

KIMBERLEY NURSING COLLEGE PHASE 2A-ACADEMIC CAMPUS
K2060

HVAC TENDER SPECIFICATION

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Client



DEPARTMENT OF HEALTH
PROVINCIAL GOVERNMENT OF THE NORTHERN CAPE

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PART 1 – GENERAL TECHNICAL SPECIFICATION

1.1 General Information Regarding Equipment

This section of the tender documents represents the combined functions of statements and schedules of technical requirements relating to equipment, and of schedules to be filled out, in part by the tenderer at tender stage, and in full by the successful sub-contractor.

It is to be carefully noted that only the items of information in the Schedules marked with an asterisk (*) are required to be completed by the tenderer at tender stage. All other information will require to be completed by the successful tenderer before the subcontract is entered into with the principal contractor.

To facilitate the process of tendering for this project in view of the fact that exact pumping heads and fan resistance characteristics cannot be determined at this stage, as such characteristics could vary depending on the finally accepted major items of equipment, estimated figures have been entered in the schedules, and tenderers are to base the selection of their fans and pumps on this data.

Should the actual pumping head and fan resistance figures, at the time of selection of equipment, be different from the corresponding figures appearing in these Schedules, corresponding subcontract price adjustments, approved to the satisfaction of the Engineer, will be made.

Attention is drawn to paragraph 4.8. Tenders who do not comply with this paragraph shall be disqualified.

1.2 General Equipment Protection

1.2.1 Protection against Damage

All equipment delivered to site shall be adequately protected against damage that can be expected on a building site.

Protection against weather is the responsibility of the sub-contractor carrying out the work detailed in this specification.

1.2.2 General Machinery Protection

All high speed couplings, projecting shaft ends and every dangerous moving parts of machinery which is within normal reach of a person shall be protected by a guard manufactured from not less than 1, 6 mm mild steel plate.

The coupling guards shall be neatly formed and securely fixed in position.

All belt or rope drives within normal reach shall be adequately protected by a belt guard.

The belt or rope guard shall be manufactured from wire mesh or open type expanded metal, securely braced and stiffened with light rolled steel section and bolted in position.

All chain drives shall be fitted with sheet steel chain cases and lubrication facilities to chain manufacturers' recommendations. All joints shall be dust tight and arranged for convenient installation and dismantling.

Each chain case shall be fitted with a hinged inspection door, drain hole and plug.

All guards shall be finished in a light orange colour too B.5 381. C.

1.3 Quality Assurance

1.3.1 General

The following general points shall be noted:

The Air Conditioning and Ventilation Contractor shall be responsible for implementing a full quality assurance plan covering all activities included in this contract.

Contractors and suppliers with ISO 9000 certification will be considered favourably in the adjudication process.

Contractors who do not have ISO 9000 certification shall provide a comprehensive quality assurance plan in accordance with ISO 9000 provisions at the time their tender is accepted.

The quality plan shall cover design activities, procurement, storage, construction, handover, maintenance and guarantee.

1.3.2 Quality Management Plan

A Quality Management Plan shall be prepared by the successful Air Conditioning and Ventilation contractor and this plan shall be submitted to the Engineer for approval within 14 days of receiving an advice of the appointment. The QMP shall include at least the following:

A responsibility matrix identifying all parties in the contractor's organisation who will be involved in the project or who are responsible for aspects of the project. The specific activities shall be identified with the responsible individual.

A list of all applicable specifications and third-party inspections required.

A list of all inspection holds points with actions and responsibilities to ensure that these are timeously inspected.

A list of all inputs required from the Engineer or the client with actions and responsibilities to ensure that the proper persons are advised in good time.

1.4 Testing and Commissioning

1.4.1 General

The Engineer or his representative shall be advised of all testing and commissioning and shall be given the opportunity to witness all tests. However, the Engineer will only be on site to witness the tests and takes no responsibility for the acceptance of test results.

The testing and commissioning procedure shall form part of the Quality Verification Plan submitted by the Contractor and shall be the subject to the same prior approval by the Engineer. The testing and commissioning procedure shall embody the following principles:

All plant shall be tested off site prior to delivery. No plant or equipment will be accepted and paid for if it is not accompanied by the manufacturer/supplier certificate verifying that it has been tested.

All plant and systems on site shall be tested as early as possible after installation to verify that the plant/system/sub-system is operating correctly.

No testing or commissioning shall take place without an approved written procedure.

The responsibility for the proper testing and commissioning of the system rests fully with the Contractor. This includes the provision of all necessary test equipment, measuring and test points, valves and dampers, etc. to test and commission the system.

At the time of submitting equipment for approval, full details of the commissioning requirements shall be provided.

1.4.2 Testing and Commissioning Program

At least four weeks before commencing any testing and commissioning the contractor shall submit a complete program for such work so that the Engineer can arrange to be on site at the appropriate time. The programme shall embody the agreed testing and commissioning procedure.

The programme shall include –

A bar chart covering all activities.

Names and addresses of companies involved in each activity.

The way in which each test will be carried out complete with pro forma forms for tabulating results.

1.4.3 Equipment and Procedure

The equipment supplied under the Contract shall be subject to inspection by the Engineer or his Selected Agent at all stages of manufacture.

The tests and commissioning procedure as laid down and such additional tests as the Engineer may reasonably require proving compliance with the Specification shall be carried out at the Contractor's Works and at Site.

The Contractor shall give reasonable notice of time and place in writing to enable the Engineer to inspect and witness tests of materials and equipment. He shall provide the Engineer with facilities for witnessing the tests and for any additional tests or inspection of any portion of the works required by the Engineer.

The Contractor shall at his own cost render all assistance and supply all labour, appliances and any other materials, as the Engineer may require checking the setting out, measure up and inspect any portions of the works at any stage during fabrication, construction, erection or painting. During such operations, the Contractor shall if required, suspend any or all the Works, without having claim for loss or damage as a result thereof.

The testing of the plant (or any part thereof) supplied under this contract shall be carried out through its full operating range (or part thereof) as required by the Engineer.

All such tests and inspections and the necessary inspection facilities shall be provided as part of the Tendered price for the Contract.

At the commencement of and during the whole of the Commissioning and Testing Periods, the Contractor shall have available on site all essential spares and tools considered necessary to enable repair work of defective parts to be carried out immediately in the event of a breakdown or adjustments being necessary.

The Contractor shall be responsible for the proper operation and maintenance of the plant throughout the period of the tests and until the operator training period is complete.

Acceptance by the Engineer of any plant item, following such inspection or tests, shall not relieve the Contractor of any obligations under this Contract.

All pumps shall be lined up and tested as a complete set. Test Certificates shall be supplied before dispatch.

All rotors and motor/impeller combinations shall be statically and dynamically balanced. Test Certificates shall be supplied before dispatch.

All such other tests as required by the Engineer to prove compliance with the specification shall be carried out.

1.4.4 Test Certificates

The Contractor shall provide three copies of test certificates in respect of all materials and equipment, further copies are to be bound into the operating and maintenance manuals.

1.4.5 Insulation Tests

All electrical wiring and equipment shall be subjected to insulation tests. All instruments and other equipment for the tests shall be provided by the Contractor.

1.4.6 Draining and Cleaning

On completion of the pressure test on a section of pipework the water used for testing shall be drained away as quickly as possible to remove as much dirt and dross as possible. After completion of a pipework circuit the circuit shall be flushed through to remove all pipe scale, dross and similar materials.

The Contractor shall provide all necessary connections, by-pass pipes, temporary strainers, and temporary make-up pieces, to enable the systems to be drained and cleaned.

Additionally, on boiler commissioning, steam lines are to be charged with steam to full operating pressure and allowed to cool. this procedure is to be carried out three times over a period of two days. Following the third cycle the pipes are to be open ended and blown through.

These procedures are to be supervised by the Engineer.

1.4.7 Plant Commissioning

The Contractor shall arrange at his cost for the manufacturer's representatives to check over and fully commission all major items of equipment. This work is to be carried out by skilled engineers preferably employed by the manufacturers, who are completely familiar with the equipment involved and shall be capable of training the operating and maintenance staff in the duties they are to perform.

On completion of the plant commissioning the Contractor shall obtain written confirmation from the various manufacturers that they have completed all commissioning work and are satisfied that the items of plant for which they are responsible are functioning satisfactorily.

Copies of the manufacturer's written confirmation shall be sent to the Engineer.

1.4.8 Tests on Completion

On completion of the balancing and commissioning of equipment the plant shall be put into normal operation and the final adjustments of the equipment shall be made.

Thereafter the Test on Completion shall be carried out to ensure that the plant meets the specification.

Such tests shall include the following:

Simulated tests for all alarm and safety cut out equipment to prove the operation of the equipment.

Simulated tests on automatic controls to prove the ability of the controls to correct conditions which are outside the required design conditions.

The tests shall be carried out by manually changing the desired values to produce an incorrect condition and then re-setting the controls to the design conditions and checking the operation of valves, etc. to restore the design conditions.

Operational tests on the Plant to demonstrate that it is giving the rated output and efficiency.

The Contractor shall provide all necessary temporary measuring and recording equipment. The equipment shall be of a type generally used for this type of testing and shall be to the approval of the Engineer. All instruments shall be accurately calibrated before the tests begin.

On completion of the whole of the tests and when the Contractor is satisfied that the entire plant is operating satisfactorily and will fulfil the function for which it has been supplied, he shall submit to the engineer triplicate copies of all test records and charts together with reports on all the tests required in terms of the approved Quality Verification Plan. The Engineer shall reserve the right to ask for any reasonable additional tests or for the repetition of previous tests in order to prove that the operation of the plant is satisfactory and in accordance with the Performance Specification.

1.5 Electric Wiring

Electrical mains supply cables will be brought to the air conditioning switchboards by others unless otherwise stated but will require to be terminated by the air conditioning sub-contractor.

Electrical connections and associated conduit work and cable ducting between the switchboards and all air conditioning, ventilation and associated plant shall be provided by the air conditioning sub-contractor.

All electric wiring and earthing shall be executed in accordance with the relevant local authority regulations.

Horizontal distribution of cables to equipment shall be by means of suitable trays using UNISTRUT type cable trays and accessory fittings. Cables installed on the cable trays must be neatly arranged in parallel and adjacent to each other and clamped at distances not exceeding 600 mm.

Isolator switches shall be fitted to equipment remote from the Electrical switchboards where required to meet local wiring regulations and where safety of operation demands such isolators.

Please refer to the schedules where all electrical power points to be provided by the main electrical sub-contractor.

The wiring to and the connections to the power points are to be undertaken by the main air conditioning contractor. Details and final power selections are to be confirmed timeously by the air conditioning contractor.

All miscellaneous fans to have suitable connection box on side of fan or duct for easy connection. Before fans are switched on the air conditioning sub-contractor is to test wiring installation for connection.

All wiring to electrical heater banks shall be heat resistant in accordance with the acceptable standards and local regulations.

Low voltage wiring and low voltage control wiring shall be of grey colour and have terminals physically separated from the usual 220V terminals for easy identification and to avoid confusion.

Low voltage wiring shall be properly “screened” where necessary to prevent the risk of “ghost” signals resulting from induction.

Whereas the supply and installation of the mains electrical supply to the air conditioning equipment is part of the electrical sub-contract, the air conditioning contractor shall ensure that suitable connections are made available to cable sizes as advised.

The mechanical distribution board(s) shall be rendered moisture, dust and vermin proof. During erection of the installation, the distribution board(s) shall be protected against damage and penetration of moisture, dust and vermin.

Care shall be taken to ensure that all equipment is fully labelled and that accurate descriptions appear. Engraved plastic or ivory sandwiched strips shall be used throughout. The strips shall bear either white lettering on black background or black lettering on white background.

Letters shall at least 5mm high.

1.6 Variable Refrigerant Flow and Direct Expansion Split Type Systems

1.6.1 After Sales Support

To ensure long term support and given the specific nature of variable refrigerant flow and direct expansion split type systems spares, the system offered shall be from a worldwide recognised brand only, with branch offices on all continents. The South African branch office shall offer full technical and local spares support. The mother

company shall guarantee full spares availability for at least 10 years after the model that is installed, has been discontinued for replacement with a later model.

1.6.2 Outdoor Units

The Direct expansion split outdoor units shall run on R-410A refrigerant. They shall be air-cooled and positioned at well ventilated spaces.

The variable refrigerant system shall be of the heat pump type, using either a 2-pipe or 3-pipe configuration and run on R-410A refrigerant. Outdoor units shall be air-cooled.

The compressors shall be of the inverter driven scroll type. Digital scroll type compressors shall not be accepted.

In order to make up the required total cooling capacity for the building, outdoor units may be grouped in parallel, but interlocked to work as a single system.

The mechanical design shall be such, that should a compressor fail on any of the outdoor units, acid contaminated oil will be effectively contained in the unit of failure so that it does not cause failure of the remaining units.

The DX split outdoor units shall run from a 220V 1-phase, 50 Hz power supply, with a tolerance of at least 10% in supply voltage. DX SPLIT units shall come standard fitted with voltage protection in the case of any electrical surges or power dips to protect PC boards and compressors.

The outdoor units shall be fitted with hail guards over and above the original protection provided by the suppliers.

1.6.3 System Design

The complete system design to shall be done by the supplier of the product, with supplier specific software, based on the capacities and layout in this specification and the drawings. To effectively make use of the heat recovery function, the units shall be grouped per level as indicated on the drawings.

The design report shall include the following on a schematic diagram:

1. Pipe sizing and junction types
2. Remote controller connection of single units, or Master / Slave configuration
3. Component addressing if addressing is done manually

1.6.4 Communication Bus and Master Controller

Indoor and outdoor unit controllers shall be interconnected via a communication bus. A master control panel shall be supplied for central control with the following functions:

1. Programmable to suit the specific building setup.
2. Reading of all measured parameters of indoor and outdoor units.
3. Adjusting of temperature set points of all units on the system.
4. Support addressable logic for all controllers connected to the system.
1. Support Lonworks and BACnet BMS protocols for integration with other BMS systems.

Regardless of the fact that the system shall be provided with a master control panel, all parameters and fault codes of all the units connected to the system, shall be readable from the controller of the outdoor unit.

1.6.5 Refrigerant Piping

All refrigerant piping shall be rated for use with R-410A refrigerant.

Hard drawn pipes shall be ordered with specific mention to have end caps on both ends, to prevent dirt and moisture from accumulating inside the pipes. Pipes that arrive on site without end caps, or pipes that lay open ended on site during assembly, shall be confiscated during routine and surprise inspections and the contractor shall be ordered to cut any pipes of the engineer's choice for inspection, at his cost.

During sweat on assembly of hard drawn pipes, the contractor shall pressurise the pipeline with Nitrogen from the end of which assembly has started. The flow of nitrogen shall be sufficient to prevent any carbon build-up on the inside of the pipes, during assembly. Whenever assembly needs to be discontinued, both ends of the pipes shall be sealed off with insulation tape.

Should it be revealed on any inspection, or during commissioning that due care was not taken to prevent dirt from entering the pipe system, or that nitrogen pressurisation was not used during assembly causing a carbon build up, the engineer has the right to reject the entire pipe installation and all damaged or blocked components will be replaced on the cost of the contractor.

1.6.6 Training Certificates

It is a specific condition of this specification, that the contractor is certified by the supplier of the product as an approved installer. Proof of successful completion of the specific supplier's installation training course, shall be submitted for each technician that does the physical installation.

1.6.7 Commissioning

It is a specific condition, that commissioning of the variable refrigerant system, shall be done by technical representatives of the local supplier. During commissioning, the contractor shall make any changes or reparations required by the commissioning technician, at his cost.

1.7 Ductwork

1.7.1 Sheet metal Ductwork

Construct air ducts according to “Low Velocity Duct Construction Standards” and “High Velocity Duct Construction Standards” (SMACNA) or SABS 1238 – 1979 as amended.

Install ductwork as indicated on the project drawings.

All duct dimensions, (including internally insulated ducts), refer to the clear internal cross-sectional area.

Where changes in duct sizes indicated are necessitated on site, duct sizes must be determined using equivalent diameters (hydraulic diameter) and not cross-sectional area.

Ducts must be airtight, not drum or vibrate when the internal static pressure varies and must be so constructed that airflow is even without excessive static pressure drop. Construction must be sturdy.

Ducts must be thermally insulated in accordance to Section 4.3.19. Apply internal or external insulation according to requirements shown on the Engineer’s drawings.

Avoid aspect ratios in excess of 4:1 in rectangular ductwork. Internal duct dimensions of less than 200mm in rectangular ducting are not acceptable in low and medium velocity ductwork.

Provide adjustable opposed blade dampers, sound attenuators, duct splitters and turning vanes where shown on the drawings.

Unless otherwise specified ductwork must be manufactured of galvanised sheet steel using thickness as recommended by SMACNA.

Paint ductwork as specified.

Isolate all ducts passing through concrete or brick walls from the walls by means of a high density glass fibre collar at least 20mm thick to prevent transmission of vibration to the building structure. Seal all openings where ducts pass through plant room walls by means of polysulphide mastic.

Flexible joints exposed to weather must be provided with protecting galvanised sheet steel cover strips.

Flexible connections must be made of fireproof fabric reinforced air-tight material attached both sides with approved galvanised steel collars or frames.

Overhead hangers for horizontal ducts must be of the “Trapeze” type (SMACNA page 45). Support vertical ducts in accordance with SMACNA page 43, Fig B.

Ductwork connected to equipment such as cooling towers, evaporative condensers, plenum chambers etc., must be provided with flanged removable sections to allow for removal and access to eliminators, etc.

1.7.2 Low Velocity Ducts

This refers to ducts with velocity up to and including 10 m/s and static pressure up to and including 500 Pa.

Refer to “Low Velocity Duct Construction Standards”. (SMACNA) for all constructional requirements. Alternative methods applicable are specified hereafter.

Galvanised sheet steel must be used with thickness as recommended in SMACNA (“Table 1, page 11). Either cross-breaking or beading is acceptable. Longitudinal seams must be of the “Pittsburg Lock” or Acme Lock” type. Transverse joints must be as follows: (SMACNA – Table 1, page 11):

Dimensions of Longest side if duct	Transverse joints		Reinforcing Angle
	Long Side	Short Side	
Up to 450mm	B	A	SMACNA – P11
475 to 750mm	E	A	SMACNA – P11
775 to 1500mm	L	L	SMACNA – P11
1525 and larger	M	M	SMACNA – P11

Reinforcing the angle irons must be galvanised. Rivets, screws, bolts and other fastening equipment must be completely corrosion proof.

Elbows must be in accordance with SMACNA page 61. Use standard radius elbows generally. Install short radius elbow pieces as shown on the project drawings.

Provide square elbows with galvanised turning vanes, SMACNA Fig. A, Page 53.

1.7.3 High Velocity, Medium Pressure Ducts

Refer to “High Velocity Duct Construction Standards” (SMACNA) for all constructional requirements. Ducts with velocities higher than 10 m/s and a static pressure between 500 Pa and 1 500 Pa apply.

Galvanised sheet metal must be used with thickness as recommended in SMACNA fig 3 – 1, pages 14 and 15. Construction must be in accordance with (1), (2), (4) and (12) of Fig 3-1.

Use standard radius generally. Install short radius square elbows as shown on the project drawings. Provide short radius elbows with splitters and square elbows with double thickness type turning vanes.

(SMACNA pages 42,43 and 44).

Flexible ducts must be of the spiral wire reinforced glass fabric type (SMACNA) page 63).

Overhead hangers for horizontal ducts must be of the “Trapeze” type (SMACNA page 56). Support vertical ducts as indicated in SMACNA page 57.

1.7.4 High Velocity, High Pressure Ducts

This refers to ducts with velocities above 10 m/s and static pressure above 1 500 Pa. Refer to “High Velocity Duct Construction Standards”(SMACNA) for all constructional requirements. Alternative methods applicable are specified hereafter.

Use galvanised sheet steel with construction in accordance with SMACNA Fig 3-2 Pages 16 and 17, Tables (1), (2), (4) and (11).

Use standard radius elbows generally. Install short radius square elbows as shown on the project drawings. Provide short radius elbows with splitters and square elbows with double thickness type turning vanes. (SMACNA) Pages 42,43 and 44.

Flexible ducts must be of the spiral wire reinforced glass fabric type (SMACNA Page 63).

Overhead hangers for horizontal ducts must be of the “Trapeze” type (SMACNA Page 56). Support vertical ducts as indicated in SMACNA Page 57.

1.7.5 Flexible Ductwork

Where indicated on the project drawings, ductwork must be connected to mixing boxes and integrally mounted ceiling diffusers by means of flexible ducting.

Flexible ducts must be either of the flexible aluminium foil metal type or of the spiral reinforced fabric type, in accordance with SMACNA Page 106, all flexible ducts must be insulated externally.

Flexible ducting must comply with local fire codes, NFPA Bulletin 90A and SABS 0400 fire resistance requirements.

Flexible ducts connected to diffusers or mixing boxes must, unless otherwise shown or approved, not exceed 1,2m in length nor have more than the equivalent of one 90 ° bends. Bends must be of the maximum possible radius without flattening or distorting the flexible ducting.

Support flexible ducting with sufficient and correct brackets that will maintain its shape.

1.7.6 Duct Access Doors

Access doors must be of the insulated hinged type as shown in SMACNA Fig. B, page 17 ("Low Velocity Duct Construction Standards").

Access doors must be of sizes as shown on the project drawing.

1.7.7 PVC Ductwork

PVC Ductwork where specified on the layout drawings must be of unplasticized polyvinyl chloride (uPVC) manufactured and installed in accordance with SMACNA – "The Thermoplastic Duct Construction Manual".

The class of ducting used must be as specified.

Provide for expansion and contraction of the ductwork.

Flexible connections must be made of plasticized polyvinyl chloride (PVC).

Duct joints must be welded flanges or male/female socket type welded around. Test all welded joints and seams by high frequency spark test at 40 kV.

1.7.8 Manual Air Dampers for Volume Control

Provide each branch duct leading to a single air outlet with a damper unless the outlet diffuser is of the variable volume type. Provide each branch duct leading to a group of air outlets with a damper at the point where the branch leaves the main air duct. Splitters may be used in lieu of dampers where the estimated pressure drop does not exceed 30 Pa. Install dampers and splitters so that they can be adjusted at any time after the completion of the work. Provide access panels where the adjusting mechanism is concealed by suspended ceilings, furring, etc. Front and back bars or vanes of directional grilles are not to be used for adjustment of air quantities.

Butterfly dampers must be of the balanced type with opposed blades and must be constructed in accordance with SMACNA Pages 64,65,66 and 67.

("Low Velocity Duct Construction Standards").

Dampers shall not be used to create artificial resistance in the system in order to reduce fan air flow capacity.

Reduction of air flow shall be accomplished by reduced fan speed or by changing the fan blade angle.

1.7.9 Testing

Unless otherwise specified, test the total ductwork installation for leakage as per SANS 10173.

Leakage rates must not exceed 5% of the required air flow quantity in any section of ductwork or exceed the SABS permissible leakage, whichever is the smaller.

1.7.10 Duct Installations

Install ductwork in accordance with the layout drawings issued with the Project Specification.

The tender drawings are diagrammatic and do not purport to show exact positions of ducts or specific details of construction of the latter. Check all final dimensions on site before preparation of manufacturing drawings and the fabrication of ducting.

Where beams, stanchions or other obstructions interfere with the straight running of ducts, provide suitable offsets or alternatively make changes in the section of the particular duct.

Study all the drawings of the particular building in order to determine the number of such offsets or changes in section and the positions in which they will be required. Allow for such offsets. A complete set of drawings of the building may be inspected at the office of the Architect.

1.7.11 General

Unless specified, type 316 stainless steel shall be used for stainless steel ducting.

All exhaust air ducting for moisture producing equipment such as cooling towers or where air is drawing through or over water shall have sealed longitudinal and cross joints and shall be painted on the inside with corrosion protection paint to the satisfaction of the Engineer. Corrosion protection shall be selected to give a minimum protection life of five years.

Black mild steel of a minimum thickness 1,6mm thickness, shall be used for grease contaminated exhaust systems. All joints shall be welded.

1.7.12 Duct Hangers

Duct Hangers shall be as follows:

Longest duct dimensions (mm)	Round hangers (mm)	Galvanized Strap Hangers (mm)	Shelf Angles	Maximum Spacing (mm)
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Kimberley Nurses College Phase 2A- Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 1 – GENERAL TECHNICAL SPECIFICATION

Up to 760	6	25 x 1.6	25 x 25 x 3	3.0
761 to 1000	10	25 x 1.6	38 x 38 x 3	3.0
1001 to 1200	10	25 x 1.6	50 x 50 x 3	2.4
2101 to 2400	10	25 x 1.6	50 x 50 x 6	2.4
2401 and over	12	25 x 1.6	50 x 50 x 6	2.4

Hangers shall not protrude below the lowest part of the shelf angles.

1.8 Fans

1.8.1 General

The combination fan and silencer selection must be such as to satisfy the specified noise levels.

Requirements under the above heading apply to fans which are not integral parts of cooling towers, air handling units or similar equipment designed as standard units by the manufacturer.

Fan duties are specified in the Equipment Schedules.

Where no pressure requirements are indicated, estimate the fan static pressure requirements from the system lay-out drawings and equipment.

The total fan system's design resistance, as specified must be finally checked when all information on selected system elements are available.

Fans must be selected to operate at or as near to maximum efficiency as possible.

Flexible connections must be fitted between fan inlet/discharge and ducting or equipment as appropriate.

Matching flanges to be supplied with all fans.

Fit fans with manufacturer's nameplates permanently fixed to the casing in a prominent position clearly indicating manufacturer, model number, maximum operating speed, maximum power absorbed, size and serial number.

Protect fan in/outlets which are not connected to ducting or equipment with removable screens.

Provide indicating arrows for direction of rotation and direction of air flow on fan casings.

Fans for special applications such as corrosive gases, explosive atmospheres, etc., must be selected for the particular medium mentioned.

Fans for proprietary and package units although not specifically covered in this specification must however comply with the general requirements of this specification.

Mount all fans on anti-vibration mountings or support from anti-vibration hangers. All anti-vibration mountings must be to the approval of the Engineer.

Bearings must be ball or roller type, and quiet in operation. They must be sized to give a long life (not less than 100 000 hours) at the loads imposed by the application.

Belt guards must be arranged to permit lubrication and use of speed counters with the guard in position. Belt guards must have adequate ventilation for belt cooling.

Fans must be painted in the factory with one primer coat and two coats of high gloss corrosion resistant paint.

Where stated in the technical schedules under Electrical power from: "By Principal Contractor" or "By Others", the electrical contractor shall provide and connect the electrical supply wiring with local isolator near each fan wired to the fan via an interlocking ON/OFF switch where necessary as indicated in the technical schedules. For 380 volt 3 phase fans the electrical contractor shall provide a 3 phase local isolator wired up to a 380 volt 3 phase supply with interlocking starter contactor with suitable overload protection.

The air conditioning sub-contractor shall wire and connect from the isolator to the fan.

1.8.2 Centrifugal Fans

Centrifugal fans must be of the forward or backward curved, multi-vane type with single or double inlet and arrangement as specified in the Equipment Schedules.

Fan performance must be based on tests carried out in accordance with BS 848: Part 1 or Part 3 (as applicable) and as amended.

The fan casing must be of the volute type manufactured from sheet steel with lock forming or continuously welded seams, suitable reinforced and adequately supported by means of a steel superstructure. Fans with a wheel diameter above 1000mm must be provided with access doors fitted to the fan casing.

Fan wheel and shaft assembly must be statically and dynamically balanced to ISO 1940 within grade G6,3.

Fan drives shall be by means of standard V-belt and grooved pulley configuration or direct drive.

Fans and motors must be rigidly bolted to a common prefabricated steel frame with the motor mounted on slide rails for normal belt drive adjustment or replacement. The complete frame must be mounted on anti-vibration mountings.

Larger fans must be manufactured with split casings in sections to permit installation through available openings in new and existing buildings.

Shaft bearings must be grease lubricated, self-aligning ball or roller bearings in accordance with the fan manufacturer's standard practice. For bearings located in the air stream, precaution must be taken to prevent loss of lubricant.

Shafts must be fully machined steel shafting conforming to BS 970.

Provide a drain socket with plug at the lowest point in the fan casing (except if discharge is at lowest point).

Fans used in variable volume applications must have stable characteristics throughout the operating range to suit the particular application.

All fans must be tested in the factory and checked for vibration to ISO 2372.

Bearings must be checked using a shock impulse meter. All measurements and observations made during this test run must be recorded and made available to the Engineer on request.

Fan motors in the air stream in draw-through applications with spray coolers or sprayed coils must be TEFC and protected to IP44 or better.

Shafts for variable inlet vane control must be supported by pre-lubricated sealed bearings. Both sets of variable inlet vanes on double inlet fans must be controlled simultaneously and equally.

1.8.3 Axial Flow Fans

Axial flow fans must be of the aerofoil type with non-overloading characteristic with peak power requirements occurring in normal operating pressure range and motor rating exceeding this requirement.

Axial fans must be selected for the highest possible efficiency with the lowest possible blade tip speed. All fans must be of the adjustable pitch impeller type.

The complete fan unit must be statically and dynamically balanced in accordance with ISO 1940 within Grade G6,3.

Fan performance must be based on tests carried out in accordance with BS 848: Part 1.

Fan casings must be manufactured from reinforced mild steel with pre-drilled flanges at both ends. Casing access panels must be provided where specified in the Equipment Schedules.

Fan motors must be totally enclosed squirrel cage induction type with protection to IP55 unless for a special application as set out in the Equipment Schedules.

Motor connections must be in an external weatherproof terminal box forming part of the casing except for flameproof and special applications which are specified in the Equipment Schedules.

Lubrication points must be extended to the outside of the casing and inspection doors of ample size must be provided in the casing.

In the case of aerofoil bladed fans, fan impellers shall be manufactured from aluminium or rigid PVC and shall be fitted in machined hubs featuring individual blade angle adjustment.

Fans mounted in ducts shall be provided with access panels for inspection and shall be easily removable for maintenance purposes.

Vibration isolation equipment to axial fans shall be provided in accordance with the Specification.

Axial flow fans, where not mounted in ducting, shall be protected with suitable wire-guards.

1.8.4 Roof Extract Fan

Roof extract units must be of the vertical jet or mushroom type unless prior approval for an alternative type is given by the Engineer in writing.

Install fans in accordance with the manufacturer's recommendations.

Outlet cowls and shutters must be the standard product of the fan unit manufacturer.

Outlet grilles must protect the fan from birds.

Provide single phase fan motors only where specified in the Equipment Schedules.

Flow and rotation direction arrows on fan casings must be easily visible from the plant room or from the access to the fan.

Where specified, units must be suitable for upstand and curb mounting, complete with weather skirting and flashing as required.

1.8.5 Propeller Fans

Propeller fans must be suitable for mounting with or without mounting plate (diaphragm) as specified in the Equipment Schedules.

Wall cowls, wire guards, diaphragm plates and louvre shutters must be standard products supplied with the fans.

Mounting plates (diaphragm) where required must be of pressed steel or fibreglass reinforced polyester with integral bell mount orifice.

Impellers must be of heavy gauge contoured pressed steel blades or reinforced polypropylene or fibreglass reinforced polyester ultra-violet stabilised, mounted on cast aluminium or steel hubs.

Fan motors must be three phase totally enclosed squirrel cage induction type with protection to IP 44 unless otherwise specified in the Equipment Schedules.

Mount fans resiliently.

Balancing and testing must be as set out as for axial flow fans.

Fit motor and impeller protection screens as applicable.

Where applicable, fit fans on exterior walls with weather proof galvanised louvre shutters and where specified with wall cowls.

Fans are essentially to be manufactured from corrosion resistant material, chemically treated and painted in a high gloss enamel.

1.8.6 Window / Wall Extract Fans

Fit window / wall type fans with automatic shutters and with finger protection guards.

Where specified provide speed control. Fit motors with thermal overload protection.

Where remote control is specified wiring between fan, control point and power supply point must be flush mounted with conduit and draw boxes.

Fans shall be supplied complete with mounting accessories.

1.9 Sound Attenuators

1.9.1 General

Sound attenuators shall be generally manufactured, selected and supplied by the fan manufacturer.

Sound attenuators shall be factory made units of a make approved by the Engineer, and consist of a casing, internal baffles and sound absorbing lining material.

Sound attenuators shall be suitable for the system working pressure, velocity and for an air temperature up to 80 ° C.

Casings shall be constructed of galvanised sheet metal, of which the minimum thickness is in accordance with requirements laid down elsewhere in the specification.

The sound absorbing lining material shall be odourless, non-flammable, rot proof and shall not tear loose as a result of the air stream flowing over it.

Sound attenuators shall be provided complete with mating flanges.

(Duct mounted) sound attenuators shall be of the rectangular or circular type to achieve the noise criteria ratings stated in the Specification.

Sound attenuators of the rectangular type shall be flanged heavy metal duct sections containing built-in silencer baffles. Baffles shall be installed in order to achieve the required attenuation rate.

Sound attenuators of the circular type shall be complete with flanges, and shall comprise of a heavy gauge circular duct section with internal sound absorption lining, complete with centre pod, (if the centre pod is required to achieve the sound attenuation rate stated in the schedule).

Sound absorbent material shall be manufactured from non-flammable, odourless, rat proof, fire resistant, non-combustible, damp-resistant material edged with galvanised sheet steel and covered with fireproof erosion resistant material. The finished product shall not tear loose as a result of the air stream flowing over it.

Sound absorbent material for sound attenuators serving kitchen canopy exhaust system, shall be “MALINEX” covered and sealed to prevent the impregnation of kitchen greases.

Sound attenuators shall be factory manufactured by recognised specialist manufacturers in this field, accepted manufacturers being TROX, HOWDEN AIR, WOODS, AIR MOVEMENT SUPPLIES or equally approved.

The attenuators shall be selected with a maximum air pressure drop of 50 Pa.

The tenderer to note the sound attenuator properties on the “Sound Attenuator Technical Schedule”.

1.9.2 Air conditioning applications

In the case of normal air conditioning applications, sound attenuator panels shall be covered with perforated metal sheet.

Sound attenuators shall be provided complete with mating flanges. The size of the flanges shall be at least as that specified for ducting of the same duty and dimension.

1.9.3 Special applications

Sound attenuators in the air flow of kitchen extraction systems shall have a sound absorbing lining which shall not absorb any grease or fat.

In the case of corrosive airflow applications, the sound attenuator materials shall be suitable for the application.

Note: Should fibre glass be used as a sound absorbent material, the exposed internal lining shall be protected with MALINEX and perforated metal sheet.

1.10 Grilles, Diffusers, louvers and Dampers

1.10.1 Grilles

Supply and return air grilles must be provided as indicated on the drawings.

Each grille must be selected in accordance with the manufacturer's recommendation to be capable of passing the specified air quantity without creating excessive resistance, noise or local draughts.

Grilles must be manufactured of stamped, extruded or rolled aluminium or steel sections, finished as specified and mounted in a neat frame.

Provide supply air grilles with double deflection aerofoil vanes adjustable from the front of the grille.

Vanes must be spaced at not more than 20mm centres.

Exhaust and return air grilles in the same installation must be similar in general appearance and construction to the supply air grilles but with a single set of fixed vanes.

Provide supply air grilles with opposed blade volume control dampers adjustable from the front of the grille.

Provide return air grilles with opposed blade dampers for volume control. Grilles shall be furnished in a natural anodised finish to the Architect's requirements. Dampers must be adjustable from the front of the grille.

Grilles must in all cases be selected with free air passage areas not less than that indicated on the drawings.

Grilles shall be finished in natural anodized. Finished to Architect's requirements.

1.10.2 Weather Louvres

Weather louvers must be manufactured of extruded aluminium sections or ferrous metal hot dip galvanised after manufacture, as specified.

Weather Louvers must be constructed with drip edges to blades and rigid frame to enable building in.

Weather louvers must be finished in natural anodised aluminium, powder coated or painted as specified.

Weather louvers must be watertight even with nominal air velocity up to 3,0m/s.

Weather louvers must be fitted with 12mm opening size galvanised expanded metal or wire mesh screen.

Top and bottom blades must be fitted flush with the frame and smooth without grooves, channels or recess where dirt or water can collect.

1.10.3 Ceiling Diffusers

Ceiling diffusers shall be manufactured of steel or aluminium and shall be finished in high quality white baked enamel or epoxy coated in a colour matching the ceiling to the Architect's requirements.

Ceiling diffusers throughout the building project shall be of similar appearance.

The Sub-Contractor shall, prior to placing orders for ceiling diffusers, submit a sample unit to the Architect in the colour format required by the Architect.

Diffusers must be square, round or rectangular with face plates matching the ceiling grid as specified.

Each diffuser must be selected in accordance with the manufacturer's recommendations to be capable of passing the specified air quantity without creating excessive resistance, noise or local draughts.

Each diffuser must be provided with an opposed blade volume control damper or alternatively, an adjustable disk type throttling mechanism.

Dampers must be selected and installed so as not to disturb the supply air distribution pattern or induction ratio of the diffuser.

Diffuser cores must be removable for cleaning and access purposes.

1.10.4 Variable Volume Outlets

Variable volume outlets with controls and re-heaters must be provided where indicated on the drawings.

Only well catalogued and proven products will be considered.

Minimum air volume must be factory set and site checked for each outlet.

Outlets must be selected and installed to ensure that no dumping or coning of supply air streams occurs, particularly at low air flow rates.

Variable volume control must be achieved with pneumatic or electric drives as specified. Low noise levels during operation are essential.

Re-heaters must be protected against overheat and must be switched with an adequately rated and reliable micro-switch.

Easy access to all parts possibly requiring servicing, removal or setting must be provided.

1.10.5 Dampers

Dampers for positive volume control purposes must be manual or electric actuator driven as specified and provided where indicated on the drawings.

Damper blades, links and damper frames must be of rigid construction galvanised steel generally as per SANS 1238, and of the opposed blade type.

Manually adjusted dampers must be provided with adjusting levers in accessible positions with provision for positive locking in any position from fully open to fully closed.

Dampers must be of the link or gear type as specified.

Damper blade shaft bearings shall be brass.

1.10.6 Non Return Outlet Louvers

Non return outlet louvers must be installed where indicated on the project drawings.

1.10.7 Door Grilles

Door grilles shall be supplied where shown on the drawings. Such door grilles shall be delivered to the Principal Contractor in good time for fitting by him in the relevant doors/frames.

Door grilles shall of the “no vision” type incorporating flanges on both sides of the door and horizontal blades of the v - type spaced in order to limit air friction loss.

Door grilles shall be finished in natural anodised finish to the Architect’s requirements.

1.11 Painting

1.11.1 General

The clauses which appear under this heading shall be considered as forming part of each of the following paint specifications.

Paint shall not be applied over any surface containing traces of grit, grease, oil etc. loose mill scale or corrosion products of any kind.

All metal surfaces to which paint is applied shall be moisture dry. Paint surfaces which are to be over coated shall be hard dry before over coating, unless the specification states otherwise.

All traces of soluble salts and corrosive air-borne contaminants shall be thoroughly washed from the surface prior to painting, dried and painted immediately thereafter.

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Unless otherwise stated, no paint shall be applied within 50mm of areas which are to be welded.

Welds and adjacent parent metal shall be deslagged, inspected and approved and all spatters shall be removed prior to painting.

The weld area shall be wire brushed and all contaminants shall be removed prior to painting. The weld area shall then be flushed with fresh water and allowed to dry. In the case of rust formation, the weld area should again be wire brushed.

Surfaces which are to rest on concrete or other floors shall receive the full paint system prior to erection.

Areas where the paint coating has been damaged during transportation, erection or by any means whatever shall be repaired.

Rust spots shall be removed by means of a wire brush or emery paper and the surrounding paint which is still intact shall be feathered for a distance of 20mm beyond the damaged area.

Spot priming shall consist of all the coats previously applied and shall overlap the undamaged area by 20 mm.

Where the shop coat has been allowed to age for a few months before painting, it shall be light sanded or rubbed with steel wool or scrubbed with Polycell Sugar Soap Solution, using a bristle brush. The surface shall then be rinsed with drinking water.

Mating or contact surfaces shall be brought together by ensuring that the two surfaces brought into contact with each other are prepared and primed in accordance with the specification.

Areas which will be inaccessible after erection shall receive the full specified coating system, before erection or assembly.

Unless otherwise specified, steel embedded within concrete shall not be painted except to within 50 mm below the concrete / air interface.

All sharp edges and cut ends shall be filed smooth and shall then receive the specified dry film thickness of paint.

When blast-cleaning, a satisfactory blast profile (i.e. anchor pattern) shall be achieved. If the abrasive used for blast cleaning is sand, then it shall be free of clay. Alternatively, an approved grit shall be used.

The Contractor shall ensure that the final finishing coat obscures the previous coat.

The Contractor shall ensure that the manufacturer's recommended thinners are used for any particular paint.

The Contractor shall ensure that primed steelwork, piping etc. which is to be delivered to site is stacked on bearers and is clear of the ground. Wherever possible channels, angles, etc. shall be stacked so that water cannot collect on the steel.

Surfaces which are to be friction bolted shall be prepared in accordance with the specification (i.e. wire brushed) but shall receive no paint coating.

The painted dry film thickness shall be measured using a non-destructive thickness gauge such as the Mikrotest or equivalent.

All the mixing of paints shall be done using either a flat-sided paddle or by means of a mechanical mixer.

Where a specified volume ratio of components must be mixed together, provision shall be made on-site for a practical yet accurate method of volume measurement.

All air used for abrasive blast-cleaning or for spraying shall be free from all traces of oil, water and other contaminants.

The paint manufacturer's instructions shall be strictly adhered to.

1.11.2 Painting of Chequer Plate or Egg-crat Flooring and Supporting Frames

This paint specification will be referred to as Class "C" painting. Chequer plate and egg-crate flooring shall not be delivered to site with a bituminous coating.

Finishing

Three coats of HYSHEEN EPOXY TAR (SAR 681-BROWN, SAR 682-BLACK) to SABS 801-1973, Type II, shall be applied, at a dry film thickness of 70-80- micrometres per coat. Overcoats shall be applied within a minimum of 16 hrs, and a maximum of 48 hrs.

1.11.3 Steelworks

All steelwork which is not galvanised, chrome plated or otherwise protected against corrosion shall be given a coat of protective paint at the Manufacturers' works and the Contractor shall maintain this protective coat until the work is finally painted.

Surface preparation

All surfaces shall be thoroughly degreased with AQUASOLV DEGREASER (Code AR), then rinsed with fresh water and allowed to dry. The surfaces shall then be wire brushed to remove loose rust and loose mill scale to a St 3 finish to Swedish Standard 515 05/59/00-1967.

Priming:

One coat NAMELCOAT PRIMER (U 53) shall be applied to a dry film thickness of 30-40 micrometres.

Undercoat

One coat of MERIT UNIVERSAL UNDERCOAT (UC1) shall be applied to a dry film thickness of 30-40 micrometres.

Finishing

One coat of UNIVERSAL HIGH GLOSS colour shall be applied, to a dry film thickness of 30-40 micrometres.

The total dry film thickness to be less than 90 micrometres.

1.11.4 Motors, Gear-Boxes Pumps and Other Equipment

Surface Preparation

The surfaces to be painted shall be abrasive blast cleaned to Grade C 5a 2 ½ of the Swedish Standard SIS 055900-1967.

Priming

One coat of EPIMIDE EPOXY PRIMER ZINC/CHROMATE IRON OXIDE (EPD 41) shall be applied to form a uniform coat and to fill all porosities in the castings.

Undercoat

One coat of EPIDUCT CHEMICAL RESISTANT EPOXY ENAMEL (EPD 700/699 series), tinted to a shade just lighter than the finishing colour with UNIVERSAL STAINERS (X 14-20), shall be applied.

Finishing

One coat of EPIDUCT CHEMICAL RESISTANT EPOXY ENAMEL (EPD 700/699 series) in the specified colour shall be applied.

The blast profile for this system shall be between 25 and 40 micrometres.

If over coating the primer after two weeks, abrades to a matt surface with 220-350 grit waterproof paper and rinse with fresh water.

1.11.5 Piping (Other than Steam Piping)

Piping which is not galvanized is to be protected as follows after installation.

Above Ground

Surface Preparation

The surfaces shall be wire brushed to remove loose rust and loose mill scale to an St 3 finish to Swedish Standard SIS 05/59/00-1967.

Priming

One coat of NAMELCOAT PRIMER (UC 53) film thickness of 30-40 micrometres.

Undercoat

One coat of MERIT UNIVERSAL UNDERCOAT (UCI) shall be applied to a dry film thickness of 30-40 micrometres.

Finishing

One coat of UNIVERSAL HIGH GLOSS ENAMEL (G) in the specified colour shall be applied to a dry film thickness of 30-40 micrometres.

The total dry film thickness for the coating system shall not be less than 90 micrometres.

Underground or in trenches.

Piping installed underground or in trenches shall be painted with bitumastic paint whether the pipe is insulated or not.

1.11.6 Galvanised Iron

Surface Preparation (General)

All grease and other deposits shall be removed from all surfaces with galvanised iron cleaner (Code G.I.C.). The surface shall then be rinsed with clean water to give a water break-free surface.

All surfaces must be thoroughly clean and dry prior to the application of any materials. Should this state not be achieved, the cleaning process must be repeated.

1.11.7 Galvanised Cladding Inside Buildings

Priming

One coat CALCIUM PLUMBATE PRIMER to a dry film thickness of 25 – 35 micrometres.

Intermediate coat

One coat UNIVERSAL UNDERCOAT (UC 1) to a dry film thickness of 25 – 35 micrometres.

The total dry film thickness shall not be less than 75 micrometres.

1.11.8 Galvanised Cladding Exposed to Atmosphere

Priming

One coat CALCIUM PLUMBATE PRIMER to a dry film thickness of 25 – 35 micrometres.

Intermediate coat and finishing

Two coats of IRONGUARD MIO MICACEOUS IRON ORE ROOF PAINT to a dry film thickness of 50 – 70 micrometers.

The total dry film thickness shall not be less than 75 micrometres.

1.11.9 Galvanised Cladding Moist Conditions

Priming

One coat CHEMICOTE HIGH BUILD CHEMICAL RESISTANT PRIMER (CHC 1) to a dry film thickness of 60 – 80 micrometres.

Intermediate coat

One coat CHEMCOTE HIGH BUILD CHEMICAL RESISTANT INTERMEDIATE COAT (CHC 101) to a dry film thickness of 60 – 80 micrometres.

1.11.10 All Galvanised Pipes

Finishing

One coat CHEMCOAT ENAMEL (CHC 3000) to 25 – 35 micrometres.

The total dry film thickness shall not be less than 145 micrometres.

PART 2 – DETAILED TECHNICAL SPECIFICATION

2.1 General Description of the Project

This specification covers the supply, delivery, installation and commissioning of all equipment related to the HVAC services for Robert Mangaliso Sobukwe hospital main kitchen, located in Kimberley, Northern Cape province.

2.1 Scope of Work

The works shall include the following:

1. Supply, delivery and installation of Dx split high/midwall units for the offices and wards, consulting rooms.
2. Supply, delivery and installation of Dx split type Concealed Hide Away(High Static Pressure) units for waiting area
3. Supply, deliver and installation of centralised in-line fresh air fans with filter boxes.
4. Supply, deliver and installation of centralised in-line extraction air fans.

2.1 Detail specification

2.1.1 Applicable Drawings

The followings drawings are applicable to all items under chapter 6.3:

- K2060MV HVAC

2.1.2 Indoor Condition

Room indoor conditions shall be maintained at maximum 23°C DB in summer and at 22°C DB in winter.

2.1.3 Ambient Conditions

Outdoor DB temperature: 29°C
Outdoor WB temperature: 15°C
Winter DB temperature: -3°C

2.1.4 High/Mid Wall and Underceiling cassette Split Type Units

The units shall be of the heat pump inverter (R410a) type.

The air-conditioning units shall be standard factory assembled, piped and wired. The units shall be thoroughly tested for all operating conditions. Spares shall be freely available in South Africa. On request, the Contractor shall provide the Engineer with performance test certificates.

The air-conditioning units and installation in general shall be in accordance with the high / mid wall unit's supplier's recommendations. Any discrepancies between this specification and the supplier's recommendations that may influence the unit's performance or guarantee shall be clarified with the Engineer during tender stage.

The indoor unit and condensing unit shall be interconnected with refrigerant piping, electrical wiring and interlocking control cabling. The pipe and cable connections shall be made in accordance with the unit supplier's recommendations. The refrigerant shall be of the R410 type.

Each condensing unit with connected evaporator unit shall be clearly labelled to identify different split units.

All units shall be of Samsung / LG / Midea or other approved make. "Other approved" means approved by the Engineer during the tender stage.

2.1.5 Four Way Cassette Split Type Units

The units shall be of the heat pump inverter (R410) type.

The air-conditioning units shall be standard factory assembled, piped and wired. The units shall be thoroughly tested for all operating conditions. Spares shall be freely available in South Africa. On request, the Contractor shall provide the Engineer with performance test certificates.

The air-conditioning units and installation in general shall be in accordance with the Four Way Cassette split type unit's supplier's recommendations. Any discrepancies between this specification and the supplier's recommendations that may influence the unit's performance or guarantee shall be clarified with the Engineer during tender stage.

The indoor unit and condensing unit shall be interconnected with refrigerant piping, electrical wiring and interlocking control cabling. The pipe and cable connections shall be made in accordance with the unit supplier's recommendations. The refrigerant shall be of the R410 type.

Each condensing unit with connected evaporator unit shall be clearly labelled to identify different split units.

All units shall be of Samsung / LG / Midea or other approved make. "Other approved" means approved by the Engineer during the tender stage.

2.1.6 Concealed Ducted Hide Away Split Type Units

The units shall be of the heat pump inverter (R410) type.

The air-conditioning units shall be standard factory assembled, piped and wired. The units shall be thoroughly tested for all operating conditions. Spares shall be freely available in South Africa. On request, the Contractor shall provide the Engineer with performance test certificates.

The air-conditioning units and installation in general shall be in accordance with the High static pressure concealed ducted Hide Away unit's supplier's recommendations. Any discrepancies between this specification and the supplier's recommendations that may influence the unit's performance or guarantee shall be clarified with the Engineer during tender stage.

The indoor unit and condensing unit shall be interconnected with refrigerant piping, electrical wiring and interlocking control cabling. The pipe and cable connections shall be made in accordance with the unit supplier's recommendations. The refrigerant shall be of the R410 type.

Each condensing unit with connected evaporator unit shall be clearly labelled to identify different split units.

All units shall be of Samsung / LG / Midea or other approved make. "Other approved" means approved by the Engineer during the tender stage.

2.1.7 Refrigerant Circuit

Refrigerant piping shall be in accordance with the following standards:

- SABS 1453: Copper tubes for medical gas and vacuum services
- SABS 0147: Refrigerating systems including plants associated with air-conditioning systems

Fittings shall be copper based capillary solder fittings in accordance with SABS 1067. All soldered joints on proprietary manufactured units shall be carefully checked and remade if found damaged in transit.

Pipe size selections shall be such as to produce moderately low velocities whilst, nevertheless:

- Ensuring proper oil return to the compressor and minimizing lubricating oil being trapped in the system.
- Ensuring practical lines without excessive pressure drops and with proper feed to evaporators.
- Preventing liquid refrigerant from entering the compressor during operation and at shutdown.

Refrigerant piping shall be sized and fitted with the necessary oil traps strictly in accordance with the unit manufacturer's requirements.

All refrigerant pipelines shall be insulated with the “Armaflex” type, lightweight, elastomeric nitrile rubber tube insulation. Insulation thickness shall be 13 mm.

Suction and liquid pipelines shall be insulated separately and joints on insulation shall be glued with the insulation manufacturer’s recommended adhesive to create a vapour barrier.

The installation of trunking and trays shall form part of this mechanical contract.

2.1.8 *Installation of Chilled water piping*

Chilled water 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. Hangers and supports where piping goes through walls shall be installed to prevent transmission of vibration to the building.

Chilled water piping in ceiling voids and mounted internally against walls shall be installed in 101 mm wide galvanised steel Cabstrut light duty cable trays (per unit). Pipes shall be strapped over insulation to cable trays at 500 mm intervals with suitably sized cable ties. Cable trays shall be 152 mm wide where drain pipes run together with refrigerant piping (per unit).

Externally mounted refrigeration pipes and drain pipes shall be mounted in Cabstrut P9000 cable trunking (127 mm x 76.2 mm). Cable trunking shall be complete with clip on covers. Pipes and cables shall be strapped together every 500 mm with suitably sized cable ties and loosely fitted in the trunking. The trunking shall be manufactured from galvanised steel and epoxy powder coated to a colour as specified by the Engineer.

Any insulation material not covered by the trunking and exposed to the elements shall be neatly strapped with cable ties to minimise the possibility of dirt and water entering between the insulation and refrigeration pipes.

2.1.9 *Installation of Indoor and Outdoor Units*

During installation, care shall be taken to ensure that no vibrations are carried over to structures to which the indoor and outdoor unit is fixed.

Outdoor condensing units shall be installed on wall mounted brackets and / or a concrete slab as indicated on the project drawings. All condensing units to be supplied with hail guards.

Where installed on wall mounted brackets, the condensing unit shall be securely bolted to the mounting bracket with adequately sized fasteners.

Where installed on a concrete slab, the condensing unit shall be fitted on top of neoprene vibration isolating pads and 450 mm square concrete paving slabs.

All condenser units shall be supplied with hail guards.

2.1.10 *Installation of Condensate Drain Pipes*

If an outdoor unit (heat pump type) is mounted against a wall more than 1 m above ground / floor level, the unit shall be fitted with an uPVC drain pipe neatly saddled to the wall. Drain pipe sizes for outdoor condensing units shall be to the supplier's specification.

Condensate drain pipes shall always run together with refrigerant pipes and shall always be installed in the same trunking and on the same cable trays for as far as the installation permits. Surface mounted drain piping shall only be allowed where condensate drain pipes run in a different direction to either a service duct, waste water pipe or any other location as indicated on the project drawings. Surface mounted drain piping shall be secured to the wall by means of galvanised steel saddles at no more than 1 m intervals.

Where units are mounted on the inside of exterior walls on wall-mounted brackets, the mechanical contractor shall drill sufficiently sized holes through which refrigerant pipes, drain pipes and cable wires shall penetrate the walls/windows of the indoor unit. Drain pipes running from the indoor unit through the wall/windows shall be adequately sloped to ensure positive drainage.

All condensate pipes running from indoor units to waste water pipes, outlet gullies or open waste water points shall be fitted with a U-trap at a location as indicated on the project drawings.

uPVC pipes shall be used for drain piping from indoor units. Drain pipe sizes for indoor units shall be Ø 32 mm for all unit sizes.

The first 5m of drain piping shall be insulated with "Armaflex" type, lightweight, elastomeric nitrile rubber tube insulation. Insulation thickness shall be 13 mm.

Where drainage piping or control cabling is required to be installed flush mounted, positioning and chasing shall be done in good time to meet construction programs.

2.1.1.1 Fresh Air Supply System

The fresh air supply system will consist of primary filters with a forward curved blade in-line axial fan supplied by a reliable supplier in RSA. The fresh air system will need to be approved at tender stage to avoid any variations at construction stage.

The system is to be mounted within the ceiling void on the trusses. Flexible connections between ducts and the FAF system is to be installed to avoid any vibrations carried over to the building.

The control of the fan will be via a timer relay that can be programmed to suit the occupancy of the buildings. |

PART 3- SCHEDULE OF CAPACITIES

3.1 General

The following points shall be noted with respect to the Schedule of Capacities below:

1. All capacities are minimum, and the Bidders offer must meet or exceed the specified capacities.
2. Where equipment performance is dependent on the selection of other equipment, The Bidder shall offer compatible equipment. No claims for additional cost will be considered for equipment not correctly selected.
3. Capacities should be corrected for altitude.
4. Failure to complete these schedules will invalidate the Bid.

BLOCK A - AC 3		
	SPECIFIED	OFFERED
Type	4 Way cassette unit	
Make	Samsung or similar approved	
Model	AC052BN4DEH/AF	
Total Heating Capacity	7.5kW	
Total Cooling Capacity	6kW	

BLOCK A - AC 2		
	SPECIFIED	OFFERED
Type	4 Way cassette unit	
Make	Samsung or similar approved	
Model	AC052BN4DEH/AF	
Total Heating Capacity	6kW	
Total Cooling Capacity	4.5kW	

BLOCK A - AC 3		
	SPECIFIED	OFFERED
Type	VRV Heat recovery unit	
Make	Samsung or similar approved	

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PART 3 – SCHEDULE OF CAPACITIES

Model	AC250KXAPNH/EU	
Total Heating Capacity	32kW	
Total Cooling Capacity	28kW	

BLOCK A – CU 1		
	SPECIFIED	OFFERED
Type	VRV Heat recovery Condenser unit	
Make	Samsung or similar approved	
Model	AM340AXVANH/EU	
Total Heating Capacity	95kW	
Total Cooling Capacity	84.5kW	

AC 1 - BLOCK B		
	SPECIFIED	OFFERED
Type	VRV Fan Coil unit	
Make	Samsung or similar approved	
Model	AC180JXAPNH/EU	
Total Heating Capacity	20kW	
Total Cooling Capacity	18kW	
Air Flow	1200l/s	

BLOCK B – CU 1		
	SPECIFIED	OFFERED
Type	VRV Heat recovery Condenser unit	
Make	Samsung or similar approved	
Model	AM180AXVANH/EU	
Total Heating Capacity	56.7kW	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
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PART 3 – SCHEDULE OF CAPACITIES

Total Cooling Capacity	50.4kW	
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AC 1 - BLOCK C		
	SPECIFIED	OFFERED
Type	Heat pump inverter split unit	
Make	Samsung or similar approved	
Model	AC026TNXDKG/EU	
Total Heating Capacity	3.3kW	
Total Cooling Capacity	2.5kW	

AC 1 - BLOCK E		
	SPECIFIED	OFFERED
Type	Fan Coil unit	
Make	Samsung or similar approved	
Model	AC026RNNDKG/EU	
Total Heating Capacity	3.4kW	
Total Cooling Capacity	2.6kW	

AC 1 - BLOCK E		
	SPECIFIED	OFFERED
Type	Fan Coil unit	
Make	Samsung or similar approved	
Model	AC026RNNDKG/EU	
Total Heating Capacity	3.4kW	
Total Cooling Capacity	2.6kW	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
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PART 3 – SCHEDULE OF CAPACITIES

AC 1- BLOCK F		
	SPECIFIED	OFFERED
Type	Fan Coil unit	
Make	Samsung or similar approved	
Model	AC026RNNDKG/EU	
Total Heating Capacity	3.4kW	
Total Cooling Capacity	2.6kW	

AC 2- BLOCK F		
	SPECIFIED	OFFERED
Type	Fan Coil unit	
Make	Samsung or similar approved	
Model	AC035RNMDKG/EU	
Total Heating Capacity	4.0kW	
Total Cooling Capacity	3.5kW	

AC 1- BLOCK H		
	SPECIFIED	OFFERED
Type	Fan Coil unit	
Make	Samsung or similar approved	
Model	AC035RNMDKG/EU	
Total Heating Capacity	4.0kW	
Total Cooling Capacity	3.5kW	

BLOCK A - AHU 1		
	SPECIFIED	OFFERED
Type	VRV Supply air Handling unit	
Make	Trox or similar approved	

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Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Model	XE Cube type	
Air flow	2596 l/s	

BLOCK A - AHU 1C		
	SPECIFIED	OFFERED
Type	Chilled water Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	2596 l/s	

BLOCK C - AHU 1		
	SPECIFIED	OFFERED
Type	VRV Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	1746 l/s	

BLOCK C - AHU 1C		
	SPECIFIED	OFFERED
Type	Chilled water Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	1746 l/s	

BLOCK D- AHU 1		
	SPECIFIED	OFFERED
Type	VRV Supply air Handling unit	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox or similar approved	
Model	XE Cube type	
Air flow	1142 l/s	

BLOCK D- AHU 1C		
	SPECIFIED	OFFERED
Type	Chilled water Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	1142 l/s	

BLOCK E- ROOF - AHU 1		
	SPECIFIED	OFFERED
Type	VRV Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	3096 l/s	

BLOCK E- ROOF - AHU 1C		
	SPECIFIED	OFFERED
Type	Chilled water Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	3096 l/s	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

BLOCK F- AHU 1		
	SPECIFIED	OFFERED
Type	VRV Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	2539l/s	

BLOCK F- AHU 1C		
	SPECIFIED	OFFERED
Type	Chilled Water Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	2539l/s	

BLOCK G- AHU 1		
	SPECIFIED	OFFERED
Type	VRV Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	2000l/s	
BLOCK G- AHU 2		
	SPECIFIED	OFFERED
Type	VRV Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	500l/s	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

BLOCK G- AHU 1C		
	SPECIFIED	OFFERED
Type	Chilled water Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	2000l/s	
BLOCK G- AHU 2C		
	SPECIFIED	OFFERED
Type	Chilled water Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	500l/s	

BLOCK H- AHU 1		
	SPECIFIED	OFFERED
Type	VRV Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	1580l/s	

BLOCK H- AHU 1C		
	SPECIFIED	OFFERED
Type	Chilled Water Supply air Handling unit	
Make	Trox or similar approved	
Model	XE Cube type	
Air flow	1580l/s	

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PART 3 – SCHEDULE OF CAPACITIES

BLOCK A - EAF1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	560mm diameter	
Air Volume	2144 l/s	
Static Pressure	300 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK A - FAF1		
	SPECIFIED	OFFERED
Type	Circular duct Inline fan	
Size	150mm diameter	
Air Volume	60 l/s	
Static Pressure	120Pa	
Sound Attenuation	1.5D Complete With Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK B -EAF1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	400mm diameter	
Air Volume	2220 l/s	
Static Pressure	225 Pa	
Sound Attenuation	1.5D Complete with Pods	

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PART 3 – SCHEDULE OF CAPACITIES

Filter Box	Customised	
Make	systemair or equally approved	

BLOCK B -FAF1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	400mm diameter	
Air Volume	2130 l/s	
Static Pressure	225 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK C -EAF1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	400mm diameter	
Air Volume	778 l/s	
Static Pressure	200 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK D -EAF1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	400mm diameter	
Air Volume	740 l/s	
Static Pressure	300 Pa	
Sound Attenuation	1.5D Complete with Pods	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
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PART 3 – SCHEDULE OF CAPACITIES

Filter Box	Customised	
Make	systemair or equally approved	

BLOCK E -EAF1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	560mm diameter	
Air Volume	2709 l/s	
Static Pressure	200 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK F-EAF1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	560mm diameter	
Air Volume	1256 l/s	
Static Pressure	250 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK F-FAF1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	150mm diameter	
Air Volume	250 l/s	
Static Pressure	150 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	systemair or equally approved	
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BLOCK H-EAF1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	560mm diameter	
Air Volume	1861 l/s	
Static Pressure	280 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK H-EAF2		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	315mm diameter	
Air Volume	345 l/s	
Static Pressure	200 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK H-EAF3		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	500mm diameter	
Air Volume	1089 l/s	
Static Pressure	250 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

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PART 3 – SCHEDULE OF CAPACITIES

BLOCK H-EAF 4		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	500mm diameter	
Air Volume	1 180 l/s	
Static Pressure	250 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK H-EAF 5		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	710mm diameter	
Air Volume	520 l/s	
Static Pressure	750 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK H-FAF 1		
	SPECIFIED	OFFERED
Type	Mixed flow fan	
Size	630mm diameter	
Air Volume	3590 l/s	
Static Pressure	500 Pa	
Sound Attenuation	1.5D Complete with Pods	
Filter Box	Customised	
Make	systemair or equally approved	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
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PART 3 – SCHEDULE OF CAPACITIES

BLOCK E -CX10		
	SPECIFIED	OFFERED
Type	Ceiling extract fan	
Size	250mm diameter	
Air Volume	91 l/s	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK E -SF1		
	SPECIFIED	OFFERED
Type	Smoke fan	
Size	560mm diameter	
Air Volume	2700l/s	
Static Pressure	200Pa	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK A -WEF1		
	SPECIFIED	OFFERED
Type	Wall Mounted extract fan	
Size	150mm diameter	
Air Volume	50l/s	
Static Pressure	50Pa	
Filter Box	Customised	
Make	systemair or equally approved	

BLOCK A - WEF2		
	SPECIFIED	OFFERED
Type	Wall Mounted extract fan	
Size	250mm diameter	
Air Volume	199l/s	
Static Pressure	158Pa	

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PART 3 – SCHEDULE OF CAPACITIES

Filter Box	Customised	
Make	systemair or equally approved	

BLOCK B - WEF1		
	SPECIFIED	OFFERED
Type	Wall Mounted extract fan	
Size	300mm diameter	
Air Volume	815l/s	
Static Pressure	250Pa	
Filter Box	Customised	
Make	systemair or equally approved	
BLOCK B - SAD1		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	150mm Diameter	
Air flow	15l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - SAD1		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	100mm Diameter	
Finish	White	
Air flow	15l/s	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

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Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

BLOCK A -SAD2		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	100mm Diameter	
Air flow	20l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A -SAD3		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	150mm Diameter	
Air flow	25l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - SAD4		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	150mm Diameter	
Air flow	30l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A -SAD5		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	150mm Diameter	
Air flow	35l/s	

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PART 3 – SCHEDULE OF CAPACITIES

Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A -SAD6		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	150mm Diameter	
Air flow	45l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - SAD7		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	150mm Diameter	
Air flow	75l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - SAD8		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	200mm Diameter	
Air flow	100l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

BLOCK C – SAD1		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	200mm Diameter	
Air flow	50l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C – SAD2		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	200mm Diameter	
Air flow	35l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C – SAD3		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	250mm Diameter	
Air flow	40l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C – SAD4		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	250mm Diameter	
Air flow	50l/s	

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Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C – SAD5		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	250mm Diameter	
Air flow	64l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C – SAD6		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	250mm Diameter	
Air flow	70l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C – SAD7		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	250mm Diameter	
Air flow	75l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

BLOCK C – SAD8		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	250mm Diameter	
Air flow	75l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C – SAD9		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	250mm Diameter	
Air flow	75l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK D – SAD1		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	100mm Diameter	
Air flow	20l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK D – SAD2		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	100mm Diameter	
Air flow	40l/s	

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Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK D – SAD3		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	150mm Diameter	
Air flow	40l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK D – SAD4		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	200mm Diameter	
Air flow	75l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E – SAD3		
	SPECIFIED	OFFERED
Type	600x600mm Supply diffuser	
Size	300mm Diameter	
Air flow	60l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
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PART 3 – SCHEDULE OF CAPACITIES

BLOCK F – SAD1		
	SPECIFIED	OFFERED
Type	250mm Dia Supply diffuser	
Size	150mm Diameter	
Air flow	30l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F – SAD1		
	SPECIFIED	OFFERED
Type	250mm Dia Supply diffuser	
Size	200mm Diameter	
Air flow	30l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F – SAD2		
	SPECIFIED	OFFERED
Type	250mm Dia Supply diffuser	
Size	200mm Diameter	
Air flow	30l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F – SAD2		
	SPECIFIED	OFFERED

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Type	250mm Dia Supply diffuser	
Size	150mm Diameter	
Air flow	45l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F – SAD3		
	SPECIFIED	OFFERED
Type	250mm Dia Supply diffuser	
Size	200mm Diameter	
Air flow	60l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F – SAD4		
	SPECIFIED	OFFERED
Type	250mm Dia Supply diffuser	
Size	200mm Diameter	
Air flow	75l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F – SAD5		
	SPECIFIED	OFFERED
Type	250mm Dia Supply diffuser	
Size	200mm Diameter	
Air flow	80l/s	
Finish	White	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK G – SAD1		
	SPECIFIED	OFFERED
Type	150mm Dia Supply diffuser	
Size	150mm Diameter	
Air flow	40l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK G – SAD2		
	SPECIFIED	OFFERED
Type	200mm Dia Supply diffuser	
Size	200mm Diameter	
Air flow	85l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK G – SAD3		
	SPECIFIED	OFFERED
Type	250mm Dia Supply diffuser	
Size	250mm Diameter	
Air flow	110l/s	
Finish	White	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H – SAD1		
	SPECIFIED	OFFERED
Type	600 X 600mm Supply diffuser	
Size	100mm Diameter	
Air flow	25l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H – SAD2		
	SPECIFIED	OFFERED
Type	600 X 600mm Supply diffuser	
Size	100mm Diameter	
Air flow	30l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H – SAD2		
	SPECIFIED	OFFERED
Type	600 X 600mm Supply diffuser	
Size	250mm Diameter	
Air flow	30l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H – SAD3		
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Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

	SPECIFIED	OFFERED
Type	600 X 600mm Supply diffuser	
Size	150mm Diameter	
Air flow	40l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H – SAD4		
	SPECIFIED	OFFERED
Type	600 X 600mm Supply diffuser	
Size	150mm Diameter	
Air flow	50l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H – SAD5		
	SPECIFIED	OFFERED
Type	600 X 600mm Supply diffuser	
Size	200mm Diameter	
Air flow	70l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H – SAD6		
	SPECIFIED	OFFERED
Type	600 X 600mm Supply diffuser	
Size	200mm Diameter	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Air flow	80l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C - SAG 2		
	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	350 mm x 350mm	
Airflow	50l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - DV1		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	40l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - DV2		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	60l/s	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - DV3		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	30l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK B -DV1		
	SPECIFIED	OFFERED
Type	Disc Valve	
Neck Size	150mm Diameter	
Face size	250mm Diameter	
Air flow	63l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK B -DV4		
	SPECIFIED	OFFERED
Type	Disc Valve	

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Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Neck Size	150mm Diameter	
Face size	250mm Diameter	
Air flow	65l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C - DV1		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	50l/s	
Face dia	200	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C – DV2		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	200mm Diameter	
Air flow	63l/s	
Face dia	200	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

BLOCK D - DV1		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	50l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK D – DV2		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	55l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK D – DV3		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	60l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK D – DV3		
	SPECIFIED	OFFERED
Type	Disc Valve	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Size	150mm Diameter	
Air flow	90l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E– DV1		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	66l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E– DV2		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	65l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E- FF – DV1		
	SPECIFIED	OFFERED
Type	Disc Valve	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Size	150mm Diameter	
Air flow	56l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E- FF – DV2		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	58l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E- FF – DV3		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	65l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E- FF – DV4		
	SPECIFIED	OFFERED
Type	Disc Valve	

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PART 3 – SCHEDULE OF CAPACITIES

Size	150mm Diameter	
Air flow	72l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F- DV1		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	32l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F- DV 2		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	40l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F- DV 3		
	SPECIFIED	OFFERED
Type	Disc Valve	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
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PART 3 – SCHEDULE OF CAPACITIES

Size	150mm Diameter	
Air flow	47l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F- DV 4		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	55l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F- DV 5		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	62l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F- DV 6		
	SPECIFIED	OFFERED
Type	Disc Valve	

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PART 3 – SCHEDULE OF CAPACITIES

Size	150mm Diameter	
Air flow	64l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F- DV 7		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	70l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F- DV 8		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	78l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- DV 1		
	SPECIFIED	OFFERED
Type	Disc Valve	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Size	150mm Diameter	
Air flow	60l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- DV 2		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	150mm Diameter	
Air flow	65l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- DV 3		
	SPECIFIED	OFFERED
Type	Disc Valve	
Size	200mm Diameter	
Air flow	75l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK D – TAG1		
	SPECIFIED	OFFERED

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Type	750x150mm Supply diffuser	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - EAG 1		
	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	165 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - EAG 2		
	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	175 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - FAG 1		
	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	100l/s	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Neck dia	300 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - FAG 2		
	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	150l/s	
Neck dia	300 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A- SAG 2		
	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	175 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK B -EAG 1		
	SPECIFIED	OFFERED

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	165 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK B - FAG 1

	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	60l/s	
Neck dia	200 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK B - FAG 2

	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	105l/s	
Neck dia	250 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK B - FAG 3

	SPECIFIED	OFFERED
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Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	180l/s	
Neck dia	300 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK B -FAG 4

	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	312l/s	
Neck dia	400 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK B -FAG 5

	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	350l/s	
Neck dia	400 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C -EAG 1

	SPECIFIED	OFFERED
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Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	60l/s	
Neck dia	250 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C -EAG 2		
	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	94l/s	
Neck dia	250 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK C -EAG 3		
	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	124l/s	
Neck dia	250 dia	
Finish	White	
Adjustable Opening	Yes	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox/Advantage Air or equally approved	
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BLOCK C -EAG 4		
	SPECIFIED	OFFERED
Type	Double deflection Extract air grille	
Size	600 mm x 600mm	
Airflow	140l/s	
Neck dia	250 dia	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E- SAG 1		
	SPECIFIED	OFFERED
Type	Double deflection Supply air grille	
Size	250 mm x 200mm	
Airflow	81 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E- SAG 1		
	SPECIFIED	OFFERED
Type	Double deflection Supply air grille	
Size	250 mm x 200mm	
Airflow	112 l/s	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK E- SEG		
	SPECIFIED	OFFERED
Type	Double deflection Return air grille	
Size	600 mm x 600mm	
Airflow	207 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	
BLOCK B -JN1		
	SPECIFIED	OFFERED
Type	160mm dia neck jet nozzle	
Airflow	40l/s	
Finish	Powder coated aluminium	
Make	Trox/Advantage Air or equally approved	

BLOCK F- FAG 1		
	SPECIFIED	OFFERED
Type	Double deflection Fresh air grille	
Size	600mm x 600mm	
Airflow	125 l/s	
Finish	White	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK F- SAG 1		
	SPECIFIED	OFFERED
Type	Double deflection Supply air grille	
Size	200mm x 200mm	
Airflow	30 l/s	
Finish	White	
Adjustable Opening	Yes	

BLOCK F- SAG 2		
	SPECIFIED	OFFERED
Type	Double deflection Supply air grille	
Size	200mm x 200mm	
Airflow	88 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 1		
	SPECIFIED	OFFERED
Type	600 x 600 mm Double deflection Extract air grille	
Size	200 dia	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Airflow	30 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 2		
	SPECIFIED	OFFERED
Type	400 x 200 mm Double deflection Extract air grille	
Size	150 dia	
Airflow	35 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 4		
	SPECIFIED	OFFERED
Type	600 x 600 mm Double deflection Extract air grille	
Size	250 dia	
Airflow	60 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

BLOCK H- EAG 5		
	SPECIFIED	OFFERED
Type	600 x 600 mm Double deflection Extract air grille	
Size	150 dia	
Airflow	65 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 7		
	SPECIFIED	OFFERED
Type	600 x 600 mm Double deflection Extract air grille	
Size	250 dia	
Airflow	103 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 8		
	SPECIFIED	OFFERED

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Type	600 x 600 mm Double deflection Extract air grille	
Size	250 dia	
Airflow	115 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 9		
	SPECIFIED	OFFERED
Type	600 x 600 mm Double deflection Extract air grille	
Size	250 dia	
Airflow	126l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 10		
	SPECIFIED	OFFERED
Type	600 x 600 mm Double deflection Extract air grille	
Size	300 dia	
Airflow	146 l/s	
Finish	White	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 11		
	SPECIFIED	OFFERED
Type	600 x 600 mm Double deflection Extract air grille	
Size	300 dia	
Airflow	159 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 12		
	SPECIFIED	OFFERED
Type	600 x 600 mm Double deflection Extract air grille	
Size	300 dia	
Airflow	150 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- EAG 13		
	SPECIFIED	OFFERED

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Type	600 x 600 mm Double deflection Extract air grille	
Size	300 dia	
Airflow	166 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- SAG 1		
	SPECIFIED	OFFERED
Type	Double deflection Supply air grille	
Size	600mm x 600mm	
Airflow	25 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- SAG 2		
	SPECIFIED	OFFERED
Type	Double deflection Supply air grille	
Size	600mm x 600mm	
Airflow	45 l/s	
Finish	White	
Adjustable Opening	Yes	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox/Advantage Air or equally approved	
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BLOCK H- SAG 3		
	SPECIFIED	OFFERED
Type	Double deflection Supply air grille	
Size	600mm x 600mm	
Airflow	85l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK H- SAG4		
	SPECIFIED	OFFERED
Type	Double deflection Supply air grille	
Size	600mm x 400mm	
Airflow	130 l/s	
Finish	White	
Adjustable Opening	Yes	
Make	Trox/Advantage Air or equally approved	

BLOCK A - DG1		
	SPECIFIED	OFFERED
Type	Door Grille	
Size	300x200mm	
Finish	Aluminium Finish	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox/Advantage Air or equally approved	
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BLOCK C - DG1		
	SPECIFIED	OFFERED
Type	Door Grille	
Size	500x200mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK D - DG1		
	SPECIFIED	OFFERED
Type	Door Grille	
Size	500x300mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK E - DG1		
	SPECIFIED	OFFERED
Type	Door Grille	
Size	300x150mm	
Finish	Aluminium Finish	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox/Advantage Air or equally approved	
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BLOCK E – DG2		
	SPECIFIED	OFFERED
Type	Door Grille	
Size	550x450mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK E – DG3		
	SPECIFIED	OFFERED
Type	Door Grille	
Size	100x150mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK A - WL1		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	1500 x 550mm	
Finish	Aluminium Finish	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox/Advantage Air or equally approved	
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BLOCK B -WL1		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	1450 X 750mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK B -WL2		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	600 x 250mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK C - WL1		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	500x 300mm	
Finish	Aluminium Finish	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox/Advantage Air or equally approved	
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BLOCK E- WL1		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	586x 586mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK E ROOF- WL1		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	1400x 586mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK F - WL1		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	400x 250mm	
Finish	Aluminium Finish	

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Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox/Advantage Air or equally approved	
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BLOCK F- WL2		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	1 200x 500mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK H- WL1		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	1 400x 600mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK H- WL2		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	600x 250mm	
Finish	Aluminium Finish	

Kimberley Nurses College Phase 2A – Academic Campus: HVAC tender specification
Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox/Advantage Air or equally approved	
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BLOCK H- WL3		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	850x 600mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK H- WL4		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	700x 600mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK H- WL5		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	2000x 1200mm	
Finish	Aluminium Finish	

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Mechanical Building Services Installation
PART 3 – SCHEDULE OF CAPACITIES

Make	Trox/Advantage Air or equally approved	
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BLOCK H- WL6		
	SPECIFIED	OFFERED
Type	Weather Louvre	
Size	1600x 1000mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

BLOCK A -FIRE DAMPER		
	SPECIFIED	OFFERED
Type	Fire Damper	
Size	300x250mm	
Finish	Aluminium Finish	
Make	Trox/Advantage Air or equally approved	

PART 8: INFORMATION ON PREVIOUS CONTRACTS

Tenderers are requested to give information on at least three contracts recently successfully completed, or presently being executed by them. The contracts must at least be similar to this installation with respect to type and size of location. This information will be used when tenders are considered.

[illegible]

PART 9- BILLS OF QUANTITIES

The quantities set out in the Schedule of Quantities are to be read in conjunction with the project specifications and drawings. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.

The quantities set out in the Schedule of Quantities are the estimated quantities of the Contract Works, but the Contractor will be required to undertake whatever quantities may be directed by the Engineer from time to time. The Contract Price for the completed contract shall be computed from the actual quantities of work done, valued at the relevant unit rates and prices.

The prices and rates to be inserted in the Schedule of Quantities are to be the full inclusive prices for the work described under the several items. Such prices and rates shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the bid is based, as well as overhead charges and profit. Reasonable prices shall be inserted as these will be used as a basis for assessment of payment for additional work that may have to be carried out. Prices and rates shall include all profit and the Main Contractor's attendance/profit.

A price or rate is to be entered against each item in the Schedule of Quantities, whether the quantities are stated or not. An item against which no price is entered will be considered to be covered by the other prices or rates in the Schedule.

Except where rates only are required, the Bidder shall insert all amounts to be included in his total bid price in the "Amount" column and show the corresponding total bid price.