bolts shall be securely tightened to avoid cables being damaged during installation.

The supports for cable trays and ladders shall in all cases be securely fixed to the structure by means of heavy duty, expansion type anchor bolts. It is the responsibility of the Specialist Controls Contractor to ensure that adequate fixing is provided since cable trays and ladders that work loose shall be rectified at his expense.

Horizontal and vertical bends, T-junctions and cross connections, shall be supplied by the Specialist Controls Contractor. The dimensions of these connections shall correspond to the dimensions of the linear sections of which they are connected.

The radius of all bends shall be 1000mm minimum. The inside dimensions of all horizontal angles or connections shall be large enough to ensure that the allowable bending radius of the cables is not exceeded. Sharp angles shall have 45° cornices.

Cables shall be installed adjacent and parallel to teach other on the trays with spacings as determined by the current ratings. Horizontal trays and ladders shall in general be installed 450mm below slabs, ceilings, etc. to facilitate access during installation.
All metal trays and ladders shall be bonded to the earth bar of the switchboard to which the cables are connected. Additional bare copper stranded conductors or copper tape shall be bolted to the tray or ladder where the electrical continuity cannot be guaranteed.

ELECTRIC MOTORS

Standard Specification

All electric motors shall comply fully with the relevant standard specifications:

SANS 1804-2:	"Low Voltage Three Phase Standard Motors".
BS 2613:	"The Electrical Performance of Rotating Electrical Machinery".
BS 170:	"The Electrical Performance of Fractional Horsepower Electric Motors and Generators".

Motor Specifications

Standard Squirrel Cage Motors shall be three phase (or single phase up to THREE kW), continuously rated, screen-protected drip-proof, suitable for direct-on-line or star-delta starting.
High-starting-torque squirrel-cage motors shall be three-phase, continuously rated, screen-protected drip-proof, with a special arrangement of rotor conductors giving high starting torque and moderate starting current and suitable for direct-on-line or star-delta starting.
Slip-ring motors shall be three-phase, continuously rated, screen-protected drip-proof, with continuously rated slip rings and brushers and brush gear suitable for automatic starting.
Fractions kW motors shall be continuously rated, totally enclosed single phase, capacitor-start induction run type, shaded pole of three-phase squirrel-cage where required.
Motors suitable for part-wound starting shall be three phase, continuously rated, screen-protected drip-proof with wound rotor circuits suitably rated to provide continuous full load power when fully switched and to provide starting in graded steps sufficient to overcome the starting load torque without exceeding the specified starting current.
Hermetically sealed motors shall be three phase squirrel cage motors, totally enclosed with suitable internal cooling medium and suitable insulation to provide continuous full load power under the specified ambient conditions.
Pole-changing motors shall be three-phase, continuously rated, screen-protected drip-proof with cage rotor and separate stator windings providing several numbers of 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.
Pole-changing rotor circuits are not recommended and shall only be used in exceptional circumstances with the proper approval of the Department. Dahlander connections providing a 2:1 speed ratio with variable torque and variable power characteristics of the motor may be used to drive centrifugal fans and 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.
Motors with a speed in excess of 1500 r/min except in the case of centrifugal compressors, will not be accepted unless agreed to by the Engineer.

Motor Ratings

When determining motor rating, the following shall be taken into account:
All motors shall be rated for continuous full load duty.

The Continuous Maximum Rating (C.M.R.) 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 over-load protection devices allowed in BS 4941 Part 1.

All starting times, irrespective of the load characteristics or the method of 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 protection discrimination.

All motors shall be capable of a **minimum** of three **consecutive** starts per hour with the load connected

and employing the method of starting to be installed without exceeding the allowed temperature limits of the insulation. In addition, the motor shall be capable of the numbers of starts per hour for the particular load as may be specified or as may be experienced under normal operating condition.

Unduly over-rated motors resulting in a low power factor and efficiency are not acceptable.

The motor starting torque and speed/torque characteristics shall be carefully matched to that of the load to ensure that the motor does 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 it's final running configuration in the case of pole-changing motors and all starting devices have been switched out of circuit in the case of assisted starting) shall be 1.6 times the rated full load torque to overcome temporary overloads and voltage fluctuations.

The actual ambient temperature in which the motor will be operating (and not the prevailing outside ambient temperature only) shall be taken into account.

It is a requirement that the above information and any other requirements that will affect the type of motor to be used, be submitted to the motor manufacturer when ordering the motor. The Contractor may at the discretion of the Engineer be required to submit written proof that the **motor manufacturing** will guarantee the performance of the motor for the expected duty and load.

Special attention shall be paid to the starting requirements of motors. It is essential that the starting torque produced by motors under the starting conditions specified, will be sufficient to accelerate the load within the time period allowed by the manufacturer of the motor with a maximum starting time of 20 seconds (refer above). The contractor may be required to submit calculations showing accelerating torque available, load torque characteristics and run-up time. The following formula may be used to calculate the run-up time:

Te = equivalent accelerating torque in N-m

$$Te = \frac{\left(\frac{T1}{T2} - 1\right)\left(T1 + T2\right)}{\left(\frac{T1}{T2} + 1\right)\text{Log}_e \frac{T1}{T2}} \qquad t = \frac{GD^2 N}{9{,}55Te}$$

T1 =

T2 = Minimum accelerating torque in N-m

GD^2 = Moment of inertia of the rotating parts of the load and motor in kg-m^2

N = Final speed in r/min.

t = Run-up time in seconds

Accelerating torque is the difference between motor torque and load torque at any given speed on the torque/speed characteristic curve.

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.

Motor Windings

All motor windings shall have Class E or better insulation. The following maximum temperatures as determined by the resistance method may not be exceeded:

Class of Insulation	*Altitude*					
	0–1000m	**1200m**	**1400m**	**1600m**	**1800m**	**2000m**
E	150°C	112.6	111.2	109.8	108.4	107
B	120°C	118.4	116.8	115.2	113.6	112
F	140°C	138	136	134	132	130
H.	165°C	163.7	162.5	161	160	158.7

The above figures comply with BS 2613 for a maximum cooling air temperature of 40°C. Where higher ambient temperatures occur (particularly in cases where heaters are installed), the above temperatures shall be reduced in accordance with BS or SANS specifications.

All windings shall be varnished and baked. The insulation shall provide protection against dust, oil and high humidity as well as aggressive vapours and gases where these are specified.
End-windings shall be carefully wrapped and supported to prevent movement and prevent mechanical damage due to vibrational stresses.

Motor Protection

Motor protection shall be provided as follows:

Type of Protection	Application
Thermal overload	All motors
Magnetic overload	Only for short circuit protection when acting capacityon circuit breakers with sufficient rupturing
Thermistor over-temperature	All motors of 25 kW and more.
Single phasing	Al 3-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
Over-temperature	Auto-transformer starters, liquid starters and resistor starters

All the protection specified in the detailed Technical Specification shall be supplied.
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.**
On motor starters on which the overload protection forms an integral part of the starter the protection shall be by means of temperature compensated bimetal 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 approximately 75% to 120% of the rated current of the motor.
Where motors are used 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.
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 the single phasing are not acceptable.
Magnetic over current trips or relays for short circuit protection may never be allowed to actuate contactor starters and may only operated on suitably circuit breakers.
Short circuit protection shall be provided by means of HRC fuses or suitably rated circuit breakers.
Thermistor over-temperature protection shall be installed. 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.
Thermistor protection may not be provided in lieu of over current protection.
Motor protection shall be “ENGLISH ELECTRIC” type “CMM” OR “P & B GOLDS” type “M”, or other approved, for all motors where preferred. Thermal (or magnetic if required) overload, single phasing (or phase unbalance) and earth fault protection relays as well as auxiliary relays where required, shall be included. The relays shall be housed in a panel mounted unit in a withdrawable case.
Motor protection relays shall not be allowed to operate on metering current transformers, but shall be connected to separate protection class current transformers matched to the motor full load current and the relay power consumption.
In all cases where protection relays are used, “CHAMBERLAIN AND HOOKHAM”, or other approved, test blocks type shall be provided to facilitate remote testing or relay operation, current transformers, etc.
Proven electronic protection relays are acceptable.
Where motors which are not described in BS specifications, e.g. semi-hermetic compressor motors, etc. are used, protection shall comply with the manufacturer’s requirements.

Special attention shall be paid to motors driving high inertia loads to ensure that motors are adequately protected against sustained over currents but do not trip unnecessarily during starting.

Shorting of the over current protection during starting is not acceptable.

Increased overload settings on protection units are not acceptable.

Connecting the overload relay in the delta loop in star-delta starting applications thus providing no protection during starting, is not acceptable.

Saturable core current transformers providing a normal over current characteristic up to 120% of full load current may be used provided they are properly matched. Alternatively, separate starting and running over current protection units shall be used. For star-delta starting methods, the latter can be achieved by connecting the starting over current unit in the main supply line to the motor and the running over current unit in the delta loop. For other starting methods, a change-over arrangement is required to switch from the starting to the running after the starting time has lapsed. For motors larger than 50 kW electronic integrating type relays with individually adjustable time/current characteristics shall preferably be used. Whichever protection method is used, a safe discrimination between “safe locked rotor time” and “starting time” shall be maintained.

Motor Protection - Thermistors

All motors with ratings of 25 kW and higher and all motors with a rating of 15 kW and more that are subjected to run-up times in excess of 15 seconds shall have thermistors for over-temperature protection installed in the stator windings. Three thermistors, one per phase, shall be installed in single wound motors and 6 thermistors shall be installed in double wound motors.
Where thermistors are installed in the end-winding, the “Curie Point” shall be 5°C above the temperature. Where thermistors are installed in the winding “hot spot”, the Curie Point shall be 15°C above the temperature values stated.
The thermistors shall comply with the following:
Only Positive Temperature Co-efficient (PTC) thermistors shall be used.

Thermistors installed in motors connected to supply voltages up to 600 V shall be flash tested at 2 kV r.m.s. Additional insulation shall be provided on higher voltage machines.

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 that the sleeve does not cover the thermistor bead.

The thermistor shall be inserted in the winding in such a way to ensure best thermal contact with the adjacent conductors of the winding.

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.

All the thermistors acting on one control unit shall be connected in series.

Where thermistors are installed it is essential that relay panels be safeguarded against high voltages in case of a short circuit between sensor and motor windings. Isolation transformers are recommended for this purpose.

Motor Construction

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.
It is essential that the correct mounting type is selected for each application.
Motor terminals shall be clearly marked, U, V, W or U1, V1, W1 and U2, V2, W2. An earth terminal shall be provided at a convenient position on the motor frame. Vulcanised rubber insulation shall not be used for the connection from windings to the terminals.
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.
All terminals shall be totally enclosed in a waterproof box sealed with gaskets and shall be complete with nuts, locknuts, lugs, etc. Cable boxes for PILCA cables shall be complete with tinned brass wiping gland and armour clamps. PVC cables 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. All

terminal boxes shall be large enough to ensure proper termination of the cables and connection of cores without exceeding the allowable bending radius. All terminal boxes shall be capable of being rotated through 360°. Where condensation may form on motor terminals, e.g. certain centrifugal refrigeration compressors, terminal boxes shall be hermetically sealed and filled with silica gel.

Motors shall as far as possible have pre-lubricated and sealed ball or roller bearings. Unsealed bearings shall be loaded conservatively in order that the grease need not be renewed at intervals of less than one year. Bearings shall be suitable for flat or V-belts drives where these are indicated without the use of outrider support bearings. Belt pulleys and couplings shall be balanced.

Bearings shall be protected against possible shaft eddy current and shall be suitable to withstand vibrations caused by reciprocating or unbalanced loads.

Anti-condensation heating elements shall be provided in the motor windings for the following motor applications:

Close-coupled motors and pumps in chilled water systems.

Standby motors in refrigeration installations where the ambient air surrounding the motor may drop below the dew point.

Pumps installed in damp areas where the pumps will not run continuously.

The heating elements shall be arranged to prevent terminals and exposed connections becoming damp. As an alternative to heating elements, a low voltage transformer (approx. 50V) can be switched into the circuit when the motor is stationary to provide a continuous circulating current in the motor windings.

Where requested copies of type test certificates for routine and performance tests in accordance with SANS 1804-2, BS 2613 or BS 170 shall be submitted before delivery of the motors. In additions the Manufacturer's guarantee that the motor will comply with the duty as described in this specification, shall be submitted. Curves of Torque/Speed and Current/Speed shall be provided on request.

The client reserves the right to witness all routine or performance tests and shall be notified in writing 14 days before the commencement of such tests.

Motors that have become damp shall be dried out before connection to the supply. Damaged motors resulting from non-compliance with this requirement, shall be rectified by the Contractor at his cost.

Star-Delta Starters

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 3 consecutive starts per hour. Starters for plugging duty shall be rated at 40 starts per hour.

The timers for open transition star-delta starters, shall be a break-before-make, snap acting type with a distinct time delay before make, of sufficient length to quench the arc on the star contactor but short enough to prevent magnetic flux decay in the motor with consequent high transients.

All star-delta starters shall be electrically interlocked via N/C contacts on the contactors.

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 changeover. The closed transition switching shall be inherent in the arrangement of the auxiliary contact operation. A "policeman" timer to protect the transition resistance may be added.

An overall "policeman" timer shall be provided on all closed transition star-delta starters in addition to the star-delta changeover timer to disconnect the load if the total allowable starting time is exceeded. The make and principle of operation, e.g. electronic vs. electro-mechanical, shall be different from the star-delta timer. On 2-wire control systems the "policeman" timer must lock out

Hfc-227 fire extinguishing system

This Technical Specification shall apply to any fire protection or extinguishing installation containing an HFC-227 Gas Agent, in accordance with the Standard on Clean Agent Fire Extinguishing Systems – NFPA 2001 latest edition, as issued by ` the National Fire Protection Association of the USA as extinguishing medium and Gaseous fire – Extinguishing system – Physical Properties and system design: SANS 14520-1 latest edition.

Part 1: General requirements

Part 2: $CF_3$1 extinguishant

Part 5: FK-5-1-12 extinguishant

Part 6: HCFC Blend A extinguishant
Part 8: HFC 125 extinguishant
Part 9: HFC 227ea extinguishant
Part 10: HFC 23 extinguishant
Part 11: HFC 236fa extinguishant
Part 12: IG-01 extinguishant
Part 13: IG – 100 extinguishant
Part 14: IG – 55 extinguishant
Part 15: IG – 541 extinguishant
The objectives of an Clean Gas Agent discharge into any protected space shall be:
Reduction of the oxygen (O_2) concentration in the protected space, by virtue of displacement of a significant part of the atmosphere, to a level which will not sustain fires of Classes, A, B or C.
To limit the reduction in oxygen concentration to a level which will still sustain human life at a fairly low rate of activity.
Where Clean Gas Agents containing carbon dioxide (CO_2) are concerned, to limit the increase in CO_2 concentration in the protected space to a level which will not cause any related effects of toxicity in persons of reasonable health.
This Technical Specification shall apply to engineered fixed total flooding installations. This Technical Specification shall apply to systems with storage pressures of 150 Bar to 200 Bar. Systems with storage pressure lower than 150 Bar shall not be acceptable. Where system storage pressure exceeds 200 Bar, such system shall be suitably rated for safe operation at such higher pressure.

Testing

A room integrity test (Refer Annex E of SANS 14520-1) shall be performed for each zone to check the enclosure's capability to retain the Clean Gas Agent.

Installation

The installation shall be carried out in accordance with sound fire engineering practice. All equipment shall be securely fixed to walls and slabs. An electrical supply will be made available where necessary.

Inspection and maintenance services

The continued capability for effective performance of a Clean Gas Agent total flooding fire suppression system depends on fully adequate maintenance procedures with periodic test. This contract includes the maintenance, free of charge, of the system for at least the 12 months guarantee period. Further maintenance contracts may be negotiated with the client once the retention period has expired.

Completion certificate and documentation

The installer shall provide the user with a completion certificate, a complete set of instructions, calculations and drawings showing the system as-installed, and a statement that the system complies with all the appropriate requirements of this part of ISO 14520, and giving details of any departure from appropriate recommendations. The certificate shall give the concentrations and, if carried out, reports of any additional test including the door fan.

Fire detection installation

The Clean Gas Agent installation will incorporate an automatic fire detection system that will in all aspects comply with SANS 10139 - 2007.
The tenderers attention is drawn to the following requirements for this specific project:
Four Gas Extinguishing Fire Panels located at the main entrances to each zone.
Four break glass units, one for each zone.
Appropriate amount and placement of smoke detectors, taking into account the beams scattered across the basement.
The panels will be equipped with all functionality as per SANS 10139:2007.
All fire detection logic will be as per SANS 10139:2007.
The units shall basically operate as follows:

When any two detectors in a room give a fire signal, the panel shall, when in automatic mode, send a signal to the solenoid of the gas cylinders to discharge. Before discharge, there will be a 30 seconds delay period during which the alarms will sound for evacuation of people.
In manual mode, the same procedures will be followed as above except that the gas will be discharged manually.
In disabled mode, the user shall still be able to discharge the gas manually by means of the manual discharge nozzles on the gas bottles.

Fire detection requirements

Supply and installation of the complete fire detection system to comply with the current applicable provisions of the following standards:
SANS 10142
National fire protection standards:
NFPA 72A Local protective signalling systems
NFPA 72D Proprietary protective signalling systems - protected premises unit
NFPA 72EAutomatic fire detectors
National Building Regulations (SANS 10400)
All requirements of the local authority
The system and all components shall be listed by Underwriters Laboratories Inc for use in fire protective signalling systems under the following standards as applicable:
UL 864 Control units for fire protective signalling systems
UL 268 Smoke detectors for fire protective signalling systems
UL 268ASmoke detectors for duct applications
UL 217 Smoke detectors, single and multiple station
UL 521 Heat detectors for fire protective signalling systems
UL 228 Door closer-holders for fire protective signalling systems
UL 464 Audible signalling appliances
UL 1638Visual signalling appliances
UL 38 Manually actuated signalling boxes
UL 346 Water flow indicators for fire protective signalling systems
UL 1481Power supplies for fire protective signalling systems.
ISO 9000 and ISO 9002
National Electrical codes as specified

Testing and commissioning

It shall be possible to put a zone in test mode. The zone in test mode will flash its fault LED and the general "test" LED. All outputs, relays, bells and fire brigade/evacuation will be switched off for this zone. Alarms or faults from other devices or zones will be handled in the normal way. While testing the detector, the panel will light up the detector's alarm LED when reaching the alarm level and reset it automatically afterwards. The printer will confirm this alarm by providing a "test alarm" printout as proof. In this way, maintenance can be performed by a single engineer. The panel will prevent leaving the test mode as long as any sensor is still in alarm
It will be possible to perform an "electronic test" of all sensors. The "electronic test" will have to force sensors into alarm level. Sensors not able to reach the currently selected alarm level in test condition will report a maintenance alarm

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DETAILED AIR CONDITIONING SPECIFICATION

It is important to note that the original project specifications will take preference. This specification is deemed supplementary to the original project specifications, please refer to Addendum A for original project specifications.

UNDER CEILLING UNITS

Under ceiling units located in the IT rooms will be located on top of one another. Each unit shall be installed over a stainless steel drip tray.
The mechanical contractor shall, in addition the standard drain, install a **stainless steel drip tray** below the units located in the server room. These units shall be supplied with a drain similar to that of the unit to the exterior. All work in this regards forms part of this project.
One unit shall act as duty and one shall act as a standby.
Condenser units will be installed in the service duct. All condenser units will be installed at high level as close to the external grille as possible. Where required the contractor shall duct the condenser outlet to the exterior.
The contractor shall connect this ducting by means of a flexible connection.
The installation of this work form part of this contract. Mechanical contractor shall ensure timeous planning to ensure all builders work is in place before any finishes is applied to the wall.

Pre construction report

The contractor shall furnish a detailed report before construction commences in each phase. The report shall be supported with necessary photo evidence.
Items as per photo report shall be referenced to BOQ items and shall be clearly allocated to an item.
Where any apparent cause is observed for the defect the contract shall mention this in the report.
This report shall be used as basis to substantiate any claims done by the contractor.
If deemed required by the Mechanical Consulting Engineer the contractor shall compile drawings of the installation before any work commences.
This reports shall be handled in accordance with main contractors phasing program and shall form part of the mechanical contractor's responsibility to ensure timeous inspections.
Failing to compile this report before construction commences will put the contractor at risk. The mechanical contractor shall be liable for any cost incurred during this phase.

Installation of volume control dampers

The contractor shall be responsible for the supply and installation of volume dampers. The contractor shall price for the alterations to existing ducting and all connections required to connect the damper. Contractor to take special note that the leakages must be kept within the allowable parameters as specified.
The onus remains with the contractor to ensure that the existing material shall be re-used. **If this is not possible the price indicated shall include all new material required to complete this installation.**
All dampers shall be balanced on the completion of phase. Contractor to note that one AHU branch feeds more than one floor and that ducting branch balancing will have to be performed more than once, due to the phasing of the project.
Contractor to price balancing of system in accordance with main contractors phasing program, no additional claims will be entertained in this regard.

Contractor shall perform balancing as per Clause 3.1 of this document.

BMS installation and commissioning

BMS shall be installed and commissioned by Atbro Systems.
Contact person:
Tarryn van der Merwe
Tel: 011 794 7900

Fax : 011 794 7904
Email : tarryn@atbro.co.za

Maintenance period

Maintenance period shall be in accordance with min contractor's documentation. Each supplier / sub-contractor shall perform maintenance at the required intervals to ensure the functionality of the equipment.

During this period the contractor must supply and install all consumable required for the installation and shall be deemed included in the price supplied.

Items that malfunction during this period shall be paid in accordance with rates submitted. In the event that an items malfunctions that is not priced in the tender BoQ the contractor shall submit a detailed rate build up for approval before installation can commence.

The contractor shall be available and able to tend to defaults within a **24 hour period** of notification, all site inspection, traveling or call out fees shall be included in the price submitted.

Price shall include allowance for all appointed sub-contractors and suppliers.

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Schedule of Equipment Offered

1. **NB: Details of all relevant data must be filled in by tenderer. Failure to do so will invalidate the tender**
2. Further details on material and equipment must be submitted by means of a covering letter, brochures, specifications, etc.
3. All such brochures, etc. must be noted in a covering letter.

Diffusers

	D1 – 200mm	D2 – 250mm	D3 – 300mm
Manufacturer			
Supplier			
Type			
Model No.			
Colour			

	D4 – 350 mm
Manufacturer	
Supplier	
Type	
Model No.	
Colour	

Under ceiling AIR CONDITIONING UNIT

	U 1
Manufacturer	
Supplier	
Model	
Nominal Cooling Capacity (kW)	
Nominal Heating Capacity (kW)	
Air Flow Rate (l/s)	

AIR-COOLED WATER CHILLERS

	Chiller 1
Manufacturer	
Supplier	
Model	
Nominal Cooling Capacity (kW)	
Nominal Heating Capacity (kW)	
Capacity control (%)	
Number of refrigerant circuits	
Refrigerant	

Declaration

I herewith declare that all the equipment above shall be designed, manufactured and delivered in accordance with the specification.
I further declare that equipment which does not meet the requirements of the specification has been listed in a separate letter, which accompanies this tender and that the way in which the equipment differs from the specified equipment, has been clearly defined.

NAME OF FIRM:
……

TENDERER'S SIGNATURE:
……

NAME (in Block letters):
……

ADDRESS:
……

TELEPHONE NUMBER:
……

Error! Not a valid bookmark self-reference. List of Drawings

DRAWING NUMBER	DESCRIPTION
3748 ML / 01	**First basement HVAC**
3748 ML / 02	**SECOND basement HVAC**
3748 ML / 03	**THIRD BASEMENT HVAC**
3748 ML / 04	**GROUND FLOOR INSTALLATION HVAC**
3748 ML / 05	**FIRST FLOOR INSTALLATION HVAC**
3748 ML / 06	**SECOND FLOOR INSTALLATION HVAC**
3748 ML / 07	**THIRD FLOOR INSTALLATION HVAC**
3748 ML / 08	**FOURTH FLOOR INSTALLATION HVAC**
3748 ML / 09	**FIFTH FLOOR INSTALLATION HVAC**
3748 ML / 10	**SIXTH FLOOR INSTALLATION HVAC**

Error! Not a valid bookmark self-reference. Variations And omissions

Tenderers shall list below any deviations between his tender submitted and the specification. If nothing is listed, this tender shall be regarded to meet the specification in all respects.

……
……
……
……
……
……
……

SIGNATURE: ……
DATE:
……

Error! Not a valid bookmark self-reference. Bills Of Quantities

NB: (i) Details of all relevant data must be filled in by tenderer.
Failure to do so will invalidate the tender
Further details on material and equipment must be submitted by means of a covering letter, brochures, specifications, etc.
(iii) All such brochures, etc. must be noted in a covering letter.

Refer to main contractor contact document for Bills of Quantities.

GENERAL NOTES

i. These bills of quantities contain pages numbered consecutively in each bill as indicated in the Master Index. Before the tenderer submits his tender, he should check the number of pages, and if any are found missing or duplicated or the figures or writing indistinct, or the bills of quantities contain any obvious errors, he should apply to the Engineer at once and have same rectified, as no liability whatsoever will be admitted by the Engineer in respect of errors in tender due to the foregoing.

ii. The bills of quantities form part of and must be read in conjunction with the specifications and drawings which contain the full description of the work to be done and material and equipment to be used.

iii. The priced bills as well as all the completed schedules and any other relevant information must be submitted with the tender.

iv. The total tender sum in the tender form shall constitute the contract price of the successful tenderer. Tenderers are advised to check their item extensions and total additions, as no claim for arithmetical errors will be considered.

v. No alteration, erasure or addition is to be made in the text of the bills of quantities. Should any alteration, erasure of addition be made, it will not be recognised but the original wording of the bills of quantities will be adhered to.

vi. The priced bills of quantities of the successful tenderer will be checked and the Engineer reserves the right to call for reasonable adjustments to any individual price and to rectify any discrepancy whilst the total tender price, as submitted, remains unaltered.

vii. The responsibility for the accuracy of the quantities written into the bills remains with the party who prepared the bills. The tenderer shall be relieved of responsibility of measuring quantities at the tender stage, and the tender sum submitted shall be in respect of the quantities set out in the bills, although he will be required to make his assessment of items such as fixings, etc. from details stated in the bills and shall include in the item prices for such small installation materials as are required for the complete installation in accordance with the specification.

viii. The rates contained in this document shall apply irrespective of the final quantities of the different classes and kinds of work actually executed.

ix. The Contractor and the Employer or his Agent may agree that the total of any bill or bills, including any variations by way of additions thereto or deductions therefrom, represents a fair and accurate quantification of the items set out in the bills and the parties may agree final payment on that basis. In the event of any dispute as to the quantities, then the disputed item or items shall be adjusted where necessary.

x. The quantities in these bills of quantities are not to be used for ordering purposes. Quantities set out in this document are to be regarded as provisional only.

xi. The work, when completed, shall be remeasured and the final contract sum calculated, using the tendered tariffs and the finally measured quantities.

xii. Variations in the scope and extent of the work included in the bills shall be allowed to meet the Employer's requirements.

xiii. The rules governing the extent and valuation of variations shall be those provided for in the conditions of contract.

xiv. Unless separate rates for the supply and for the installation of any item is specifically called for, the supply and installation costs of any item shall be fully included in the unit price.

xv. The description of each item shall, unless otherwise stated herein, be held to include making, conveying and delivering, unloading, storing, unpacking, hoisting, setting, fitting and fixing in position, cutting and waste, patterns, models and templets, plant, temporary works, return of packings, establishment charges, profit and all other obligations arising out of the conditions of contract.

xvi. The quantities and rates included for dayworks shall form part of the tender price, but tenderers shall note that this item must be regarded as indicative and will only be payable to the Contractor if and when covered by a Variation Order.

xvii. Tenderers shall price the Preliminaries under any or all of three groups, viz:

(a) a fixed amount

(b) an amount varied in proportion to the final contract value as compared to the tender price

(c) an amount varied in proportion to the final contract period as compared to the originally specified contract period.

xviii. The allocation of prices to the three categories listed above must be realistic and the Contractor may be required to justify the allocation of the prices. Attention is particularly drawn to the right reserved in terms of Clause 6 above.

xix. All provisional sums shall be expended as directed by the Engineer and any balance remaining shall be deducted from the amount of the contract sum.

xx. Provision is made on the final summary for the applicable Value Added Tax to be added.

xxi. In these bills, the word “supply” shall be deemed to include the acquiring of equipment and materials from suppliers and workshops and the delivery, off-loading and safe storage of the equipment on site.

xxii. In this bills the word “install” shall be deemed to include the unpacking, hoisting, placing and fixing, suspending or building in an approved position, cutting, connection, commissioning, testing and handing over of plant, equipment and materials.

xxiii. Method of Measurement

xxiv. Ductwork has been measured along centre lines and include for the length of any fittings. Fittings to ductwork has been measured as "extra over" ductwork. Accordingly, the rate allowed for the fittings should only include the additional labour to manufacture and erect such fittings. The size of the fitting shall always be the maximum circumference.

xxv. The rate for ducting shall include all necessary jointing materials such as driveslips, angle section flanges, gaskets, nuts, bolts, duct sealer, etc. and shall allow for offcuts and wastage.

xxvi. The price for duct supports shall form part of the tariff and shall include fixing to concrete slabs, roof trusses, etc.

xxvii. All bends are 90° bends unless otherwise stated.

xxviii. The price for internal and external duct insulation shall form part of the tariff for ducting.

xxix. Piping shall be measured in metres, stating the internal or external diameter in accordance with accepted trade usage. The rate for piping shall include cutting, jointing and running joints. The lengths of pipes shall be measured over/through all fittings, but not over valves, pumps and inline instruments such as strainers, site glasses, etc.

xxx. Pipe fittings shall be measured “in number” as “extra over” piping. Pipe fittings such as bushes, elbows, bends, junctions, etc. to pipes not exceeding 50mm diameter shall be given in one item for each diameter of pipe. Pipe fittings to pipes exceeding 50mm diameter shall be given separately for each diameter of pipe and each type of fitting. Unions, valves, flanges, etc. shall be given separately for all diameters of pipe. Purpose-made fittings are to include for lining up of fittings. Welded joints, including joints to fittings, shall be measured separately and shall allow for all cutting, preparation of ends and welding.

xxxi. The rate for flanges shall include for flange weld, flange screw, gasketing and bolts.

xxxii. Pipe supports and brackets shall be measured separately in number on main piping systems with diameter above 80mm only.

xxxiii. Pipe insulation shall be measured in metres stating the diameter of the pipe. Pipe fittings shall be measured in number as “extra over” pipe insulation, all as described under 19.3. piping above.

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PRICING SCHEDULE/ BILLL OF QUANTITIES

Bid no: Q25/052

Bid/ Project Description: BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)

Item	Description	Unit	Qty	Tariff	Amount
	BILL No. 1				
	PRELIMINARY ITEMS				
	Allow for all preliminary and general items required to provide the air conditioning installation for this project, but excluding items priced elsewhere in these Bills (These amounts will be paid *pro rata* to the rest of the amount claimed by the contractor, re)				
1.	**CONTRACTUAL REQUIREMENTS**				
	Tenderers to allow for compliance with all the conditions of the contract	Item	1		R -
2	**SITE ESTABLISHMENT**				
	Tenderers to allow for all costs which may be required in order to place the necessary facilities on site for safe storage and orderly management purposes for the duration of the contract	Item	1		R -
3	**REMOVAL OF WASTE**				
	Tenderers to allow for all costs associated with cleaning the site of all rubbish and waste caused by this contract	Item	1		R -
4	**PRE CONSTRUCTION INSPECTION**				
	Before the contractor commences with work the entire system shall be evaluated and a detailed report shall be submitted to the mechanical engineer. Price shall include all necessary specialist contractors/suppliers required to perform this investigation. Investigation shall entail all disciplines mentioned in the BOQ. As per Detailed project specification and shall be issued in accordance with main contractor's project phasing.	Item	1		R -
5	**GENERAL ITEMS**				
	Any additional items that the Tenderer deems necessary for the successful and total completion of the portion of the work required for this Bill. Specify:				
(a)		Item	1		
(b)		Item	1		
(c)		Item	1		
(d)		Item	1		
(e)		Item	1		
(f)		Item	1		
	TOTAL FOR BILL No. 1 : PRELIMINARIES (Carried forward to Summary)				R -

Item	Description	Unit	Qty	Tariff	Amount
	BILL No.2				
1.	**WATER CHILLER (NEW)**				
1.1	Supply and install hail guards	Item	1		R -
1.2	Drain chilled water system completely, refill and complete treatment	Item	1		R -
1.3	Major service to existing unit	Item	1		R -
1.4	Major service to existing circulating pumps	Item	2		R -
1.5	Chilled water piping with 40 mm lagging vapour proofing and sheet metal ducting in accordance with the specification complete with pipe supports and hangers				
	Ø 42	m	5		R -
	45° Bend: Ø 42	No	2		R -
	90° Bend Ø 42	No	2		R -
	T-pieces: Ø 42	No	4		R -
1.6	For the complete labelling of **ALL** the chiller piping throughout the entire building.	Sum	1		R -
1.8	Replace all air bellows on circulation pipeline	No	4		R -
1.7	For the complete recommissioning of the chilled water system as detailed in the specifications.	Sum	2		R -
2	**HOT WATER (BOILERS)**				
2.1	Drain Hot water system completely, refill and complete treatment	Item	1		R -
2.2	Service and clean of boilers	Item	3		R -
2.3	Repalce of 2.5 kW heater elements (long)	Item	10		R -
2.4	Replace cold water pump	Item	1		R -
2.5	Replacement of sump pumps	Item	2		R -
2.6	Replacement of thermostats	Item	3		R -
3	**AHU**				
3.1	Service of AHU	Item	9		R -
3.2	Repalce of filters	Item	80		R -
3.3	Replce VCD controller in basement 3	Item	80		R -
	TOTAL FOR BILL No. 2 - CHILLER (Carry to Summary)				**R -**

Item	Description	Unit	Qty	Tariff	Amount
	BILL No.5 /1 **AIR CONDITIONING INSTALLATION** **6TH FLOOR**				
	Airflow balancing, test, and replacement to include airflow measurements. Existing diffusers are of variable volume type				
1	Room 6-2 :Heat not working, test and replace heater	No	1		R -
2	Room 6-3 :No air flow, Check and open damper	No	1		R -
3	Room 6-4 :Diffuser no operating, test acuator and replace if faulty	No	2		R -
5	Room 6-9 :No air flow, Check and open damper	No	1		R -
6	Room 6-10 :No air flow,Check and open damper	No	1		R -
7	Room 6-10 :Heat not working, test and replace heater	No	1		R -
8	Room 6-11 :No air flow,Check and open damper	No	1		R -
9	Room 6-11 :Heat not working and Diffuser actuator not working, Replace diffuser	No	1		R -
10	Room 6-12 :No air flow and diffuser actuator not operating,Check and open damper, test and replace diffuser if faulty.	No	1		R -
11	Room 6-13 :No air flow and diffuser actuator not operating,Check and open damper, test and replace diffuser if faulty.	No	1		R -
12	Room 6-14 :No air flow,Check and open damper	No	1		R -
13	Manually balance supply air damper	No	3		R -
	TOTAL FOR BILL No.5/1: (Carried forward to Summary)				R -

Item	Description	Unit	Qty	Tariff	Amount
	BILL No.5 /2 **AIR CONDITIONING INSTALLATION** **5TH FLOOR**				
	Airflow balancing and test, to include airflow measurements				
1	Room 5-1 :No air flow, Check and open damper	No	1		R -
2	Room 5-2 :No air flow, Check and open damper	No	1		R -
3	Room 5-3 :No air flow, Check and open damper	No	1		R -
4	Room 5-5 :No air flow, Check and open damper	No	1		R -
5	Room 5-7a :No air flow, Check and open damper	No	1		R -
6	Room 5-7b :No air flow, Check and open damper	No	1		R -
7	Room 5-8 :No air flow, Check and open damper	No	1		R -
8	Room 5-9 :Diffuser removed, Re instate	No	1		R -
9	Room 5-10 :No air flow, Check and open damper	No	1		R -
10	Room 5-11 :No air flow, open damper. Test heater and replace heater if damaged	No	1		R -
11	Room 5-13 :No air flow, Check and open damper	No	1		R -
12	Room 5-14 :Diffuser not operating, test actuator and replace	No	1		R -
13	Room 5-15 :No air flow, Check and open damper	No	1		R -
14	Room 5-16 :Diffuser not operating, test actuator and replace if damaged	No	1		R -
15	Room 5-16 :Controller not working, Replace controller				
16	Room 5-17 :No air flow, Check and open damper	No	1		R -
17	Manually balance supply air damper	No	3		R -
	TOTAL FOR BILL No.5/2: (Carried forward to Summary)				R -

Item	Description	Unit	Qty	Tariff	Amount
	BILL No.5 /3 **AIR CONDITIONING INSTALLATION** **4TH FLOOR**				
	Airflow balancing and test, to include airflow measurements				
1	Room 4-1 :Replace controller	No	1		R -
2	Room 4-2 :Replace controller	No	1		R -
3	Room 4-3 :Replace controller	No	1		R -
4	Room 4-5 :Low air flow, check and open damper	No	1		R -
5	Room 4-7 :Low air flow and Heat not working, replace heater and open damper	No	1		R -
6	Room 4-8 :Replace controller	No	1		R -
7	Room 4-9a :Diffuser no operating, test actuator and replace if damaged	No	1		R -
8	Room 4-10 :No air flow, check and open damper	No	1		R -
9	Room 4-11 :No air flow, check and open damper	No	1		R -
10	Room 4-12 :No air flow and No heat, check and open damper, test and replace diffuser if dammaged	No	1		R -
11	Room 4-15 :No air flow, check and open damper	No	1		R -
12	Room 4-16 :Diffuser no operating, heat not working, no air flow. check and open damper, test actuator and replace diffuser if damaged	No	1		R -
13	Room 4-17 :Diffuser actuator not operating. Test and replace if damaged	No	1		R -
14	Room 4-20 :No air flow, Heat not working. Check and open damper. Test heater and replace if damaged.	No	1		R -
15	Room 4-21 :No air flow, open damper. Test heater	No	1		R -
16	Room 4-22 :No air flow, open damper	No	1		R -
17	Room 4-23 :No air flow, open damper. Test heater	No	1		R -
18	Manually balance supply air damper	No	3		R -
	TOTAL FOR BILL No.5/3: (Carried forward to Summary)				R -

Item	Description	Unit	Qty	Tariff	Amount
	BILL No.5 /4 **AIR CONDITIONING INSTALLATION** **3 RD FLOOR**				
	Airflow balancing and test, to include airflow measurements				
1	Room 3-1 :Diffuser not operating, Heat not working. Test diffuser and replace if damaged	No	1	R	-
2	Room 3-2 :Heat not working. Test diffuser and replace if damaged	No	1	R	-
3	Room 3-3a :Fume coming out of the Diffuser. Replace diffuser	No	1	R	-
4	Room 3-4 :Diffuser not operating, Heat not working. Test and replace if damaged	No	1	R	-
5	Room 3-5 :Air flow too high, Heat not working. Check damper. Test heater and replace if damaged	No	1	R	-
6	Room 3-6 :Air flow too high, Heat not working. Check damper. Test heater and replace if damaged	No	1	R	-
7	Room 3-7 :No air flow, Heat not working. Check damper. Test heater and replace if damaged	No	1	R	-
8	Room 3-8 :Air flow too high, Heat not working. Check damper. Test heater and replace if damaged	No	1	R	-
9	Room 3-9 :Air flow too high, Heat not working. Check damper. Test heater and replace if damaged	No	1	R	-
10	Room 3-9 :Controller faulty. Replace controller	No	1	R	-
11	Room 3-11 :Diffuser no operating, test actuator and replace if damaged	No	1	R	-
12	Room 3-12 :Diffuser no operating, test actuator and replace if damaged	No	1	R	-
13	Room 3-12 :Controller not working. Replace controller	No	1	R	-
14	Room 3-13 :Controller not working. Replace controller	No	1	R	-
15	Room 3-14 :No Air flow, Heat not working. Check damper, test diffuser and replace if damaged	No	1	R	-
16	Room 3-15 :Diffuser no operating, test actuator and replace if damaged	No	1	R	-
17	Room 3-16 :Heat not working. Test diffuser and replace if damaged	No	1	R	-
18	Room 3-17 :Heat not working. Test diffuser and replace if damaged	No	1	R	-
19	Room 3-18 :No air flow, diffuser actuator not operating, heat not working. Test diffuser and replace if damaged, check and open damper	No	1	R	-
20	Room 3-20a :Fume coming out of the Diffuser, Difffuser actuator not operating. Replace diffuser	No	1	R	-
21	Room 3-20c :Diffuser not operating. test actuator and replace	No	1	R	-
22	Room 3-21 :Air flow too high. Check damper	No	1	R	-

23	Room 3-21 :Replace controller	No	1		R	-
24	Room 3-22 :Air flow too high. Check damper	No	1		R	-
25	Room 3-22 :Replace controller	No	1		R	-
26	Room 3-23 :Air flow too high. Check damper	No	1		R	-
27	Room 3-24 :No air flow, open damper. Test heater	No	1		R	-
28	Room 3-26 :Heat not working. Test and replace if damaged	No	1		R	-
29	Room 3-27 :Air flow too high, Heat not working. Check damper, Test diffuser and replace if damaged	No	1		R	-
30	Room 3-28 :Diffuser actuator not operating, Heat not working. Replace	No	1		R	-
31	Room 3-29 :No air flow, open damper. Test heater	No	1		R	-
32	Room 3-30 :Air flow too high, Heat not working. Check damper, Test diffuser and replace if damaged	No	1		R	-
33	Room 3-31 :Heat not working. Test heater and replace if damaged	No	1		R	-
34	Room 3-32 :Heat not working. Test heater and replace if damaged	No	1		R	-
35	Room 3-34 :diffuser not operating. Air flow too high. Test diffuser and replace if damaged, check damper	No	1		R	-
36	Room 3-35 :No air flow, open damper. Test heater	No	1		R	-
37	Room 3-36 :Replace controller, Test diffuser	No	1		R	-
38	Room 3-37 :Heat not working. Test heater and replace if damaged	No	1		R	-
39	Room 3-38 :Heat not working. Test heater and replace if damaged	No	1		R	-
40	Room 3-40 :No Air flow, Heat not working, Diffuser actuator not operating. Check damper, test diffuser and replace if damaged	No	1		R	-
41	Room 3-42 :No Air flow, Heat not working. Check damper, test diffuser	No	1		R	-
42	Room 3-43 :Diffuser actuator not operating, Heat not working. Test and	No	1		R	-
43	Room 3-44 :No air flow, open damper. Test heater	No	1		R	-
44	Room 3-45 :No Air flow, Heat not working. Check damper, test diffuser and replace if damaged	No	1		R	-
45	Room 3-48 :No air flow. Check and open damper	No	1		R	-
46	Room 3-53 :No air flow, open damper. Test heater	No	1		R	-
47	Room 3-54 :Check damper	No	1		R	-
48	Manually balance supply air damper	No	3		R	-
	TOTAL FOR BILL No.5/4: (Carried forward to Summary)				R	-

Item	Description	Unit	Qty	Tariff	Amount
	BILL No.5 /5 **AIR CONDITIONING INSTALLATION** **2ND FLOOR**				
	Airflow balancing and test, to include airflow measurements				
1	Room 2-1 :No air flow, Diffuser not operating, heat not working. Check and open damper, test and replace damper if damaged	No	1		R -
2	Room 2-1 :Replace controller	No	1		R -
3	Room 2-4a :Replace controller	No	1		R -
4	Room 2-4a :Heat not working. Test and replace if damaged	No	1		R -
5	Room 2-4b :No air flow. Check and Open damper. Test heater	No	1		R -
6	Room 2-4d :Replace controller	No	1		R -
7	Room 2-4d :No air flow. Check and open damper	No	1		R -
8	Room 2-5 :Air flow too high, Diffuser actuator not operating. Check damper, Test diffuser and replace if damaged.	No	1		R -
9	Room 2-6 :Heat not working. Test. Repair or replace diffuser	No	1		R -
					R -
10	Room 2-7 :Diffuser not operating, Heat not working. Test and repair/replace	No	1		R -
11	Room 2-10 :Replace controller	No	1		R -
12	Room 2-12 :Replace controlle	No	1		R -
					R -
13	Room 2-12 :Air flow too high, Diffuser actuator not operating. Check and open damper, test diffuser and repair/replace		1		R -
14	Room 2-13 :Diffuser not operating, heat not working. Test and repair/replace	No	1		R -
15	Room 2-14 :Diffuser not operating, heat not working, no air flow. Check damper and open, test and repair/replace diffuser	No	1		R -
16	Room 2-14 :Replace controller	No	1		R -

17	Room 2-15 :Heat not working, No air flow, both diffuser actuators not operating. Check and open damper, Test and repair/replace diffuser	No	2		R	-
18	Room 2-16 :No air flow, Heat not working. Check and open damper, test and repair/replace diffuser	No	1		R	-
19	Room 2-17 :Diffuser not operating, no air flow. Check and open damper, test and repair/replace diffuser	No	1		R	-
20	Room 2-18 :No air flow, Diffuser plates not operating, Heat not working. Test and repair/replace diffuser, check and open damper	No	1		R	-
21	Room 2-19 :low air flow, Heat not working. Check damper, test and repair/replace diffuser	No	1		R	-
22	Room 2-20a :Heat not working. Test and repair/replace diffuser	No	1		R	-
23	Room 2-20b :Air flow too high, Heat not working. Check damper, test and repair or replace diffuser	No	1		R	-
24	Room 2-21 :Air flow too high, Heat not working. Check damper, test and repair or replace diffuser	No	1		R	-
25	Room 2-22 :Replace controller	No	1		R	-
26	Room 2-23 :Air flow too high, Heat not working	No	1		R	-
27	Room 2-23 :Replace contoller	No	1		R	-
28	Room 2-26 :No air flow, Two Diffuser actuators not operating, Heat not working. Check and open damper, test and repair/replace diffuser	No	1		R	-
29	Room 2-27 :Heat not working. Test and repair/replace diffuser	No	1		R	-
30	Room 2-28 :Heat not working. Test and repair/replace diffuser	No	1		R	-
31	Room 2-29 :No air flow, Heat not working. Check damper, Test and repair/replace diffuser	No	1		R	-
32	Room 2-30 :No air flow, Diffuser actuator not operating, Heat not working. Check damper, Test and repair/replace diffuser	No	1		R	-
33	Room 2-31 :No air flow, open damper. Test heater	No	1		R	-
34	Room 2-33 :No air flow, Heat not working on both diffusers. Test and repair/replace diffuser	No	1		R	-
35	Room 2-33 :Replace controller	No	1		R	-

36	Room 2-34 :Air flow too high, Diffuser actuator not operating, Heat not working. Check damper, Test and repair/replace diffuser	No	1		R	-
37	Room 2-34 :Replace controller	No	1		R	-
38	Manually balance supply air damper	No	3		R	-
	TOTAL FOR BILL No.5/5: (Carried forward to Summary)				R	-

Item	Description	Unit	Qty	Tariff	Amount
	BILL No.5 /6 **AIR CONDITIONING INSTALLATION** **1ST FLOOR**				
	Airflow balancing and test, to include airflow measurements				
1	Room 1-3 :Heat not working. Test and repair/replace diffuser	No	1	R	-
2	Room 1-4 :Heat not working. Test and repair/replace diffuser	No	1	R	-
3	Room 1-5 :No air flow, Heat not working. Check damper, Test and repair/replace diffuser	No	1	R	-
4	Room 1-7 :Air flow too high, Diffuser actuator not operating. Check damper, Test and repair/replace diffuser	No	1	R	-
5	Room 1-8 :Replace controller	No	1	R	-
6	Room 1-8 :Diffuser not operating. test diffuser and repair/replace	No	1	R	-
7	Room 1-9 :Diffuser not operating, air flow too high. Check damper, Test and repair/replace diffuser	No	1	R	-
8	Room 1-10 :No air flow, open damper. Test heater, Check damper	No	1	R	-
9	Room 1-11 :No air flow, Diffuser not operating. Test heater, Check damper	No	1	R	-
10	Room 1-11 :Replace controller	No	1	R	-
11	Room 1-12 :Replace controller	No	1	R	-
12	Room 1-12 :Air flow too high. Check damper	No	1	R	-
13	Room 1-13 :Replace controller	No	1	R	-
14	Room 1-14 :Diffuser not operating, No air flow. Check damper, Test and repair/replace diffuser	No	1	R	-
15	Room 1-15 :Diffuser is burnt inside. Replace	No	1	R	-
16	Room 1-16 :Diffuser actuator not operating, Heat not working. Test and repair/replace diffuser	No	1	R	-
17	Room 1-16 :Replace controller	No	1	R	-
18	Room 1-17 :Diffuser actuator not operating, Heat not working. Test and repair/replace diffuser	No	1	R	-

19	Room 1-18 :Diffuser actuator not operating, Heat not working. Test and repair/replace diffuser	No	1		R	-
20	Room 1-21b :Diffuser actuator not operating, Heat not working. Test and repair/replace diffuser	No	1		R	-
21	Room 1-21c :No controller. Supply and install controller	No	1		R	-
22	Room 1-21d :Heat not working. Test and repair/replace diffuser	No	1		R	-
23	Room 1-22 : Air flow too high, heat not working. Check damper, test and repair/replace diffuser	No	1		R	-
24	Room 1-23 :Diffuser not operating. Test and repair/replace diffuser	No	1		R	-
25	Room 1-23 :Replace controller	No	1		R	-
26	Room 1-24 :Diffuser not operating, test actuator, Test heater	No	1		R	-
27	Room 1-25 :Replace controller	No	1		R	-
28	Room 1-26 :Replace controller	No	1		R	-
29	Room 1-27 :Replace controller	No	1		R	-
30	Room 1-28 :Replace controller	No	1		R	-
31	Room 1-28: No air flow. Check damper	No	1		R	-
32	Room 1-30 :Diffuser actuator not operating, Heat not working. Test and repair/replace diffuser	No	1		R	-
33	Room 1-30 :Replace controller	No	1		R	-
34	Room 1-31 :Heat not working. Test and repair/replace diffuser	No	1		R	-
35	Room 1-32b :Replace controller	No	1		R	-
36	Room 1-33 :Diffuser not operating. Test and repair/replace diffuser	No	1		R	-
37	Room 1-33 :Replace controller	No	1		R	-
38	Room 1-34 :Replace controller	No	1		R	-
39	Room 1-35 :Replace controller	No	1		R	-
40	Romm 1-35 :Diffuser not operating. Test and repair/replace diffuser	No	1		R	-
41	Room 1-36 :Diffuser not operating, Air flow too high. Check damper, test and repair/replace diffuser	No	1		R	-

42	Room 1-37 :Diffuser not operating, no air flow. Check damper, test and repair/replace diffuser	No	1		R	-
43	Room 1-37 :Replace controller	No	1		R	-
44	Room 1-38 :Diffuser not operating, test actuator, Test heater	No	1		R	-
45	Room 1-39 :Diffuser not operating, test actuator, Test heater,	No	1		R	-
46	Room 1-40 :Diffuser not operating, test actuator, Test heater,	No	1		R	-
47	Room 1-41 :Diffuser not operating, no air flow. Check damper, test and repair/replace diffuser	No	1		R	-
48	Room 1-41 :Replace controller	No	1		R	-
49	Room 1-42 :No air flow. Check damper	No	1		R	-
50	Room 1-42 :Replace controller	No	1		R	-
51	Room 1-43 :Replace controller	No	1		R	-
52	Room 1-44a :Replace controller	No	1		R	-
53	Room 1-45 :Replace controller	No	1		R	-
54	Manually balance supply air damper	No	3		R	-
	TOTAL FOR BILL No.5/6: (Carried forward to Summary)				R	-

Item	Description	Unit	Qty	Tariff	Amount
	BILL No.5 /7 **AIR CONDITIONING INSTALLATION** **GROUND FLOOR**				
	Airflow balancing and test, to include airflow measurements				
1	Room G-8 :Diffuser not operating, no air flow. Check damper, Test and repair/replace diffuser	No	1		R -
2	Room G-9 (Kitechen) :Heat not working. Test and repair/replace diffuser.	No	1		R -
3	Room G-9 (Kitechen) :Cold room rontroller not working. Test and repair/replace controller	No	1		R -
4	Room G-10 :Heat not working. Test and repair/replace diffuser.	No	1		R -
5	Room G-11 :Heat not working. Test and repair/replace diffuser.	No	1		R -
6	Room G-13 :Heat not working. Test and repair/replace diffuser.	No	1		R -
7	Room G-17 :Diffuser plate Rack is scratching. Heat not working. Test and repair/replace diffuser.	No	1		R -
8	Room G-18 :Heat not working. Test and repair/replace diffuser.	No	1		R -
9	Room G-19 :Heat not working. Test and repair/replace diffuser.	No	1		R -
10	Room G-20 : Replace controller	No	1		R -
11	Room G-21a :Heat not working. Test and repair/replace diffuser.	No	1		R -
12	Room G-26 :Diffusers not operating, No air flow, Heat not working on two diffusers. Check damper, Test and repair/replace diffuser	No	2		R -
13	Room G-27 :No air flow. Check damper	No	1		R -
14	Room G-28a :Two diffuser actuator not operating, Heat not working on two diffusers.Test and repair/replace diffuser	No	2		R -
15	Room G-28 :Diffuser not operating. Test and repair/replace diffuser	No	1		R -
16	Room G-29 :Heat not working. Test and repair/replace diffuser.	No	1		R -

17	Room G-30 :No air flow, open damper. Test heater	No	1		R	-
18	Sick Bay :Heat not working. Test and repair/replace diffuser.	No	1		R	-
19	Sick Bay :Replace controller	No	1		R	-
20	Meeting area :Diffuser hanging loose	No	1		R	-
21	Manually balance supply air damper	No	3		R	-
	TOTAL FOR BILL No.5/7: (Carried forward to Summary)				R	-

Item	Description	Unit	Qty	Tariff	Amount
	BILL No.6				
	BMS INSTALLATION				
	Supply, installation, commissioning, hand-over and 12 months maintenance and guarantee of a BMS system , as per clauses 22 and 23 of the Specification, consisting of the following:				
1	**Building Management System**				
1,1	Ensure the existing Network Automation is re-configured and updated with all required firmware to ensure functionality and compatibility.	Item	1		R -
1,2	Reconfigure the existing database to meet client requirements and ensure efficiency of system and energy management functionality.	Item	1		R -
1,3	Upgrade BMS software to latest	Item	1		R -
1,4	Re-configure NAE and update existing	Item	1		R -
1,5	Database and graphic configuration	Item	1		R -
2	**Field Hardware**				
	Test and check all existing field controllers as detailed below.				
	All points to be tested and checked for continuity back o the BMS Front End.				
	All sensors will be calibrated.				
	All individual plant control operation to be re commissioned and reported on				
2,1	AHU 1	No	1		R -
2,2	AHU 2	No	1		R -
2,3	AHU 3	No	1		R -
2,4	AHU 4	No	1		R -
2,5	AHU 5	No	1		R -
2,6	AHU 6	No	1		R -
2,7	AHU 7	No	1		R -
2,8	AHU 8	No	1		R -
2,9	AHU 9	No	1		R -
2,10	Basement Vent Fan 1 Controls	No	1		R -
2,11	Basement Vent Fan 2 Controls	No	1		R -
2,12	Basement Vent Fan 3 Controls	No	1		R -
2,13	Chiller Controller	No	1		R -
2,14	Boiler Monitoring	No	1		R -
2,15	PRD Controls - AHU 1	No	1		R -
2,16	PRD Controls - AHU 2	No	1		R -
2,17	PRD Controls - AHU 3	No	1		R -
2,18	PRD Controls - AHU 4	No	1		R -
2,19	BACNET Diffuser Interface +/- 1000 diffusers	No	1		R -
3	**Air Handling Unit No´s: 5, 6, 7, 8 & 9 - Controller for Constant Volume**				
3,1	Temp. sensor before cooling coil	No	5		R -
3,2	Temp. sensor after cooling coil	No	5		R -
3,3	Temp. sensor after heaters	No	5		R -
3,4	Humid sensor after heaters	No	5		R -

3,5	Temp. sensor outside air	No	10		R	-
3,6	Temp. sensor mixing air	No	10		R	-
3,7	Air flow switch	No	5		R	-
3,8	Dirty filter sensor	No	5		R	-
3,9	Run Start status	No	5		R	-
3,10	Actuators: 24 Volt AC	No	5		R	-
3,11	Temp sensor chilled water	No	5		R	-
3,12	Controller for AHU	No	10		R	-
3,13	Expansion Module	No	5		R	-
3,14	Mylar screened: 0.22 mm 2 pair (4 core)	No	350		R	-
4	**Air Handling Units No's 1, 2, 3 & 4: Controllers for Variable Volume**					
4.1	Temp. sensor before cooling coil	No	4		R	-
4.2	Temp. sensor after cooling coil	No	4		R	-
4.3	Temp. sensor after heating coil	No	4		R	-
4.4	Humid sensor after heating coil	No	4		R	-
4.5	Temp. sensor outside air	No	4		R	-
4.6	Temp. sensor mixing air	No	4		R	-
4.7	Air flow switch	No	4		R	-
4.8	Dirty filter sensor	No	4		R	-
4.9	Run Start status	No	4		R	-
4.10	3-Way Valve: Chilled water: Ø 80	No	8		R	-
4.11	3-Way Valve: hot water: Ø 40	No	4		R	-
4.12	3-Way Valve: hot water: Ø 32	No	4		R	-
4.13	Actuators: 24 Volt AC	No	4		R	-
4.14	Temp sensor for chilled water	No	4		R	-
4.15	Temp sensor for hot water	No	4		R	-
4.16	Controllers for AHU's	No	4		R	-
4.17	Expansion Module	No	4		R	-
4.18	Mylar screened: 0.22 mm 2 pair (4 core)	m	1000		R	-
5	Pressure Reducing Dampers					
5.1	Rotary Actuator	No	1		R	-
5.2	Pressure sensor	No	2		R	-
5.3	Compatible controller	No	1		R	-
5.4	Differential Air Pressure Switch static pressure sensor	No	10		R	-
5.5	For the complete testing of all isntalled pressure reducing dampers	Sum	1		R	-
6	VAV Diffuser Master Controllers					
6.1	VAV Diffuser Master controller	No	10		R	-
					R	-
6.2	Remote temp. indicator / set point adjustor	No	10		R	-
					R	-
6.3	Temp. sensor (1 m length)	No	10		R	-
					R	-
6.4	Stepless heater controller	No	50		R	-
					R	-
6.5	Mylar screened: 0.22 mm 2 pair (4 core)	m	4000		R	-
7	Basement					
7.1	Supply and install a CO monitoring sensor, field installed and linked to the VS controller of No fan to vary the air supply between 100 – 30%	No	3		R	-
7.2	Field and control wiring complete for supply air system inclusive of CO monitoring and VS control.	No	3		R	-
8	Energy meter					

8.1	Energy multimeter for recording and monitoring Voltage, Demand, Energy and Power Factor	No	1		R	-
8.2	Dissconect and remove all exisitng redudant equipment, contractor to ensure that the equipment and material to be retained shall Not be damaged	Sum	1		R	-
10	Recommission the building to the satisfaction of the client. Ensure Energy Management Functionality.	Item	1		R	-
11	Provide training for all on site staff	Item	1		R	-
12	Operating manuals	No	3		R	-
	TOTAL FOR BILL No.6: (Carried forward to Summary)				R	-

Item	Description		Amount
	Summary		
	Bill No. 1 : Preliminaries		
	Bill No. 2 : Major Equipment		
	Bill No. 5/1 : Air Conditioning : Sixth floor		
	Bill No. 5/2 : Air Conditioning : Fifth floor		
	Bill No. 5/3 : Air Conditioning : Fourth floor		
	Bill No. 5/4 : Air Conditioning : Third floor		
	Bill No. 5/5 : Air Conditioning : Second floor		
	Bill No. 5/6 : Air Conditioning : First floor		
	Bill No. 5/7 : Air Conditioning : Ground floor		
	Bill No. 6 : BMS installation		
	Subtotal		
	Plus: 15% VAT		
	TOTAL TENDER PRICE INCLUDING VAT CARRIED TO DPW-07(EC) FORM OF OFFER AND ACCEPTANCE		
	NAME OF FIRM:		
	TENDERER'S SIGNATURE:		
	NAME (IN BLOCK LETTERS):		
	ADDRESS:		
	DATE:		
	TEL. No.:		
	FAX. No.:		

PWI BLOEMFONTEIN REGIONAL OFFICE - FINAL COMPLETION			
Floor	**Room**	**Fault**	**Action To Be Taken**
6	602	Heat not working	Replace Heater
6	603	No air flow	Check Damper
6	604	Two Diffuser actuators not operating	Replace
6	609	No air flow	Check Damper
6	610	Heat not working, No air flow	Check Damper, Replace heater
6	611	Heat not working, No air flow, Diffuser actuator not operating	Check Damper, Replace Diffuser
6	612	No air flow, Diffuser actuator not operating	Check Damper, Replace Diffuser
6	613	No air flow, Diffuser actuator not operating	Check Damper, Replace Diffuser
6	614	No air flow	Check Damper
5	501	No air flow	Check Damper
5	502	No air flow	Check Damper
5	503	No air flow	Check Damper
5	505	No air flow	Check Damper
5	506	No air flow	Check Damper
5	507a	No air flow	Check Damper
5	507b	No air flow	Check Damper
5	508	No air flow	Check Damper
5	509	Diffuser removed	Check Damper
5	510	No air flow	Check Damper
5	511	No air flow	Check Damper
5	513	No air flow	Check Damper
5	514	No air flow, Diffuser actuator not operating	Check Damper, Replace diffuser
5	515	No air flow	Check Damper
5	516	No air flow, Diffuser actuator not operating, faulty controller	Check Damper, Replace diffuser, Replace controller
	517	No air flow	Check Damper
4	401	Controller not working	Replace Controller
4	402	Controller not working	Replace Controller
4	403	Controller not working	Replace Controller
4	405	Low air flow	Check Damper
4	406	Air too dry for the ofice user	Close Damper
4	407	Heat not working, Low air flow	Replace Diffuser, Check Damper
4	408	Broken Controller	Replace Controller
4	409a	Diffuser actuator not operating	Replace diffuser
4	410	No air flow	Check Damper
4	412	Diffuser actuator not operating, No air flow	Replace Diffuser, Check Damper
4	416	Diffuser actuator not operating, No air flow, Heat not working	Replace Diffuser, Check Damper
4	417	Diffuser actuator not operating	Replace diffuser
4	420	Heat not working	Replace heater
4	422	Low air flow, Heat not working, Isolator burnt	Replace Diffuser, Check Damper, check Isolator
4	423	No air flow	Check Damper
4	424	No air flow	Check Damper
4	plant room	Pump strainers are dirty	Repair

3	301	Heat not working	Replace Diffuser
3	302	Heat not working	Replace Diffuser
3	303a	Fume coming out of the Diffuser	Replace Diffuser
3	304	Diffuser actuator not working, Heat not working	Replace Diffuser
3	305	Air flow too high	Check Damper
3	306	Air flow too high, Heat not working	Replace Diffuser, Check damper
3	307	No Air flow, Heat not working	Replace Diffuser, Check damper
3	308	Air flow too high	Check Damper
3	309	Air flow too high, Heat not working, Controller faulty	Replace Diffuser, Check damper, Replace controller
3	311	Diffuser actuator not working	Replace Diffuser
3	312	Controller not working	Replace Controller
3	313	Controller not working	Replace Controller
3	314	No Air flow, Heat not working	Replace Diffuser, Check damper
3	315	Diffuser actuator not operating	Replace Diffuser
3	316	Heat not working	Replace Diffuser
3	317	Heat not working	Replace Diffuser
3	318	Two Diffuser actuators not operating, heat not working	Replace Diffuser
3	320a	Fume coming out of the Diffuser, Difffuser actuator not operating	Replace Diffuser
3	320c	Diffuser actuator not operating	Replace Diffuser
3	321	Air flow too high, Controller not working	Replace Controller, Check damper
3	322	Air flow too high, Controller not working	Replace Controller, Check damper
3	323	Air flow too high	Check Damper
3	324	No air flow	Check Damper
3	325a	No Air flow, Heat not working	Replace Diffuser, Check damper
3	326	Heat not working	Replace Diffuser
3	327	Air flow too high, Heat not working	Replace Diffuser, Check damper
3	328	Diffuser actuator not operating, Heat not working	Replace Diffuser
3	330	Air flow too high, Heat not working	Replace Diffuser, Check damper
3	331	Heat not working	Replace Diffuser
3	332	Heat not working	Replace Diffuser
3	334	diffuser actuator not operating, Air flow too high	Replace Diffuser, Check damper
3	336	Controller not working	Replace controller
3	337	Heat not working	Replace Diffuser
3	338	Heat not working	Replace Diffuser
3	340	No Air flow, Heat not working, Diffuser actuator not operating	Replace Diffuser, Check damper
3	342	No Air flow, Heat not working	Replace Diffuser, Check damper
3	343	Diffuser actuator not operating, Heat not working	Replace Diffuser
3	345	No Air flow, Heat not working	Replace Diffuser, Check damper
3	348	No air flow	Check Damper

2	201	Controller faulty, Heat not working, Diffuser actuator not operating	Replace controller, replace Diffuser
2	204a	Heat not working, Controller faulty	Replace controller, replace Diffuser
2	204b	No air flow	Check damper
2	204d	Controller faulty, No air flow	Replace Diffuser, Check Damper
2	205	Air flow too high, Diffuser actuator not operating	Replace Diffuser, Check Damper
2	206	Heat not Working	Replace Diffuser
2	207	Diffuser plate not operating, Heat not working	Replace Diffuser
2	210	No Controller	Replace Controller
2	212	Air flow too high, Diffuser actuator not operating, Controller faulty	Replace Diffuser, Check Damper, Replace controller
2	213	Diffuser plate not operating, Heat not working	Replace Diffuser
2	214	Controller faulty, Heat not working, Diffuser actuator not operating, No air flow	Replace Diffuser, Check Damper, Replace controller
2	215	Heat not working, No air flow, both diffuser actuators not operating	Replace Diffuser, Check Damper
2	216	No air flow, Heat not working	Replace Diffuser, Check Damper
2	217	No air flow, Diffuser plates not operating	Replace Diffuser, Check Damper
2	218	No air flow, Diffuser plates not operating, Heat not working	Replace Diffuser, Check Damper
2	219	Low air flow, No heat	Replace Diffuser, Check Damper
2	220a	Heat not Working	Replace Diffuser
2	220b	Air flow too high, Heat not working	Replace Diffuser, Check Damper
2	221	Air flow too high, Heat not working	Replace Diffuser, Check Damper
2	222	Controller broken	Replace controller
2	223	Air flow too high, Heat not working, Controller not working	Replace Diffuser, Check Damper, Replace controller
2	226	No air flow, Two Diffuser actuators not operating, Heat not working	Replace Diffuser, Check Damper
2	227	Heat not Working	Replace Diffuser
2	228	Heat not working	Replace Diffuser
2	229	No air flow, Heat not working	Replace Diffuser, Check Damper
2	230	No air flow, Diffuser actuator not operating, Heat not working	Replace Diffuser, Check Damper
2	232	No air flow, Diffuser actuator not operating, Heat not working	Replace Diffuser, Check Damper
2	233	controller faulty, Heat not working on both diffusers	Replace Diffuser, replace Controller
2	234	Air flow too high, Diffuser actuator not operating, Controller faulty, Heat not working	Replace Diffuser, Check Damper, Replace controller

1	103	Heate not working	Replace diffuser
1	104	Heate not working	Replace diffuser
1	105	No air flow, Heat not working	Replace diffuser, Check damper
1	107	Air flow too high, Diffuser actuator not operating	Replace diffuser, Check damper
1	108	Diffuser actuator not operating, Controller faulty	Replace diffuser and controller
1	109	Diffuser actuator not operating, Air flow too high	Replace diffuser, Check damper
1	111	Diffuser actuator not operating, Controller faulty, No air flow	Replace diffuser, Check damper, Replace controller
1	112	Air flow too high, contoller loose and faulty	Replace controller, Check damper
1	113	Controller broken	Replace controller
1	114	Diffuser actuator not operating, No air flow	Replace diffuser, Check damper
1	115	Diffuser actuator is burnt	Replace diffuser
1	116	Controller faulty, Diffuser actuator not operating, Heat not working	Replace diffuser and controller
1	117	Diffuser actuator not operating, Heat not operating	Replace diffuser
1	118	Diffuser actuator not operating, Heat not operating	Replace diffuser
1	121b	Diffuser actuator not operating, Heat not operating	Replace diffuser
1	121c	No controller	Replace controller
1	121d	Heat not working	Replace diffuser
1	122	Air flow too high, No heat	Replace diffuser, Check damper
1	123	Controller faulty, Diffuser actuator not operating	Replace diffuser and controller
1	125	Controller faulty	Replace controller
1	126	Controller faulty	Replace controller
1	127	Controller faulty	Replace controller
1	128	No air flow, Controller faulty	Replace controller, Check damper
1	130	Controller faulty, Diffuser actuator not operating, Heat not working	Replace diffuser and controller
1	131	Heat not working	Replace diffuser
1	132b	Controller faulty	Replace controller
1	133	Controller faulty, Diffuser actuator not operating	Replace diffuser and controller
1	134	Controller faulty	Replace controller
1	135	Controller faulty, Diffuser actuator not operating	Replace diffuser and controller
1	136	Air flow too high, Diffuser actuator not operating	Replace diffuser, Check damper
1	137	Diffuser actuator not operating, Controller faulty, No air flow	Replace diffuser, Check damper, Replace controller
1	141	Diffuser actuator not operating, Controller faulty, No air flow	Replace diffuser, Check damper, Replace controller
1	142	No air flow, Controller not working	Replace controller, Check damper
1	143	Controller not working	Replace controller
1	144a	Controller not working	Replace controller
1	145	Controller not working	Replace controller
1	AHU-5	Emergency stops not working	Repair

Ground	G08	No air flow on one diffuser	Check damper
Ground	Kitchen	Heat not working	Replace diffuser
Ground	Coldroom	Cold room rontroller not working	Replace controller
Ground	G010	Heat not working	Replace diffuser
Ground	G11	Heat not working	Replace diffuser
Ground	G13	Heat not working	Replace diffuser
Ground	G17	Diffuser plate Rack is scratching, Heat not working	Replace diffuser
Ground	G18	Heat not working	Replace diffuser
Ground	G19	Heat not working	Replace diffuser
Ground	G20	Controller faulty	Replace controller
Ground	G21A	Heat not working	Replace diffuser
Ground	G26	One diffuser actuator not operating, No air flow, Heat not working on two diffusers	Replace diffuser, Check damper
Ground	G27	No air flow	Check damper
Ground	G28a	Two diffuser actuator not operating, Heat not working on two diffusers	Replace diffuser
Ground	G28b	One diffuser actuator not operating	Replace diffuser
Ground	G29	Heat not working	Replace diffuser
Ground	Sic Bay	Controller faulty, Heat not working	Replace diffuser, Replace controller
Ground	leeting are	Diffuser hanging loose	Repair
		BMS not operating	Update software and program
Basement 1 and 3		AHU is noisy	Repair
Basement 1		All three boiler DB trips, AHU is noisy	Check boilers, Repair
New Chillers		No expansion bellows	Install expasion bellows on supply and return lines
			Put direction arrows on all Pipelines
AHU-529		Safeties are bridged out	Check all safties
AHU-1		Releigh faulty	Repair

DRPW – 03 (EC) TENDER DATA

Bid no: Q25/052

Bid/ Project Description: BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)

NOTES TO CONTRACTORS

- ***Final Summary MUST be fully completed by the contractor; failure will invalidate the contractors' quotation***
- ***The Contractor is advised NOT TO EXECUTE any additional work other than specified above/ or one the scope of works***
- ***The Contractor SHALL NOT TAKE any instruction(s) from the Client department or any person other than the relevant Works Manager when executing the service***
- ***The Contractor MUST visit the site to acquaint themselves with the condition of the service to be rendered***
- ***Quantity of material is provisional; the Contractor will only be paid for material used on site and proof of purchase for the material utilized for this service must be attached to the invoice.***
- ***The Guarantee provided MUST comply with requirement set out in the Scope of Works***
- ***Electrical Work MUST be executed by a qualified Installation Electrician***
- ***Security Works MUST be executed by a PSIRA register staff member.***
- ***Mechanical Work MUST be executed by a qualified Artisan/Tradesman***
- ***Works MUST be done according to SABS and Public Works and Infrastructure Standards***
- ***NO HIDDEN service(s) (e.g. underground) will be covered before being verified by the Works Manager***
- ***Kindly be advised that the above service is NOT to be sub-contracted in its entirety to third parties as the agreement is only between the Department and the Contractor herein.***
- ***Where new component/equipment (Security, etc.) has been replaced, guarantee must be furnished as per supplier's/manufacturer's requirements and the proof of purchase must be attached to the invoice.***

- ***Please provide VAT No. (if registered)*** | |
- ***Please provide CIDB Registration number. (if applicable)*** | |
- ***Construction Period: 03 months***
- ***Subject to CPAP in terms of CPAP policy*: *N/A***
- ***Penalty amount per calendar day for Late Completion will be calculate according to QS002 Guidelines for building contracts dated February 2023 on DPWI website and GCC 2015: 3rd EDITION (General Conditions of Contract for Construction Works).***
- ***Retention Period (Defect liability period) of 12 months from date of Completion (Practical Completion).***
- ***Project Address: DPWI Building, 18 President Brand Street, Bloemfontein CBD, Bloemfontein.***
- ***Payments and Retention monies will be calculated according to GCC 2015: 3rd EDITION (General Conditions of Contract for Construction Works.***

PA-11: BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. BIDDER'S DECLARATION

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest[3] in the enterprise, employed by the state?

☐ YES ☐ NO

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

([3]) the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.

Any reference to words "Bid" or Bidder" herein and/or in any other documentation shall be construed to have the same meaning as the words "Tender" or "Tenderer".
For External Use

2.2 Do you, or any person connected with the bidder, have a relationship with any person who is employed by the procuring institution?

☐ YES ☐ NO

2.2.1 If so, furnish particulars:

……....

……

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract?

☐ YES ☐ NO

2.3.1 If so, furnish particulars:

……..

……..

3. DECLARATION

I, the undersigned, (name)……. in submitting the accompanying bid, do hereby make the following statements that I declare to be true and complete in every respect:

3.1 I have read and I understand the contents of this disclosure;

3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;

3.3 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[4] will not be construed as collusive bidding.

3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.

3.5 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.

3.6 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

[4] 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.

Any reference to words “Bid” or Bidder” herein and/or in any other documentation shall be construed to have the same meaning as the words “Tender” or “Tenderer”.
For External Use

3.7 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.

I DECLARE THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT. I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

Name of Bidder	Signature	Date	Position

This form is aligned to SBD 4.

PA-15.1: RESOLUTION OF BOARD OF DIRECTORS

RESOLUTION of a meeting of the Board of *Directors / Members / Partners of:

_____
(*legally correct full name and registration number, if applicable, of the Enterprise)*

Held at _____ (*place)*

on _____ *(date)*

RESOLVED that:

1 The Enterprise submits a Tender to the Department of Public Works in respect of the following project:
_____

_____
(*project description as per Tender Document)*

Tender Number: _____*(Tender Number as per Tender Document)*

2 *Mr/Mrs/Ms: _____

in *his/her Capacity as: _____(*Position in the Enterprise)*

and who will sign as follows:

_____

be, and is hereby, authorised to sign the Tender, and any and all other documents and/or correspondence in connection with and relating to the Tender, as well as to sign any Contract, and any and all documentation, resulting from the award of the Tender to the Enterprise mentioned above.

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Note:

1. ** Delete which is not applicable.*
2. ***NB:** This resolution must, where possible, be signed by <u>all</u> the Directors / Members / Partners of the Tendering Enterprise.*
3. *In the event that paragraph 2 cannot be complied with, the resolution must be signed by Directors / Members / Partners holding a majority of the shares / ownership of the Tendering Enterprise (attach proof of shareholding / ownership hereto).*
4. *Directors / Members / Partners of the Tendering Enterprise may alternatively appoint a person to sign this document on behalf of the Tendering Enterprise, which person must be so authorized by way of a duly completed power of attorney, signed by the Directors / Members / Partners holding a majority of the shares / ownership of the Tendering Enterprise (proof of shareholding / ownership and power of attorney are to be attached hereto).*
5. *Should the number of Directors / Members / Partners exceed the space available above, additional names and signatures must be supplied on a separate page.*

ENTERPRISE STAMP

PA-15.2: RESOLUTION OF BOARD OF DIRECTORS TO ENTER INTO CONSORTIA OR JOINT VENTURES

RESOLUTION of a meeting of the Board of *Directors / Members / Partners of:

_____

_____
(*legally correct full name and registration number, if applicable, of the Enterprise)*

Held at _____ (*place)*

on _____ *(date)*

RESOLVED that:

1. The Enterprise submits a Tender, in consortium/joint venture with the following Enterprises:

   _____

   _____
   (list all the legally correct full names and registration numbers, if applicable, of the Enterprises forming the consortium/joint venture)

   to the Department of Public Works in respect of the following project:

   _____

   _____
   (*project description as per Tender Document)*

   Tender Number: _____(*Tender Number as per Tender Document)*

1 *Mr/Mrs/Ms: _____

   in *his/her Capacity as: _____*(Position in the Enterprise)*

   and who will sign as follows:
   _____

   be, and is hereby, authorised to sign a consortium/joint venture agreement with the parties listed under item 1 above, and any and all other documents and/or correspondence in connection with and relating to the consortium/joint venture, in respect of the project described under item 1 above.

2 The Enterprise accept joint and several liability with the parties listed under item 1 above for the due fulfilment of the obligations of the joint venture deriving from, and in any way connected with, the Contract to be entered into with the Department in respect of the project described under item 1 above.

3 The Enterprise chooses as its *domicilium citandi et executandi* for all purposes arising from this joint venture agreement and the Contract with the Department in respect of the project under item 1 above:

   Physical address: _____

   _____Postal Code _____

Postal Address: _____

_____Postal Code_____

Telephone number: _____ Fax number: _____

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

The tendering enterprise hereby absolves the Department of Public Works from any liability whatsoever that may arise as a result of this document being signed.

Note:

*1. * Delete which is not applicable.*
*2. **NB:** This resolution must, where possible, be signed by all the Directors / Members / Partners of the Tendering Enterprise.*
3. In the event that paragraph 2 cannot be complied with, the resolution must be signed by Directors / Members / Partners holding a majority of the shares / ownership of the Tendering Enterprise (attach proof of shareholding / ownership hereto).
4. Directors / Members / Partners of the Tendering Enterprise may alternatively appoint a person to sign this document on behalf of the Tendering Enterprise, which person must be so authorized by way of a duly completed power of attorney, signed by the Directors / Members / Partners holding a majority of the shares / ownership of the Tendering Enterprise (proof of shareholding / ownership and power of attorney are to be attached hereto).
5. Should the number of Directors / Members / Partners exceed the space available above, additional names and signatures must be supplied on a separate page.

ENTERPRISE STAMP

PA-15.3: SPECIAL RESOLUTION OF CONSORTIA OR JOINT VENTURES

RESOLUTION of a meeting of the duly authorised representatives of the following legal entities who have entered into a consortium/joint venture to jointly tender for the project mentioned below: *(legally correct full names and registration numbers, if applicable, of the Enterprises forming a consortium/joint venture)*

1 _____

_____

2 _____

_____

3 _____

_____

4 _____

_____

5 _____

_____

6 _____

_____

7 _____

_____

8 _____

_____

Held at _____ (*place)*

on _____*(date)*

RESOLVED that:

A. The above-mentioned Enterprises submit a tender in consortium/joint venture to the Department of Public Works & Infrastructure in respect of the following project:

_____

_____

(project description as per Tender Document)

Tender Number: _____ *(tender number as per Tender Document)*

B. Mr/Mrs/Ms:_____

in *his/her Capacity as: _____ *(position in theEnterprise)*

and who will sign as follows: _____

be, and is hereby, authorised to sign the tender, and any and all other documents and/or correspondence in connection with and relating to the tender, as well as to sign any Contract, and any and all documentation, resulting from the award of the tender to the Enterprises in consortium/joint venture mentioned above.

C. The Enterprises constituting the consortium/joint venture, notwithstanding its composition, shall conduct all business under the name and style of:

_____

D. The Enterprises to the consortium/joint venture accept joint and several liability for the due fulfilment of the obligations of the consortium/joint venture deriving from, and in any way connected with, the Contract entered into with the Department in respect of the project described under item A above.

E. Any of the Enterprises to the consortium/joint venture intending to terminate the consortium/joint venture agreement, for whatever reason, shall give the Department 30 days' written notice of such intention. Notwithstanding such decision to terminate, the Enterprises shall remain jointly and severally liable to the Department for the due fulfilment of the obligations of the consortium/joint venture as mentioned under item D above.

F. No Enterprise to the consortium/joint venture shall, without the prior written consent of the other Enterprises to the consortium/joint venture and of the Department, cede any of its rights or assign any of its obligations under the consortium/joint venture agreement in relation to the Contract with the Department referred to herein.

G. The Enterprises choose as the *domicilium citandi et executandi* of the consortium/joint venture for all purposes arising from the consortium/joint venture agreement and the Contract with the Department in respect of the project under item A above:

Physical address: _____

_____

_____Postal Code _____

Postal Address: _____

_____

_____Postal Code _____

Telephone number _____ Fax number: _____

E-mail address: _____

	Name	Capacity	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

The tendering enterprise hereby absolves the Department of Public Works & Infrastructure from any liability whatsoever that may arise as a result of this document being signed.

Note:

*1. * Delete which is not applicable.*
*2. **NB:** This resolution must be signed by <u>all</u> the Duly Authorised Representatives of the Legal Entities to the consortium/joint venture submitting this tender, as named in item 2 of Resolution PA-15.2.*
3. Should the number of the Duly Authorised Representatives of the Legal Entities joining forces in this tender exceed the space available above, additional names, capacity and signatures must be supplied on a separate page.
4. Resolution PA-15.2, duly completed and signed, from the separate Enterprises who participate in this consortium/joint venture, must be attached to this Special Resolution (PA-15.3).

DPW-16. TENDER BRIEFING MEETING CERTIFICATE

Project title:	**BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)**		
Tender / Quotation no:	**Q25/052**	**Reference no:**	**Not Applicable**

Date Bid Briefing Meeting: N/A

Time of Bid Briefing Meeting: N/A

Venue: N/A

This is to certify that I,_____

representing _____

attended the tender clarification meeting on: _____

I further certify that I am satisfied with the description of the work and explanations given at the tender clarification meeting and that I understand the work to be done, as specified and implied, in the execution of this contract.

Name of Tenderer	Signature	Date

Name of DPW Representative	Signature	Date

DPW-21: RECORD OF ADDENDA TO TENDER DOCUMENTS

Project title:	**BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)**		
Tender / Quotation no:	**Q25/052**	**Reference no:**	**Not Applicable**

1. I / We confirm that the following communications received from the Department of Public Works before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer: *(Attach additional pages if more space is required)*

	Date	Title or Details
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Name of Tenderer	Signature	Date

2. I / We confirm that no communications were received from the Department of Public Works before the submission of this tender offer, amending the tender documents.

Name of Tenderer	Signature	Date

PA- 40: DECLARATION OF DESIGNATED GROUPS FOR PREFERENTIAL PROCUREMENT

Tender Number: Q25/052
Name of Tenderer ……..…… ☐ EME[2] ☐ QSE[3] ☐ Non EME/QSE (tick applicable box)

1. **LIST ALL PROPRIETORS, MEMBERS OR SHAREHOLDERS BY NAME, IDENTITY NUMBER, CITIZENSHIP AND DESIGNATED GROUPS.**

Name and Surname #	Identity/ Passport number and Citizenship##	Percentage owned	Black	Indicate if youth	Indicate if woman	Indicate if person with disability	Indicate if living in rural / under developed area/township	Indicate if military veteran
1.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
2.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
3.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
4.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
5.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
6.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
7.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
8.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
9.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
10.			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

[2] EME: Exempted Micro Enterprise
[3] QSE: Qualifying Small Business Enterprise

Where Owners are themselves a Company, Close Corporation, Partnership etc., identify the ownership of the Holding Company, together with Registration number
State date of South African citizenship obtained (not applicable to persons born in South Africa)

1. DECLARATION:

The undersigned, who warrants that he/she is duly authorized to do so on behalf of the Tenderer, hereby confirms that:

1 The information and particulars contained in this Affidavit are true and correct in all respects;

2 The Broad-based Black Economic Empowerment Act, 2003 (Act 53 of 2003), Preferential Procurement Policy Framework Act, 2000 (Act 5 of 2000), the Preferential Procurement Regulations, 2022, National Small Business Act 102 of 1996 as amended and all documents pertaining to this Tender were studied and understood and that the above form was completed according to the definitions and information contained in said documents;

3 The Tenderer understands that any intentional misrepresentation or fraudulent information provided herein shall disqualify the Tenderer's offer herein, as well as any other tender offer(s) of the Tenderer simultaneously being evaluated, or will entitle the Employer to cancel any Contract resulting from the Tenderer's offer herein;

4 The Tenderer accepts that the Employer may exercise any other remedy it may have in law and in the Contract, including a claim for damages for having to accept a less favourable tender as a result of any such disqualification due to misrepresentation or fraudulent information provided herein;

5 Any further documentary proof required by the Employer regarding the information provided herein, will be submitted to the Employer within the time period as may be set by the latter;

Signed by the Tenderer

Name of representative	**Signature**	**Date**

DPW-09 PARTICULARS OF TENDERER'S PROJECTS

Project title:	**BLOEMFONTEIN REGIONAL OFFICE CORRECTION ON COMPLETION FOR RETENTION CONTRACT (MECHANICAL HVAC INSTALLATION COMPLETION CONTRACT)**		
Tender / Quotation no:	**Q25/052**	**Closing date: Wednesday, 22 October 2025**	**Time: 11h00**

Note: The Tenderer is required to furnish the following particulars and to attach additional pages if more space is required.

1. PARTICULARS OF THE TENDERER'S CURRENT AND PREVIOUS COMMITMENTS

1.1. Current projects

	Projects currently engaged in	**Name of Employer or Representative of Employer**	**Contact tel. no.**	**Contract sum of Project**	**Scope of Services (Work stages appointed for – eg 1 to 6)**	**Work stages completed**	**Work stages in progress**
1.							
2.							
3.							
4.							
5.							
6.							

1.2. Completed projects

Projects completed in the last 5 (five) years		Name of Employer or Representative of Employer	Contact tel. no.	Contract sum of Project	Scope of Services (Work stages appointed for – eg 1 to 6)	Date of appointment	Date of completion
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							

Name of Tenderer	Signature	Date

PA-16: PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022

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

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

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1. GENERAL CONDITIONS

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

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

1.2 Preference Points System to be applied

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

1.3 Points for this tender shall be awarded for:

1.3.1 Price: Maximum 80 points

1.3.2 Specific Goals: Maximum 20 points

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

Preference Points System to be applied	**80/20**
PRICE	**80**
SPECIFIC GOALS	**20**
Total points for Price and Specific Goals	**100**

1.5 Breakdown Allocation of Specific Goals Points

1.5.1 **For procurement transaction with rand value greater than R2 000, 00 and up to R1 Million (Inclusive of all applicable taxes) the specific goals listed below are applicable:**

Serial No	Specific Goals	Preference Points Allocated out of 20	Documentation to be submitted by bidders to validate their claim
1.	An EME or QSE which is at least 51% owned by black people	10	• SANAS Accredited BBBEE Certificate or Sworn Affidavit where applicable.

Serial No	Specific Goals	Preference Points Allocated out of 20	Documentation to be submitted by bidders to validate their claim
2.	Located in a specific Local Municipality or District Municipality or Metro or Province area for work to be done or services to be rendered in that area **FREE STATE**	2	• Official Municipal Rates Statement which is in the name of the bidder. Or • Any account or statement which is in the name of the bidder. Or • Permission To Occupy from local chief in case of rural areas (PTO) which is in the name of the bidder. Or • Lease Agreement which is in the name of the bidder.
3.	An EME or QSE which is at least 51% owned by black women	4	• SANAS Accredited BBBEE Certificate or Sworn Affidavit where applicable.
4.	An EME or QSE which is at least 51% owned by black people with disability	2	• SANAS Accredited BBBEE Certificate or Sworn Affidavit where applicable. and • Medical Certificate indicating that the disability is permanent. Or • South African Social Security Agency (SASSA) Registration indicating that the disability is permanent. Or • National Council for Persons with Physical Disability in South Africa registration (NCPPDSA).
5.	An EME or QSE which is at least 51% owned by black youth	2	• SANAS Accredited BBBEE Certificate or Sworn Affidavit where applicable.

1.6 Failure on the part of the tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals, if the service provider/ tenderer did not submit proof or documentation required to claim for specific goals will be interpreted to mean that preference points for specific goals are not claimed.

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

2. DEFINITIONS

(a) **"tender"** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;

(b) **"price"** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;

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

(d) **"tender for income-generating contracts"** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and

(e) **"the Act"** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

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

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

80/20 **or** **90/10**

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

Where

Ps = Points scored for price of tender under consideration
Pt = Price of tender under consideration
Pmin = Price of lowest acceptable tender

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

3.2.1. POINTS AWARDED FOR PRICE

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

80/20 **or** **90/10**

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

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1,2 and 3 above as may be supported by proof/ documentation stated in the conditions of this tender:

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

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

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

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

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

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

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

The specific goals allocated points in terms of this tender	**Number of points allocated (80/20 system) (To be completed by the organ of state)**	**Number of points claimed (80/20 system) (To be completed by the tenderer)**
1. An EME or QSE or any entity which is at least 51% owned by **Historically Disadvantaged Individuals** (HDI)	10	
2. Located in a specific Local Municipality or District Municipality or Metro or Province area for work to be done or services to be rendered in that area	2	
3. An EME or QSE or any entity which is at least 51% owned by women	4	
4. An EME or QSE or any entity which is at least 51% owned by people with disability	2	
5. An EME or QSE or any entity which is at least 51% owned by youth.*	2	

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3. Name of company/firm…….

4.4. Company registration number: ……...

4.5. TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

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

i) The information furnished is true and correct;

ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;

iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –

(a) disqualify the person from the tendering process;

(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

(d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and

(e) forward the matter for criminal prosecution, if deemed necessary.

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

SWORN AFFIDAVIT – B-BBEE EXEMPTED MICRO ENTERPRISE - GENERAL

I, the undersigned,

This affidavit **must not** be used for Construction/ CIDB related projects/ services

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1. The contents of this statement are to the best of my knowledge a true reflection of the facts.

2. I am a Member / Director / Owner (**Select one**) of the following enterprise and am duly authorised to act on its behalf:

Enterprise Name:	
Trading Name (If Applicable):	
Registration Number:	
Enterprise Physical Address:	
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):	
Nature of Construction Business:	
Definition of "Black People"	As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians – (a) who are citizens of the Republic of South Africa by birth or descent; or (b) who became citizens of the Republic of South Africa by naturalisation- i. before 27 April 1994; or ii. on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;"
Definition of "Black Designated Groups"	"Black Designated Groups means: (a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution; (b) Black people who are youth as defined in the National Youth Commission Act of 1996; (c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act; (d) Black people living in rural and under developed areas; (e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;"

3. I hereby declare under Oath that:

 The Enterprise is _____% Black Owned using the flow-through principle as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

 The Enterprise is _____% Black Female Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

 The Enterprise is _____% Black Designated Group Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

 Black Designated Group Owned % Breakdown as per the definition stated above:

- Black Youth % = _____%
- Black Disabled % = _____%
- Black Unemployed % = _____%
- Black People living in Rural areas % = _____%
- Black Military Veterans % = _____%

Based on the Audited Financial Statements/Financial Statements and other information available on the latest financial year-end of _____/_____/_____ the annual Total
Date/ month / year
Revenue was R10, 000,000.00 (Ten Million Rands) or less

 Please Confirm on the below table the B-BBEE Level Contributor, **by ticking the applicable box.**

100% Black Owned	**Level One** (135% B-BBEE procurement recognition level)	
At Least 51% black owned	**Level Two** (125% B-BBEE procurement recognition level)	
Less than 51% Black Owned	**Level Four** (100% B-BBEE procurement recognition level)	

4. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the owners of the enterprise which I represent in this matter.

5. The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature_____

Date: _____

_____
Commissioner of Oaths
Signature & stamp

Stamp Commissioner of Oaths

SWORN AFFIDAVIT – B-BBEE QUALIFYING SMALL ENTERPRISE – GENERAL

I, the undersigned,

This affidavit **must not** be used for Construction/ CIDB related projects/ services

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1. The contents of this statement are to the best of my knowledge a true reflection of the facts.
2. I am a Member / Director / Owner (**Select one**) of the following enterprise and am duly authorised to act on its behalf:

Enterprise Name:	
Trading Name (If Applicable):	
Registration Number:	
Enterprise Physical Address:	
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):	
Nature of Construction Business:	
Definition of "Black People"	As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians – (a) who are citizens of the Republic of South Africa by birth or descent; or (b) who became citizens of the Republic of South Africa by naturalisation- i. before 27 April 1994; or ii. on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;"
Definition of "Black Designated Groups"	"Black Designated Groups means: (a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution; (b) Black people who are youth as defined in the National Youth Commission Act of 1996; (c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act; (d) Black people living in rural and under developed areas; (e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;"

I hereby declare under Oath that:

 The Enterprise is _____% Black Owned using the flow-through principle as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

 The Enterprise is _____% Black Female Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

 The Enterprise is _____% Black Designated Group Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

 Black Designated Group Owned % Breakdown as per the definition stated above:

- Black Youth % = _____%
- Black Disabled % = _____%
- Black Unemployed % = _____%
- Black People living in Rural areas % = _____%
- Black Military Veterans % = _____%

 Based on the Audited Financial Statements/ Financial Statements and other information available on the latest financial year-end of _____/_____/_____
Day/ month / year
(the annual Total Revenue was between R10,000,000.00 (Ten Million Rands) and R50,000,000.00 (Fifty Million Rands),

 Please Confirm on the below table the B-BBEE Level Contributor, **by ticking the applicable box.**

100% Black Owned	**Level One** (135% B-BBEE procurement recognition level)	
At Least 51% black owned	**Level Two** (125% B-BBEE procurement recognition level)	

3. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the owners of the enterprise which I represent in this matter.

4. The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature_____

Date: _____

_____
Commissioner of Oaths
Signature & stamp

Stamp Commissioner of Oath

B-BBEE EXEMPTED AFFIDAVIT FOR EXEMPTED MICRO ENTERPRISES (ISSUED IN TERMS OF THE AMENDED CONSTRUCTION SECTOR CODE)

(Gazette Vol. 630 No. 41287)
Issued in terms of paragraph 3.6.2.4.1 (B)

This affidavit **must** be used for Construction/ CIDB related projects/ service **only**

I, the undersigned,

Full name & Surname	
Identity number	

Hereby declare under oath as follows:
1) The contents of this statement are to the best of my knowledge a true reflection of the facts.
2) I am a Member / Director / Owner of the following enterprise and am duly authorized to act on its behalf:

Enterprise Name:			
Trading Name (If Applicable):			
Registration Number:			
Enterprise Physical Address:			
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):			
Nature of Construction Business:	**BEP** (Built Environment Professional)	**Contractor**	**Supplier**
Definition of "Black People"	As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians – who are citizens of the Republic of South Africa by birth or descent; or who became citizens of the Republic of South Africa by naturalization before 27 April 1994; or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;"		
Definition of "Black Designated Groups"	"Black Designated Groups" means: (a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution; (b) Black people who are youth as defined in the National Youth Commission Act of 1996; (c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act; (d) Black people living in rural and under developed areas; (e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;"		

3) I hereby declare under Oath that as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

- The Enterprise is _____% Black Owned
- The Enterprise is _____% Black Female Owned
- The Enterprise is _____% Owned by Black Designated Group (provide Black Designated Group Breakdown below as per the definition in the table above)

o Black Youth % _____%

o Black Disabled % _____%

o Black Unemployed % _____%

o Black People living in Rural areas % _____%

o Black Military Veterans % _____%

4) Based on the Financial Statements/Management Accounts and other information available on the latest financial year-end of _____/_____/_____, the annual Total Revenue was less than the applicable amount confirmed by ticking the applicable box below.

day *month* *year*

BEP	R1.8 million	
Contractor	R3.0 million	
Supplier	R3.0 million	

If the turnover exceeds the applicable amount in the table above then this affidavit is no longer applicable and an EME certificate must be obtained from a rating agency accredited by SANAS or when applicable a B-BBEE Verification Professional Regulator appointed by the Minister of Trade and Industry.

- Please Confirm on the below table the B-BBEE Level Contributor, **by ticking the applicable box below.**

100% Black Owned	**Level One** (135% B-BBEE procurement recognition level)	
At least 51% Black Owned	**Level Two** (125% B-BBEE procurement recognition level)	
At least 30% Black Owned	**Level Four** (100% B-BBEE procurement recognition level)	
Less than 30% Black Owned	**Level Five** (80% B-BBEE procurement recognition level)	

5) I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the Owners of the Enterprise which I represent in this matter.

6) The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature_____

Date: _____

_____

Commissioner of Oaths
Signature & stamp

Stamp Commissioner of Oath

FACILITIES MANAGEMENT CONDITIONS OF CONTRACT (DPW)

SEPT. 2005 VERSION 1

PA-10 (FM): CONDITIONS OF CONTRACT

1. *DEFINITIONS*

1.1. *The following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires:*

1.1.1. *"Additional Services" are increases in the quantity of the routine Services detailed in the Scope of Works.*

1.1.2. *"Bill of Quantities" means the document so designated in the Pricing Data that describes the Services and indicates the quantities and rates associated with each item which the Employer agrees to pay the Service Provider for the Services completed;*

1.1.3. *"Certificate of Completion" means the certificate issued by the Service Manager signifying that the Contract has expired;*

1.1.4. *"Commencement Date" means the date on when the Service Provider is notified of the Employer's acceptance of its offer;*

1.1.5. *"Contract" means the Contract signed by the Parties and of which these Conditions of Contract form part of, and such amendments and additions to the Contract as may be agreed in writing between the Parties;*

1.1.6. *"Contract Data" means the specific data, which together with these Conditions of Contract, Scope of Works and Pricing Data collectively describe the risks, liabilities and obligations of the contracting Parties and the procedures for the administration of the Contract;*

1.1.7. *"Contract Period" is from Commencement Date for the period stated in the Contract Data;*

1.1.8. *"Contract Price" means the price to be paid for the Services in accordance with the Pricing Data, subject to such additions thereto or deductions there from as may be made from time to time under the provisions of the Contract;*

1.1.9. *"Contract Sum" refers to the amount stated by the Service Provider in the Form of Offer and Acceptance;*

1.1.10. *"CPAP" means contract price adjustment provisions used for the adjustment of fluctuations in the cost of labour, plant and materials and goods as stated in the Contract Data;*

1.1.11. *"Day" means a calendar day;*

1.1.12. *"Drawings" means all drawings, calculations and technical information which are made available to the Service Provider for inspection at a venue and time to be announced by the Service Manager and any modifications thereof or additions thereto from time to time approved in writing by the Employer or delivered to the Service Provider by the Employer;*

1.1.13. *"Employer" means the contracting Party named in the Contract Data who appoints the Service Provider;*

1.1.14. *"Equipment" includes all appliances, tools implements, machinery, articles and things of whatsoever nature required in or for the rendering, completion or defects correction of the Services but does not include materials;*

1.1.15. *"Facilities" means the land and buildings, detailed in the Scope of Works, and any additions, or omission thereto, made available by the Employer for the purposes of the Contract, on, under, over, in or through which the Services are to be rendered or carried out;*

1.1.16. *"Form of Offer and Acceptance" means the written communication by the Employer to the Service Provider recording the acceptance of the Service Provider's offer;*

1.1.17. *"Identified Projects" means any projects, other than routine Services, identified and agreed to by the Parties during the Contract period or any extensions thereto, to be completed in terms of the Contract.*

1.1.18. *"Materials" includes all materials, commodities, articles and things required to be furnished under the Contract for the execution of the Services;*

1.1.19. *"Month" refers to the period commencing on a certain day of a month to the day preceding the corresponding day of the next month;*

1.1.20. *"Parties" means the Employer and the Service Provider;*

1.1.21. *"Pricing Data" means the document that contains the Bill of Quantities and provides the criteria and assumptions, which it will be assumed in the Contract were taken into account by the Service Provider when developing his prices;*

1.1.22. *"Services" means all the work to be performed by the Service Provider during the Contract Period in accordance with the Contract, as more fully set out in the Scope of Works, as amended from time to time by written agreement between the Parties;*

1.1.23. *"Service Provider" means the Tenderer, as named in the Contract Data, whose offer has been accepted by or on behalf of the Employer and, where applicable, includes the Service Provider's heirs, executors, administrators, trustees, judicial managers or liquidators, as the case may be, but not, except with the written consent of the Employer, any assignee of the Service Provider;*

1.1.24. *"Service Manager" means the representative of the Employer named as the Service Manager in the Contract Data. The Employer reserves the right to replace the said Service Manager, by written notice to the Service Provider, without the need to furnish reasons therefor;*

1.1.25. *"Scope of Work" refers to the document which defines the Employer's objectives and requirements and specifications and any other requirements and constraints relating to the manner in which the Services must, or may, be provided or performed;*

1.1.26. *"Service Period" refers to the period indicated in the Contract Data during which the Service Provider shall render the Services required in terms of the Contract;*

1.1.27. *"Transitional Stage" refers to the period indicated in the Contract Data, which commences immediately on the expiry of the Service Period, and during which the Services to be provided by the Service Provider shall include, inter alia, the provision and transfer to the incoming service provider of managerial support and information, as detailed in the Scope of Works.*

2. *INTERPRETATION*

2.1. *In this Contract, except where the context otherwise requires:*

2.1.1 *The masculine includes the feminine and the neuter, vice versa;*

2.1.2 *The singular includes the plural; and vice versa*

2.1.3 *Any reference to a natural person includes a body corporate, firm, association or consortium/joint venture/partnership, vice versa.*

2.2. *The headings to the clauses of this Contract are included for reference purposes only and shall not affect the interpretation of the provisions to which they relate.*

2.3. *Words and phrases defined in any clause shall bear the meanings assigned thereto.*

2.4. *The various parts of the Contract are severable and may be interpreted as such.*

2.5. *The expressions listed in clause 1 bear the meanings as assigned thereto and cognate expressions bear corresponding meanings.*

2.6. *If any provision in a definition clause is a substantive provision conferring rights or imposing obligations on any Party, effect shall be given to it as if it were a substantive clause in the body of the Contract, notwithstanding that it is only contained in the interpretation clause.*

3. *DURATION*

3.1. *The rights and obligations of the Parties to this Contract shall commence on the Commencement Date.*

3.2. *Subject to the terms of clauses 33 and 34 relating to breach and termination respectively, the Contract will commence on the Commencement Date and terminate on the expiry of the Contract Period, unless it is extended in terms of clause 3.3.*

3.3. *The terms or duration of the Contract may be extended as a result of bona fide negotiations between the Parties. No extension of term or duration of the Contract shall however be valid unless the terms and conditions of such extension has been reduced to writing and signed by the authorised representatives of both Parties.*

4. *RIGHTS AND OBLIGATIONS OF THE EMPLOYER*

4.1. *The Employer shall give access to or supply the Service Provider with:*

4.1.1 *All relevant, available data and information required and requested by the Service Provider for the proper execution of the Services; and*

4.1.2 *Such assistance as shall reasonably be required by the Service Provider for the execution of its duties under the Contract.*

5. *RIGHTS AND OBLIGATIONS OF THE SERVICE PROVIDER*

5.1. *The Service Provider shall, in executing his obligations, comply with the Service Manager's written instructions on any matter relating to the Services.*

5.2. *The Service Provider shall take instructions only from the Service Manager or other persons authorised by the Service Manager in terms of Clause 6.*

5.3. *The Service Provider shall not have the power of attorney or authority to enter into any contract or to otherwise bind or incur liability on behalf of the Employer, save where prior written authorisation has been obtained.*

5.4. *The Service Provider shall ensure that it, its employees, agents and representatives have the relevant experience and capacity necessary for rendering of the Services with the reasonable*

degree of skill, care and diligence that may be expected of professionals providing services similar to the Services.

5.5. *Should any member of the Service Provider's team, in the opinion of the Service Manager or occupants of the Facilities, misconduct himself or is incompetent or negligent in the delivery of the Services, or whose presence on the Facilities is otherwise considered by the Service Manager, or occupants of the Facilities, on reasonable grounds, to be undesirable, the Employer may, in writing and together with reasons therefor, request that such person be removed. Such person shall not again be employed on the Services without the prior written consent of the Employer.*

5.6. *The Service Provider undertakes to effect such removal, as referred to in 5.5 above, within a day of receipt of the Employer's written request.*

5.7. *The Service Provider shall ensure that reasonable levels of care and responsibility are exercised when using items belonging to the Employer in the delivery of the Services.*

5.8. *During the ongoing provision of the Services the Service Provider shall at all times keep the Facilities clean and in a safe condition.*

5.9. *Notwithstanding anything herein contained to the contrary, it is specifically agreed that the appointment of the Service Provider shall not create an employment contract or relationship between the Parties and the Service Provider or his employees shall therefore not be entitled to any benefits to which the employees of the Employer may be entitled.*

6. *SERVICE MANAGER*

6.1. *The Service Manager shall administer the Contract on behalf of the Employer in accordance with the provisions of the Contract.*

6.2. *The Service Manager may delegate any of his powers and authority and may cancel such delegation, on the prior written notification thereof to the Service Provider.*

6.3. *Such delegation shall continue in force until the Service Manager notifies the Service Provider in writing that the delegation is terminated.*

6.4. *The Service Provider may at any time, prior to giving effect thereto, refer any written order or instruction of the Service Manager's delegate to the Service Manager who shall confirm, reverse or vary such order or instruction.*

7. *SECURITY*

7.1. *The Service Provider shall provide to the Employer security in the amount and in the form set out in the Contract Data and any expenditure incurred in doing so shall be borne by the Service Provider.*

7.2. *Should the Service Provider fail to select the security to be provided or should the Service Provider fail to provide the Employer with the selected security within 21 days from Commencement Date, it shall be deemed that the Service Provider has selected a security in the form of a retention of 2.5 % of the Contract Sum (excl. VAT).*

8. *SECURITY CLEARANCE*

8.1. *In the event of security clearance becoming necessary, the Service Provider, any subcontractors and all human resources utilized by the Service Provider undertake to undergo security clearance, for which purpose the necessary forms will be made available to the Service Provider at the relevant time by the Employer. The Service Provider accepts that if he or any of*

his human resources refuses to undergo the required security clearance, they will not be allowed on the Facilities to render the Services.

8.2. *It is required that all persons engaged in the rendering of the Services shall be easily identifiable and where required, security cleared.*

9. *CONFIDENTIALITY*

9.1. *The Service Provider undertakes to keep any and all information, of whatever nature, relating to the Contract or which he becomes privy to due to his presence at the Facilities, strictly confidential and such shall not be sold, traded, published or otherwise disclosed to anyone in any manner whatsoever, including by means of photocopy or other reproduction, without the Employer's prior written consent. As disclosure or improper use of the confidential information, without the Employer's prior written consent, will cause the Employer harm:*

9.1.1 *the Service Provider shall be liable for any loss or damages suffered by the Employer and shall indemnify the Employer against any claims by third parties as a result of such unauthorised disclosure or use thereof , either in whole or in part; and/or*

9.2.1 *the Employer shall be entitled to cancel the Contract*

9.2. *The Service Provider shall be entitled to disclose such confidential information to the following persons, who have a clear need to know interest, in order to assist with the rendering of the Services on the Contract:*

9.2.1 *employees, officers and directors of the Service Provider; and*

9.2.2 *any professional consultant or agent retained by the Service Provider for the purpose of rendering the Services, provided that the identity of such consultant or agent is made known to the Employer in writing and the Employer acknowledges in writing that the confidential information may be disclosed to such person.*

9.3. *The Service Provider shall be responsible for ensuring that all persons to whom the confidential information is disclosed under this Contract shall keep such information confidential and shall not disclose or divulge the same to any unauthorised person.*

9.4. *The confidential information shall remain the property of the Employer and the Employer may demand the return or destruction thereof, at the cost of the Service Provider, at any time upon giving written notice to the Service Provider. Within ten (10) days of receipt of such notice, the Service Provider shall return all of the original confidential information and shall destroy all copies and reproductions (both written and electronic) in its possession or in the possession of persons to whom it was disclosed and furnish a certificate to the Employer stating as much.*

10. *AMBIGUITY IN DOCUMENTS*

10.1. *The several documents forming the Contract are to be taken as mutually explanatory of one another and any ambiguity in or discrepancy between them shall be explained and, if necessary, rectified by the Service Manager who shall thereupon issue to the Service Provider a written explanation giving details of the adjustments, if any, and a written instruction directing what Service, if any, is to be delivered.*

11. *INSURANCES*

11.1. *It is the responsibility of the Service Provider to assess his risks on this project and to ensure that he obtains and maintains the adequate insurances to cover such risks.*

12. *ACCESS TO THE FACILITIES AND COMMENCEMENT OF THE SERVICES*

12.1. *The Service Provider shall provide the Employer, within 21 days of the Commencement Date, with an acceptable health and safety plan and such other information required in terms of the Occupational Health and Safety Act (85 of 1993).*

12.2. *The Service Period shall commence 30 days from Commencement date, or on such other date as maybe specified in the Contract Data*

12.3. *Notwithstanding the provision of 12.2, the Service Provider shall be given access to the Facilities or portions thereof, only after the provision by the Service Provider of an acceptable health and safety plan and of security clearance being obtained in terms of Clauses 12.1 and 8.1 respectively.*

12.4. *The Service Provider shall be given access to the Facilities or portions thereof and shall render the Services in accordance with its programme, referred to in clause 13 or after the receipt by him of a written instruction to this effect.*

12.5. *If the Employer fails to give the Service Provider access to the facility or any portion thereof for any reason other than default by the Service Provider and the Service Provider suffers additional costs as a result thereof, the Service Provider shall be entitled to make a claim therefor provided that the Service Provider is able to prove his claim and that he has taken all reasonable steps to mitigate the additional costs.*

13. *PROGRAMME*

13.1. *The Service Provider shall deliver to the Service Manager within 14 days from Commencement Date, a realistic programme and a cash flow for the delivery of the Services. The programme shall describe and detail the order in which the Services are to be rendered and shall be subject to the approval of the Service Manager, which written approval shall not be unreasonably withheld.*

13.2. *The Service Provider shall, on receipt of a written request from the Service Manager, furnish the Employer with any documents or information, of whatever nature, in support of the programme and/or in relation to the manner in which the Services are to be rendered and/or the resources to be supplied and used in the rendering of the Services and/or progress of the various parts of the Contract; and/or a detailed cash flow forecast.*

13.3. *A programme and the cash flow forecast will be submitted in terms of 13.1 and reviewed quarterly or as circumstances may require.*

13.4. *Agreement to the programme by the Service Manager or any adjustment thereto will not alter the responsibilities of the Service Provider in terms of this Contract.*

14. *SUBCONTRACTING*

14.1. *The Service Provider may subcontract any part of the Services at its discretion. The subcontracts shall incorporate the applicable terms, conditions and requirements of this Contract.*

14.2. *Subcontracting by the Service Provider shall not be construed as relieving the Service Provider from any obligations under the Contract or imposing any liability on the Employer.*

15. *INTELLECTUAL PROPERTY RIGHTS INDEMNITY*

15.1. *The Service Provider undertakes to obtain the necessary consent from the proprietors or their licensees should the Service Provider make use of the intellectual property of any other person.*

15.2. *The Service Provider further indemnifies the Employer against any claim or action (including costs on an attorney and client scale) caused by or arising from the failure to obtain such consent.*

16. *COMPLIANCE WITH LEGISLATION*

16.1. *This clause applies to legislation emanating from national and provincial government as well as that of any local authorities in whose area of jurisdiction the Facilities fall and which have a bearing on the delivery of the Services and Facilities under this Contract.*

16.2. *All the applicable legislation, which does not specifically allow discretion in respect of compliance by the Employer, shall be followed exactly as intended by such legislation regardless of any instructions, verbal or in writing, to the contrary.*

16.3. *Should any applicable legislation allow discretion in respect of compliance by the Employer it shall be followed exactly as intended by the relevant legislation as if no discretion is allowed until such time as specific instructions in writing are issued to the Service Provider by the Service Manager.*

16.4. *The Service Provider shall in the provision of the Services comply with the provisions of, and give all notices and pay all fees, taxes, levies and other charges required to be given or paid in terms of any legislation or imposed by any other body or person. The Service Provider hereby indemnifies the Employer against any liability for any breach of the provision of this clause.*

16.5. *It is the responsibility of the Service Provider to obtain the consents, permissions and/or permits, referred to in Clause 16.4, in the provision of the Services.*

16.6. *The Service Provider shall not have a claim against the Employer, and the Employer shall not be liable to refund the Service Provider for any of the fees, taxes, levies and other charges referred to Clause 16.4.*

17. *REPORTING OF INCIDENTS*

17.1. *In addition to the above, the Service Provider shall, as soon as possible, notify the Employer in writing of any incidents at the Facilities, which resulted or could have resulted in damage to property or injury or death to persons.*

17.2. *The Service Provider shall verbally notify the Service Manager of any of the incidents referred to in 17.1 immediately after the occurrence thereof.*

17.3. *The Service Provider shall follow up the verbal notification referred to in 17.2 with a detailed written report on such incidents to the Service Manager within the time frame indicated by the Service Manager, but in any event within 48 hours of the incident.*

17.4. *The written report referred to in 17.3 shall provide for all incidents, which resulted in injury, death or damage to property.*

17.5. *The Service Provider shall notify the Employer immediately, on becoming aware of the Contract requiring him to undertake anything that is illegal or impossible*

18. *NUISANCE*

18.1. *The Service Provider shall deliver the Services in a manner that shall not cause unnecessary noise, nuisance, or hinder the normal activities in the Facilities.*

18.2. *The Service Provider hereby indemnifies the Employer against any liability arising out of the Service Provider's non-compliance with his obligations in terms of Clause 18.1.*

19. *MATERIALS, WORKMANSHIP AND EQUIPMENT*

19.1. *All Services delivered, and materials and workmanship shall comply with the requirements of this Contract, the manufacturer's specification; good industry practice and the Service Manager's written instructions and shall be suitable for the purpose intended.*

19.2. *The Service Provider shall, in accordance with the Scope of Works or if instructed by the Service Manager, carry out tests demonstrating the acceptability of the relevant Services provided, or the suitability of materials or equipment to be used.*

19.3. *The Service Provider shall provide all necessary assistance, labour, materials, testing equipment and instruments for the purpose of such tests to be performed by himself or, if so instructed by the Service Manager, for the purposes of tests to be performed by any other person.*

19.4. *All costs for tests carried out shall be deemed to be included in the Service Provider's prices*

19.5. *Copies of the reports on the tests referred to in Clause 19.2 shall be forwarded by the Service Provider to the Employer within 10 days of the tests being completed.*

20. *URGENT WORK*

20.1. *The Employer may, by itself or through another service provider, effect any remedial or other repair work which becomes necessary due to no act or omission on the part of the Service Provider.*

20.2. *If the remedial or repair work became necessary due to an act or omission on the part of the Service Provider, its employees, agents or representatives, the Service Provider shall effect such remedial or repair work at its own cost.*

20.3. *If the remedial or repair work is urgently necessary due to an act or omission on the part of the Service Provider, its employees, agents or representatives and the Service Provider refuses to or is not available or able to effect such remedial or repair work, the Employer may effect such remedial or repair work either by itself or through another service provider.*

20.4. *If the Employer effects the remedial or repair work in terms of 20.3, then the Employer may recover such costs, losses or damages from the Service Provider or by deducting the same from any amount still due under this Contract or under any other contract presently or hereafter existing between the Employer and the Service Provider and for this purpose all these contracts shall be considered one indivisible whole.*

21. *INDEMNIFICATIONS*

21.1. *The Service Provider shall be liable for and hereby indemnifies the Employer against any liability, claim, demand, loss, cost, damage, action, suits or legal proceedings whether arising in common law or by statute consequent upon:*

21.1.1 *personal injuries to or the death of any person arising out of, related to, occasioned by, attributed to, or in the cause of or caused by the rendering of the Services;*

21.1.2 *loss of or damage to any movable or immovable or personal property or property contiguous to the Facilities whether belonging to or under the control of the Employer or any other body or person arising out of, related to, occasioned by, attributed to, or in the cause of or caused by reason of the rendering of the Services;*

21.1.3 *any liens, attachments, charges or other encumbrances or claims upon or in respect of any materials parts, work-in-process or finished work furnished to, or in respect of which any payment has been made by the Employer.*

21.2. *The Employer accepts liability for all acts or omissions of its employees, agents or representatives.*

22. *VARIATIONS*

22.1. *The Employer may at any time during the Contract Period, vary the Services by way of additions, omissions, or substitutions.*

22.2. *No variation by the Employer of whatever nature shall vitiate the Contract.*

22.3. *Any Services required by the Employer outside of the Services as referred to in the Scope of Works will be regarded as being Identified Projects and shall be dealt with under clause 23 and shall be executed as a variation order.*

22.4. *The Service Provider shall inform the Employer of any instructions that are deemed to be Additional Services prior to such instructions being executed.*

22.5. *Additional Services will only be executed by the Service Provider after receipt by him of a written instruction from the Service Manager.*

22.6. *If no prior written authorisation, as required in 22.5 above, has been obtained, the Employer shall not reimburse the Service Provider for the Additional Services so executed, and the Service Provider agrees that it shall not have a claim for payment for such Additional Services.*

22.7. *The Additional Services will be valued at the rates in the Pricing Data.*

23. *IDENTIFIED PROJECTS*

23.1. *The Service Provider shall inform the Employer of any instructions that are deemed to be Identified Projects prior to such instructions being executed.*

23.2. *The Employer is not obliged to engage the services of the Service Provider on Identified Projects. The Employer may, by itself, through another service provider or through the Service Provider effect the services/works under Identified Projects.*

23.3. *Identified Projects will only be executed by the Service Provider after receipt by him of a written instruction from the Service Manager.*

23.4. *If no prior written authorisation, as required in 23.3 above, has been obtained, the Employer shall not reimburse the Service Provider for the Identified Projects so executed, and the Service Provider agrees that it shall not have a claim for payment for such Identified Projects.*

23.5 In respect of the Identified Projects, the written instruction referred to in 23.3 shall:

(a) describe the services/works required to be executed by the Service Provider under the Identified Project;

(b) state the due commencement and completion dates of the relevant Identified Project;

(c) state the total cost of the relevant Identified Project as agreed to between the Parties; and

(d) any additional requirements, conditions of contract and/or restrictions, other than those already stated in the Contract, that will be applicable.

23.6 Within 14 days of receipt of the written instruction referred to in 23.5, the Service Provider shall furnish the Employer with a realistic programme and a cash flow for the relevant Identified Project as required in 13.

23.7 Where an Identified Project comprises services/works that are of the same or similar character executed under the same or similar conditions as those to which the rates in the Pricing Data apply, it shall be valued at such rates.

23.8 Where an Identified Project comprises services/works that are not of the same or similar character executed under the same or similar conditions as those to which the rates in the Pricing Data apply, it shall be valued at market related rates to be agreed to in writing between the Employer and the Service Provider and in advance of executing the Identified Project. Failing agreement, the rates applicable shall be as determined by the Employer.

23.9 If the Service Provider fails to complete the Identified Project by the completion date specified in the written instruction referred to in 23.3, then the Service Provider will be liable for a penalty, at the rate stated in the Contract Data, for every day that lapses from the due completion date of the relevant Identified Project to the date of the actual completion of such Identified Project.

23.10 If the Identified Projects are delayed by variations, omissions, additions, substitutions or organised work stoppages by any workman not due to any action on the part of the Service Provider, exceptionally inclement weather, any substantial increase in provisional quantities or any other cause beyond the Service Provider's control, including delays caused by the Employer, then the Service Provider shall be entitled to apply in writing within 21 days of the cause of delay arising to the Service Manager for extension of the due completion date of the relevant Identified Project stating the cause of delay and period of extension applied for.

23.11 If during the period for completion of the Identified Project or any extension thereof abnormal rainfall or wet conditions occur, the formula below shall be used to calculate separately the delay for each calendar month or part thereof. It shall be calculated each month during the period referred to herein above, or until the issue date of the certificate of completion for the relevant Identified Project, whichever is the shorter period. The delay calculated for a given month shall be used to determine the interim extension of time granted for the month. At the end of the applicable period referred to above, the aggregate of the monthly delays will be taken into account for the final determination of the total extension of time for the Contract:

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

V = Delays due to rain 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 Y mm or more per day has been recorded

Rw = Actual rainfall in mm for the calendar month under consideration.

Nn = Average number of days in the relevant calendar month (as derived from existing rainfall records provided in the project specifications) on which a rainfall of Y mm or more per day has been recorded.

Rn = Average rainfall in mm for the calendar month, as derived from the rainfall records supplied in the project specifications.

X = 20, unless otherwise provided in the project specifications.

Y = 10, unless otherwise provided in the project specifications.

The total delay that will be taken into account for the determination of the total extension of time for the Contract shall be the algebraic sum of the monthly totals for the period under consideration. But if the grand total is negative, the time for completion shall not be reduced on account of abnormal rainfall. The total extension of time for any calendar month shall not exceed (Nc – Nn) calendar days, where Nc = number of days calendar days in the month under consideration

The factor (Nw – Nn) shall be considered to represent a fair allowance for variations from the average number of days during which rainfall equals or exceeds Y mm per day.

The factor (Rw – Rn) ÷ X shall be considered to represent a fair allowance for variations from the average for the number of days during which rainfall does not equal or exceed Y mm per day, but when wet conditions prevent or disrupt work.

This formula does not take into account any flood damage, which could cause further or concurrent delays and which should be treated separately in so far as extension of time is concerned.

Accurate rain gaugings shall be taken at a suitable point on the site daily at 08:00 unless otherwise agreed to by the Service Manager, and the Contractor shall, at his own expense, take all necessary precautions to ensure that the rain gauges cannot be interfered with by unauthorized persons.

Information regarding existing rainfall records, if available from a suitable rainfall station near the site, will be supplied in the project specifications, together with calculations of rain delays for previous years in accordance with the above formula. The average of these delays will be regarded as normal rain delays which the Contractor shall accommodate in his programme, and for which no extension of time will be considered.

23.12 Upon receipt of such written application, referred to in 23.10, the Employer may in writing extend the due completion date of the relevant Identified Project by a period to be determined by the Employer or may refuse to extend the due completion date of the relevant Identified Project. The due completion date of an Identified Project may not be extended beyond the end of the Contract Period stated in the Contract Data.

23.13 Any decision given by the Employer, in terms of 23.12, shall be final and binding on the Parties.

23.14 Should the Service Provider fail to apply in writing for an extension of the due completion date of the relevant Identified Projects within the 21 days referred to in 23.10, or should the Employer not grant an extension of the due completion date then the due completion date stipulated in the relevant written instruction referred to in 23.5 shall not be extended nor the Service Provider exonerated from liability to pay the penalty stipulated in 23.9 or from specific performance of the service/works within the period in the relevant written instruction.

24. *SUSPENSION OF THE SERVICES*

24.1 The Service Provider shall, on the written order of the Service Manager, suspend the provision of the Services or any part thereof for such time or times and in such manner as the Service Manager shall order and shall, during such suspension, properly protect the Services so far as is necessary.

24.2 If the Service Provider is instructed in writing by the Service Manager to suspend any or all of the Services, the Service Provider shall re-schedule the relevant Services. For the duration of such suspension all penalties applicable to that Service will be waived. Should the Service Provider suffer any additional costs resulting from such suspension, the Service Provider shall be entitled to make a claim therefor provided that the Service Provider shall prove his claim and that he has taken all reasonable steps to mitigate the additional costs.

24.3 If the Service Provider is unable to render any of the Services for any reason other than an instruction by the Employer to suspend the Services in terms of clause 24.1, the Employer shall not be liable for any claim of whatever nature, including a claim for costs, by the Service Provider.

25. *PENALTY FOR NON-PERFORMANCE*

25.1 The Service Provider shall be liable for a performance deduction, if the Service Provider in rendering any of the Services required under the Scope of Works, as amended from time to time,

25.1.1 delays in performing any of the Services;

25.1.2 fails to perform any of the Services;

25.1.3 fails to perform any of the Services to the standard required in the Scope of Works, as amended from time to time.

25.2 The performance deduction shall be calculated in accordance with the formula detailed in the Scope of Works.

25.3 The Service Provider shall not be liable for a performance deduction, if the Service Provider is unable to perform due to no fault of his own, his employees, agents or representatives.

26. *PAYMENTS*

26.1 The Service Manager will evaluate the Service Provider's performance on a monthly basis.

26.2 The Service Provider shall submit a monthly certificate taking into account the following:

26.2.1 the assessment of the Services rendered during the assessment month, including routine services, management fees, and services using call down rates;
26.2.2 adjustments in terms of the pricing data;

26.2.3 additional work rendered by the Service Provider;

26.2.4 CPAP adjustment where stated in the Contract Data; and

26.2.5 VAT. Vat will be indicated separately in all documents.

26.3 If the Service Provider elects a security of 2,5% retention, or a 1,25% cash and 1,25% retention, then 5% of all moneys (excl. VAT) in the monthly certificate assessed by the Service Manager as being due to the Service Provider will be retained until such time as the amount retained equals 2.5% or 1,25%, whichever is applicable, of the Contract Sum (excl. VAT)

26.4 The monthly certificate shall be supported by a detailed report substantiating the Services rendered at each Facility during the month under assessment.

26.5 The monthly certificate shall be assessed by the Service Manager. If the Service Manager agrees with the certificate, he will issue a statement within 14 days of the receipt of the certificate, taking into account inter alia the following:

i. Deductions for penalties;
ii. Deductions for overpayments;
iii. Deductions for retention
iv. Deductions for damages.

26.6 The Service Provider shall, on receipt of the statement referred to in 26.5, issue to the Employer a tax invoice in the amount reflected in the statement. The Employer shall effect payment to the Service Provider within 16 days of receipt of the tax invoice.

26.7 If the Service Manager does not agree with the certificate issued by the Service Provider in terms of Clause 26.2, the Service Manager shall within 14 days of receipt of the certificate, issue a statement in the amount to which the Service Manager agrees and shall give reasons for rejecting the balance of the claim indicated in the statement.

26.8 The Service Provider shall furnish the Employer with a tax invoice in the amount indicated in the statement referred to in Clause 26.7.

26.9 With regards to the claim in dispute, the Service Provider may, within 14 days of the Service Manager issuing the statement referred to in 26.7, submit a revised certificate or a justification for his claim or declare a dispute in terms of 34.

26.10 If it is later resolved that the amount in dispute or any part thereof is owing to the Service Provider, the Employer shall be liable for interest thereon from 30 days after the issue of the relevant monthly certificate referred to in 26.2 until the date of payment at the interest rate determined from time to time, by the Minister of Finance in terms of section 80 (1)(b) of the Public Finance Management Act, 1999 (Act 1 of 1999), as amended.

26.11 All the work shall be evaluated in accordance with the provisions of the Pricing Data.

26.12 In assessing the quality of the work presented by the Service Provider, the Employer may enlist the assistance of third persons. In assessing the work the third person shall act reasonably. The selection of such third persons shall be in the absolute discretion of the Employer and the Service Provider shall abide by such selection.

26.13 Any and all extra costs incurred by the Service Provider, resulting from the Service Provider having to address and/or rectify queries arising from a claim submitted in respect of work done, shall be for the account of the Service Provider.

27. *RELEASE OF SECURITY*

27.1 If the Service Provider has furnished a security by way of a variable guarantee of 2.5% of the Contract Sum (excl. VAT), the security will be reduced and be released in accordance with the provisions of such variable guarantee.

27.2 If the Service Provider elects to furnish a security by way of a cash deposit of 2.5% of the Contract Sum (excl. VAT), then the security will be released as follows:

27.2.1 annually in equal portions, subject to 27.2.2 and 27.2.3;

27.2.2 95% of the last annual portion of retention shall be released within 30 days of the expiry of the Service Period;

27.2.3 the remaining retention shall be released within 30 days of the issue of the Certificate of Completion.

27.3 If the form of security selected is:

(a) a retention of 2.5% of the Contract Sum (excl. VAT); or
(b) a 1,25% cash deposit and a 1,25% retention of the Contract Sum (excl. VAT),

then security will only be released after the 2,5% or 1,25% retention respectively has been accumulated, as follows:

27.3.1 annually in equal portions, subject to 27.3.2 and 27.3.3;

27.3.2 95% of the last annual portion of retention shall be released within 30 days of the expiry of the Service Period;

27.3.3 the remaining retention shall be released within 30 days of the issue of the Certificate of Completion.

28. *OVERPAYMENTS*

28.1 If any overpayment of whatever nature is made to the Service Provider, the Service Provider shall be obliged to repay such amount to the Employer and the Employer shall be entitled to deduct such over payment from any amount due to the Service Provider, in respect of this Contract or any other contract, which the Employer may have with the Service Provider. The Employer shall be entitled to claim interest on any and all overpayments made to the Service Provider at the rate prescribed, from time to time, by the Minister of Finance in terms of section 80 (1)(b) of the Public Finance Management Act, 1999 (Act 1 of 1999), as amended.

29. *COMPLETION*

28.1 At the expiry of the Service Period the Service Manager shall furnish the Service Provider with a written list of Employer's Assets and Data handed over at commencement of the Contract and accumulated during the Contract Period.

29.2 At the expiry of the Contract Period, the Service Manager shall issue to the Service Provider a Certificate of Completion.

29.3 Upon the issue of a Certificate of Completion, unless otherwise provided in the Contract:

29.3.1 The Guarantee shall be returned, if applicable.

29.3.2 The final cash deposit or retention, whichever is applicable, shall be reduced to zero.

30. *ASSIGNMENT*

30.1 The rights and obligations of the Parties in terms of this Contract shall not be ceded, assigned, delegated, or otherwise transferred, by either Party to any person outside of the Service Provider and the Employer, save with the prior written consent of the other Party.

30.2 Each Party warrants that he is acting as a principal and not as an agent of an undisclosed principal.

31. *INDULGENCES*

31.2 No extension of time, latitude or other indulgences which may be given or allowed by either Party to the other shall constitute a waiver or alteration of this Contract, or affect such Party's

rights, or prevent such Party from strictly enforcing due compliance with each and every provision of this Contract.

32. *OWNERSHIP AND PUBLICATION OF DOCUMENTS*

32.1 The Employer will become the owner of the information, documents, advice, recommendations and reports collected, furnished and/or compiled by the Service Provider during the course of, and for the purposes of executing this Contract, all of which will be handed over to the Employer, unless otherwise stipulated in the Contract, within ten (10) days of request therefor, but in any event on the termination and/or cancellation of this Contract for whatever reason. The Service Provider relinquishes its retention or any other rights to which it may be entitled.

32.2 The copyright of all documents, recommendations and reports compiled by the Service Provider during the course of and for the purposes of finalising Services, and the Contract as a whole, will vest in the Employer, and may not be reproduced or distributed or made available to any person outside the Employer's service, or to any institution in any way, without the prior written consent of the Employer. The Employer shall have the right to use such material for any other purpose without the approval of, notification to or payment to the Service Provider.

32.3 The copyright of all electronic aids, software programmes etc. prepared or developed in terms of this Contract shall be vested in the Employer, who shall have the right to use such material for any other purpose without the approval of, information or payment to the Service Provider.

32.4 In case of the Service Provider providing documents or material to the Employer, the development of which has not been at the expense of the Employer, copyright shall not be vested in the Employer. The Service Provider shall be required to indicate to which documents and/or materials this provision applies.

32.5 The Service Provider hereby indemnifies the Employer against any action or claim that may be instituted against the Employer and for any damages suffered or legal costs (including costs on an attorney and client scale) incurred on the grounds of an alleged infringement of any copyright or any other intellectual property right in connection with the work outlined in this Contract.

32.6 All information, documents, recommendations, programmes and reports collected or compiled must be regarded as confidential and may not be communicated or made available to any person outside the Employer's service and may not be published either during the currency of this Contract or after termination thereof without the prior written consent of the Employer.

33. *BREACH OF CONTRACT*

33.1 In the event of a breach by the Service Provider of any of the terms and conditions of this Contract, the Employer shall issue a notice of non- compliance requiring compliance within 10 (ten) days. In the event that the Service Provider fails to remedy such breach on expiry of the notice period, then the Employer shall without prejudice to any other rights that it may have, be entitled to exercise any or all of the following rights:

33.1.1 Enforce strict compliance with the terms and conditions of the Contract;

33.1.2 To terminate this Contract without prejudice to any other rights it may have;

33.1.3 To suspend further payments to the Service Provider;

33.1.4 To appoint other service providers to complete the execution of the Services, in which event the Service Provider shall be held liable for costs incurred in connection with and arising from the appointment of such a service provider as well as damages suffered.

33.2 The Service Provider agrees to, within ten (10) days of written request from the Employer, give access to and to make available all information, documents, programmes, advice, recommendations and reports collected, furnished and/or compiled by them to enable the Employer to assume responsibility for and the benefit of the project as a whole.

33.3 In the event of breach by the Employer of the terms and conditions of this Contract, and in the event of the Employer remaining in breach after ten (10) days' written notice calling for rectification of the breach, the Service Provider shall be entitled to:

33.3.1 enforce strict compliance with the terms and conditions of the Contract; or

33.3.2 terminate the Contract by delivering written notice to the Employer to that effect to the extent that such breach is of a material term of this Contract.

34. *STOPPAGE AND/OR TERMINATION OF CONTRACT*

34.1 The Employer reserves the right to terminate this Contract or temporarily stop the Services, or any part thereof, at any stage of completion.

34.2 The Employer shall have the right to terminate this Contract without prejudice to any of its rights upon the occurrence of any of the following acts:

34.2.1 on breach of this Contract by the Service Provider as stipulated in Clause 33;

34.2.2 on commencement of any action for the dissolution and/or liquidation of the Service Provider, except for purposes of an amalgamation or restructuring approved in advance by the Employer in writing;

34.2.3 if the Service Provider receives a court order to be placed under judicial management or to commence liquidation proceedings that is not withdrawn or struck out within five (5) days;

34.2.4 if the Service Provider informs the Employer that it intends to cease performing its obligations in terms of this Contract;

34.2.5 if the Service Provider informs the Employer that it is incapable of completing the Services as described; or

34.2.6 if in the opinion of the Employer the Service Provider acted dishonestly;

34.3 The Employer reserves the right to, even in the absence of breach or the events referred to in 34, terminate this Contract at any time, by giving one (1) calendar month written notice to the Service Provider.

34.4 Further, the Contract shall be considered as having been terminated:

34.4.1 where the Employer stops the Contract and/or the Project and instructions to resume or reinstate the Services are not issued within twelve (12) months of the instruction; or

34.4.2 if instructions, necessary for the Service Provider to continue with the Services after a stoppage instruction, are not received from the Employer within three (3) months after such instructions were requested by the Service Provider.

34.5 Should the Contract between the Employer and the Service Provider, or any part thereof, be terminated by either of the Parties due to reasons not attributed to the Service Provider:

34.5.1 The Service Provider will be remunerated for the appropriate portion of the Services satisfactorily completed, calculated in accordance with the agreed rates.

34.5.2 Invoices for work done shall be submitted to the Employer within three (3) months after the termination of the Contract, failing which the Employer will not be obliged to pay same.

34.5.3 The Service Provider shall not be entitled to advance a right of retention or any similar right if this Contract is terminated and specifically agrees to, within ten (10) days of written request from the Employer, give access to and to make available all information, documents, programmes, advice, recommendations and reports collected, furnished and/or compiled by them to enable the Employer to assume responsibility for and the benefit of the Contract as a whole.

35. *DISPUTE RESOLUTION*

35.1 In the event of a dispute, the Parties shall endeavour to resolve such dispute through negotiation, in good faith.

35.2 If the Parties fail to resolve a dispute through negotiation as mentioned in 35.1, within 14 days of a dispute being declared, the Parties may by written agreement refer the matter to mediation.

35.3 The mediator shall be a person agreed to by the Parties, failing agreement, the President: South African Facilities Management Institute shall nominate the mediator.

35.4 Whether or not mediation resolves the dispute and irrespective of the outcome of thereof, the Parties shall bear their own costs arising from the mediation and shall equally share the costs of the mediator and related costs. The mediator and the Parties shall, before the commencement of the mediation, agree on a scale of fees on which the mediator's fees will be based.

35.5 The Parties shall appoint the mediator within 21 days of agreeing to mediate.

35.6 On appointment of the mediator, the Parties shall jointly with the mediator decide on the procedure to be followed, representation, dates and venue for the mediation.

35.7 If the dispute or any part thereof is settled, the agreement shall be recorded by the mediator and signed by both Parties. The agreement shall be binding on the Parties to the extent that it correctly records the issues agreed upon between the Parties.

35.8 If the dispute or any part thereof remains unresolved, it may be resolved by litigation proceedings.

35.9 If the mediator or any Party, at any time during the mediation process, is of the opinion that the mediation will not resolve the dispute, then he may in writing stop the mediation process. The dispute may then be dealt with in terms of 35.8.

35.10 Notwithstanding anything else herein contained to the contrary, it is agreed that irrespective of the fact that the dispute is referred to negotiation, mediation or litigation in court, the decision of the Employer on the dispute involved will immediately be given effect to by the Service Provider and the Service Provider shall proceed with the Services with all diligence unless the Parties agree otherwise in writing.

36. *GENERAL*

36.1 This is the entire Contract between the Parties and may only be amended if reduced to writing and signed by the duly authorised representatives of both Parties, whereafter such amendments will take effect.

36.2 The Contract shall be governed by, construed and interpreted according to the law of the Republic of South Africa.

37. *DOMICILIUM CITANDI ET EXECUTANDI*

37.1 The domicilium citandi et executandi of the Parties for all purposes arising from this Contract for the service of notices and legal process shall be as specified by the Parities in the Contract Data.

37.2 Each of the Parties shall be entitled at any time by way of written notice to the other Party, to change its domicilium citandi et executandi to another physical address.

37.3 Any notice in terms of the conditions of the Agreement must either be:

37.3.1 delivered by hand during normal business hours of the recipient; or

37.3.2 sent by prepaid registered post to the address chosen by the addressee.

37.4 A notice in terms of the provisions of this Agreement shall be considered to be duly received:

37.4.1 if hand-delivered on the date of delivery;

37.4.2 if sent by registered post as indicated in clause 37.3.2 above, ten (10) days after the date it was posted, unless the contrary is proved.

37.5 Notwithstanding anything to the contrary contained or implied in this Agreement, the written notice or communication actually received by one of the Parties from the other, including by way of facsimile transmission, shall be adequate written notice or communication to such Party.

37.6 Any notice, request, consent, or other communication made between the Parties pursuant to the Contract shall be in writing and shall be deemed to have been made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or one day after being sent by facsimile to such Party at the number specified in the Contract Data or one week after being sent by registered post to the addressee specified in the Contract Data.