Be moved prasa PASSENGER RAIL AGENCY OF SOUTH AFRICA

**J42000 PRASA EPCM**
**Durban Lifting Shop Depot Upgrade**

# Mechanical Building Services Equipment Schedule

**Ref: J42000-B-06-05-MEC-SCH-0001-01**

Rev 1 – TEDNER
*1 May 2024*

GIBB INFRASTRUCTURE & TRANSPORT

*J42000-B-06-05-MEC-SCH-0001-01*

**ALL EQUIPMENT IS EQUAL OR APPROVED**

# *1 HVAC Systems*

## 1.1 AIR CONDITIONING VRF INDOOR UNITS and ASSOCIATED EQUIPMENT

| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Electrical | Controls | Requirements and Notes |
|---|---|---|---|---|---|---|
| ACC/01 | VRF 4-Way Ceiling Cassette Unit | | 1.7kW | 230V 1ph 50hz<br>Power: 0.02kW<br>Current: 0.19A | Unit to be controlled using the hard wired wall mounted controller. See WC/02 below for additional details<br><br>The unit will also be connected to the central controller which will be able to override the settings on the local controller. See CC/01 | Inverter Unit<br><br>Unit to be supplied with integrated condensate drain lift pump. Fresh air supplied direct to the unit – unit must have spigot connection.<br><br>c/w electronic control valves to control flow or refrigerant<br><br>The fans shall be of the multi blade type and statically and dynamically balanced to ensure low noise and vibration free operation.<br><br>All exposed metal prone to rust shall have a secondary corrosion resistant protection coating (Blu-chem or similar approved).<br><br>Front panel of unit to be colour as per architect finishing schedule<br><br>600x600 |
| ACC/02 | VRF 4-Way Ceiling Cassette Unit | | 2.2kW | 230V 1ph 50hz<br>Power: 0.02kW<br>Current: 0.21A | | |
| ACC/03 | VRF 4-Way Ceiling Cassette Unit | | 2.2kW | 230V 1ph 50hz<br>Power: 0.02kW<br>Current: 0.22A | | |
| ACC/04 | VRF cassette unit | | 3.6kW | 220V/1/50Hz<br>Power: 0.02kW,<br>Current: 0.23A | | |
| ACC/05 | VRF 4-Way Ceiling Cassette Unit | | 4.5kW | 230V 1ph 50hz<br>Power: 0.03kW<br>Current: 0.28A | | |
| ACC/06 | VRF 4-Way Ceiling Cassette Unit | | 5.6kW | 230V 1ph 50hz<br>Power: 0.06kW<br>Current: 0.4A | | |
| ACD/01 | VRF Ceiling hide-away type unit | | 7.1kW | 230V 1ph 50hz<br>Power: 0.09kW<br>Current: 0.66A | Unit to be controlled using the hard wired wall mounted controller. See WC/01 below for additional details<br><br>The unit will also be connected to the central controller which will be able to override the settings on the local controller. See CC/01 | Inverter Unit<br><br>Unit to be supplied with integrated condensate drain lift pump. Fresh air supplied direct to the unit<br>c/w electronic control valves to control flow or refrigerant<br><br>The fans shall be of the multi blade type and statically and dynamically balanced to ensure low noise and vibration free operation. |
| ACD/02 | VRF Ceiling hide-away type unit | | 9.0kW | 230V 1ph 50hz<br>Power: 0.08kW<br>Current: 0.57A | | |
| ACD/03 | VRF Ceiling hide-away type unit | | 11.2kW | 230V 1ph 50hz<br>Power: 0.142kW<br>Current: 0.97A | | |

| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Electrical | Controls | Requirements and Notes |
|---|---|---|---|---|---|---|
| ACD/04 | VRF Ceiling hide-away type unit | | 14kW | 230V 1ph 50hz<br>Power: 0.199kW<br>Current: 1.23A | | All exposed metal prone to rust shall have a secondary corrosion resistant protection coating (Blu-chem or similar approved).<br><br>Units will have front and rear plenum for air distribution. See PLF/XX and PLR/XX. Fresh Air connected to side of return air plenum box.<br><br>Mounted to soffit c/w vibration dampers and mounts<br>Medium Static Pressure unit<br><br>All units installed on soffits in areas where there is no ceiling to fully conceal the unit will be powder coated / painted as per the architects finishing schedule |
| WC/01 | Wired controller for in ceiling units | VRF System Supplier | | Powered via the cable from the AC unit to the controller | Controller to be wired to both the relevant AC Unit<br>Controller will allow user to change the following<br><br>Where multiple in ceiling units are located in one room, a controller will be installed in the room for each in ceiling unit. | Display will be small LCD showing<br>Required temp (when changing temp)<br>Current room temp (when no action on panel)<br>Unit flow rate (low med high)<br>Mode (heat, cool, auto, if available) |
| WC/02 | Wired controller for cassette units | VRF System Supplier | | Powered via the cable from the AC unit to the controller | Controller to be wired to both the relevant AC Unit<br>Controller will allow user to change the following<br><br>Where multiple cassettes are located in one room, one controller will be provided for that room and the controller will control all cassette units in the relevant room | Display will be small LCD showing<br>Required temp (when changing temp)<br>Current room temp (when no action on panel)<br>Unit flow rate (low med high)<br>Flow pattern (if available)<br>Mode (heat, cool, auto, if available) |
| CC/01 | Central control unit and panel for AC system | VRF System Supplier | | | All units will be wired back to the central controller to allow full system override and reset.<br>Central controller will allow override of all units on the system<br>Control controller will allow time schedules to be set up for individual unit or blocks of units<br>Controller will reset all units in the morning to a default setting<br><br>Wired controller in the spaces must reflect the reset change every morning. | Central controller located in a server room, lockable room to reduce tampering. |

## 1.2 AIR CONDITIONING VRF OUTDOOR UNITS

| Ref | Description | Manufacturer / Ref | Spec | Electrical | Controls | Notes |
|---|---|---|---|---|---|---|
| VRF /01 | VRF system outdoor unit.<br><br>This unit serves he ground floor AC units | | 130kW Approx Capacity.<br><br>Supplier to select appropriate cooling capacity of outdoor units based on indoor unit requirement | 380V/3/50Hz<br>52kW<br>Nominal running current 94A | The outdoor units shall be factory-assembled units housed in sturdy weatherproof casings constructed from rustproofed galvanised steel panels coated with a baked epoxy powder finish.<br><br>The units shall each have a minimum of two scroll compressors and be able to operate even when one of the compressors is out of order. The compressor shall be of highly efficient hermetic scroll type and equipped with inverter control capable of changing the speed in accordance to the cooling or heating load requirement.<br><br>The noise level shall not be more than 60 dB (A) at normal operation measured horizontally 1 m away and 1.5 m above ground. The outdoor unit shall be equipped with a night quiet mode.<br><br>The heat exchanger shall be constructed with copper tubes mechanically bonded to aluminium fins to form a cross fin coil. The aluminium fins shall be covered by anti-corrosion resin film.<br><br>External condenser units shall have a secondary corrosion resistant protection coating (Blu-chem or similar approved).<br><br>The refrigerant circuit shall include liquid and gas shut off valves and a solenoid valves. All necessary safety devices shall be provided to ensure the safety operation of the system. The units shall be fitted with high pressure switch, overload relay, inverter overload protector and fusible plugs as safety devices. The unit shall be equipped with an oil recovery system to ensure stable operation with long refrigerant piping runs.<br><br>There is limited space available for the units so the supplier is to please ensure that the selected equipment will fit. | |

## 1.3 Air Conditioning - Split Type Direct Expansion System

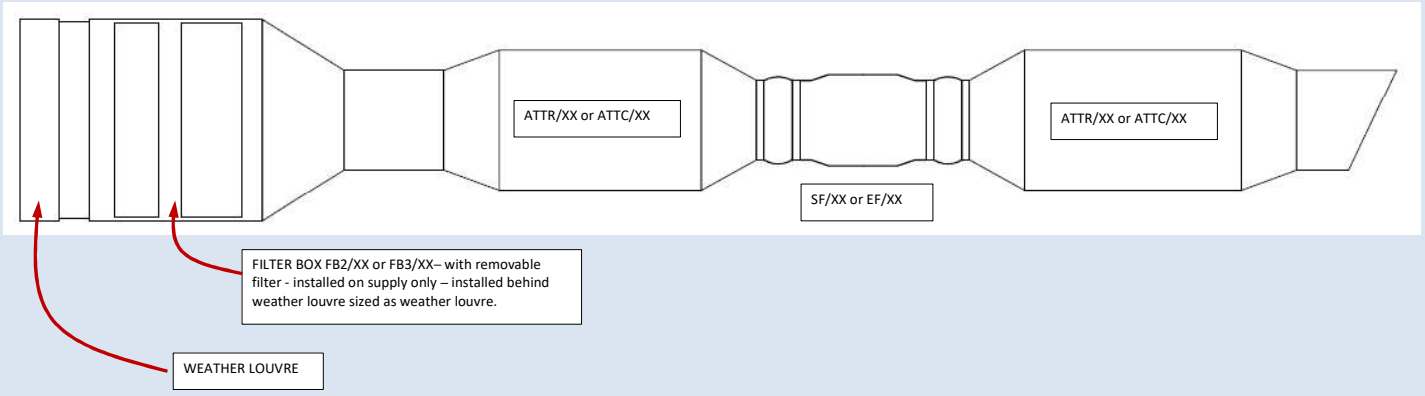
| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Electrical | Controls | Requirements and Notes |
|---|---|---|---|---|---|---|
| ACS/01 | Split Wall-mounted Unit with Indoor wall mount, outdoor condenser, controller | | 4.5 kW | 220V/1/50Hz<br>1.19kW | Unit to be controlled using the hard wired wall mounted controller that is to be supplied with the unit.<br><br>Connected to fire alarm panel | Cooling and heating system.<br>Unit must have a condensate drain lift pump<br>Size WxHxD:<br>Weight: |
| ACS/02 | Split type Cassette units, outdoor condenser and controller | | 4.5 kW | 220V/1/50Hz<br>1.19kW | Unit to be controlled using the hard wired wall mounted controller that is to be supplied with the unit.<br><br>Connected to fire alarm panel | Cooling and heating system.<br>Unit must have a condensate drain lift pump<br>Size WxHxD:<br>Weight: |
| ACS/03 | Split type Cassette units, outdoor condenser and controller | | 4.5 kW | 220V/1/50Hz<br>1.19kW | Unit to be controlled using the hard wired wall mounted controller that is to be supplied with the unit.<br><br>Connected to fire alarm panel<br><br>The unit will be installed in the server room. Two units will be installed. They will be in a run/standby configuration. | Cooling and heating system.<br>Unit must have a condensate drain lift pump<br>Size WxHxD:<br>Weight: |

## 1.4 Supply And Extract Fans

| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Electrical | Controls | Requirements and Notes |
|---|---|---|---|---|---|---|
| SF/01 | In Line Supply Air Fan | | 0.54m³/s @150kpa | 230V 1ph 50hz Power: 0.0255kW Current: 1.07A | EC Motor or frequency converter for full variable speed control<br><br>c/w proprietary controller to control and set speed. Controller will allow for speed setting as well as On/Off functionality.<br><br>Controller will be mounted on a piece of unistrut attached to either the soffit of roof structure adjacent to the fan<br><br>Each Fan will be connected to and controlled by the supply fan control panel<br><br>Fans will be set to required flow using controller.<br><br>Fans linked to AC system timeclock to ensure supply and AC on at the same time.<br><br>Fan controller to be linked to fire panel via AC system to ensure system turn off on alarm | in line circular mixed flow fan. To be silent fan with integral sound reducing housing<br><br>Installed and to be supplied with:<br>ATTC/XX on either side of the fan, installed with flexible couplings and reducers. 600mm long<br><br>Filter Bank FB/XX installed either at wall or adjacent to intake Attenuator – sized as the weather louvre<br><br>Anti-vibration mounts to mounting bracket/surface<br>Flex connector either side to connect to ductwork |
| SF/02 | In Line Supply Air Fan | | 0.8m³/s @200kpa | 230V 1ph 50hz Power: 0.030kW Current: 1.2A | | |
| EF/01 | In Line Extract Fan | | 0.3m³/s @100kpa | 230V 1ph 50hz Power: 0.180kW Current: 0.83A | EC Motor or frequency converter for full variable speed control<br><br>c/w proprietary controller to control and set speed. Controller will allow for speed setting as well as On/Off functionality.<br><br>Controller will be mounted on a piece of unistrut attached to either the soffit of roof structure adjacent to the fan<br><br>Fans installed in toilet areas will be linked to PIR system for on-off control based on occupancy, c/w PIR sensors for installation in the toilet area. Occupancy sensors will have a 10 minute run on period. This will be separate to the lighting sensors.<br><br>Fans will be controlled via a timeclock to be installed in the local DB board on the fan circuit. | in line circular mixed flow fan. To be silent fan with integral sound reducing housing<br><br>Installed and to be supplied with:<br>ATTC/XX on either side of the fan, installed with flexible couplings and reducers. 600mm long<br><br>Anti-vibration mounts to mounting bracket/surface<br>Flex connector either side to connect to ductwork |
| EF/02 | In Line Extract Fan | | 0.3m³/s @100kpa | 230V 1ph 50hz Power: 0.180kW Current: 0.83A | | in line circular mixed flow fan. To be silent fan with integral sound reducing housing<br><br>Installed and to be supplied with:<br>ATTC/XX on either side of the fan, installed with flexible couplings and reducers. 900mm long<br><br>Anti-vibration mounts to mounting bracket/surface<br>Flex connector either side to connect to ductwork |
| EF/03 | In Line Extract Fan | | 0.28m³/s @100kpa | 230V 1ph 50hz Power: 0.180kW Current: 0.83A | | |

| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Electrical | Controls | Requirements and Notes |
|---|---|---|---|---|---|---|
| EF/04 | In Line Extract Fan | | 0.27m³/s @100kpa | 230V 1ph 50hz Power: 0.180kW Current: 0.83A | Fan controller to be linked to fire panel to ensure system turns off on fire alarm activation | |
| SKF/01 | In Line Extract Fan for smoke and vent<br><br>Warehouse | | 5.0m³/s @150 Pa | 380V/3Ph/50Hz 2.5kW | See Fan Control Panel below | Fan to be high temperature smoke rated<br>Within the roof monitors,<br>high volume / low pressure /<br>Adjustable pitch axial flow roof fans,<br>including 1.5D sound attenuator,<br>inlet cone with bird mesh<br>plenum box to connect the fan and louver accordingly<br>(with hinged access door for access to louver actuator). |

STANDARD SUPPLY and EXTRACT FAN INSTALLATION

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|---|---|---|---|---|---|---|
| KEF/01 | Kitchen extract fan | | 0.105m³/s @100kpa | 230V 1ph 50hz Power: 0.045kW Current: 0.026A | | Ceiling mounted Kitchen extract fan for kitchenette extract.<br><br>c/w 4m of flex ductwork to be installed from ceiling fan to 300x300 weather louvre. |
| REF/01 | Roof Extract Fan for shed ventilation | | 610mm Throat 6150m³/hr | | | Whirlybird style construction<br>Twister Unit<br>To be supplied with required flashing<br>Design to achieve 10 air changes per hour ion the sheds |

### 1.5 Attenuators

| Ref | Description | Manufacturer / Ref [1] | Spec | Requirements and Notes |
|---|---|---|---|---|
| ATTR/XX | Rectangular Sound Attenuator | | Galvanised steel attenuators installed in line in ductwork either side of the fan.<br><br>Rectangular ductwork – straight splitter type | Straight splitter type attenuator with 27% free area<br>To minimise noise transmission through ductwork from fans.<br>Located in line in ductwork adjacent to the fans<br>Size in rectangular ductwork - Ductwork Width + 100mm Ductwork Height + 100mm<br><br>Length as required on layout OR – round up value of 1.5 times ductwork in 300mm jumps |
| ATTC/XX | Circular Sound Attenuator | | Galvanised steel attenuators installed in line in ductwork either side of the fan.<br><br>Circular ductwork – Podded attenuator | Circular Attenuator with central Pod<br>To minimise noise transmission through ductwork from fans.<br>Located in line in ductwork adjacent to the fans<br>Size in circular Ductwork Diam + 100mm<br><br>Length as required on layout OR – round up value of 1.5 times ductwork in 300mm jumps |
| ATTR/CT/XX | Rectangular Cross Talk Sound Attenuator | | As ATTR/XX | As ATTR/XX |
| ATTC/CT/XX | Circular Sound Attenuator | | As ATTC/XX | As ATTC/XX |

### 1.6 Ancillaries

| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Requirements and Notes |
|---|---|---|---|---|
| PLF/XX | Front Plenum for ACD/XX units | | Galvanised steel plenum for front of AC units to distribute air to one or more outlets | Unit to be a galvanised steel plenum with spigot/s for connections.<br>One side connects to the front of the AC unit with a single open connection as per the unit<br>The plenum will taper to the required duct size for the supply duct to connect to.<br><br>Plenum will be 50mm taller than largest connection and 50mm wider the AC unit onto which it is mounted. |
| PLR/XX | Rear Plenum for ACD/XX units | | Galvanised steel plenum for rear of AC units for fresh air intake | Unit to be a galvanised steel box with spigot/s for connections.<br>One side connects to the back of the AC unit with one spigot as per the AC unit intake<br>A fresh air connection spigot is located on the side for fresh air supply duct.<br>The plenum will have 2 spigots on the underside for connection to the return air grille. 500Ø flex will drop from the plenum and connect to the return air grille plenum<br><br>Plenum will be 50mm taller than largest connection and 50mm wider the AC unit onto which it is mounted. |

| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Requirements and Notes |
|---|---|---|---|---|
| VCD/XX | Volume Control Damper | | Galvanised steel<br>Manually adjustable to set flow<br>Setting must be lockable<br>Must have setting gauge to mark and note setting.<br><br>Size shall be to suite associated duct size | Rectangular ductwork<br>As per duct size<br>Opposed blade damper<br><br>Circular ductwork<br>As per duct size<br>Iris type, |
| FD/XX | Fire Damper | | Shutter type fire damper<br><br>Size shall be to suite associated duct size | Curtain to be out of air stream curtain.<br><br>Rectangular damper to be installed in both circular and rectangular ductwork |
| FB/XX | Filter Banks | | Galvanised steel filter bank with access doors and mounts for filters.<br><br>Sized to be 100mm larger than the ductwork into which it is installed. Will have 45° transitions either side to connect to ductwork. | Dual filter banks.<br>The filter banks shall comprise of one bag filter and one pleated filter that can be removed and washed.<br><br>The filters will be installed in housings such that should the filters be removed, the gap in the ductwork can be closed so the system can keep running.<br><br>Filter banks will be installed inside the intake louvre and will be same size as the intake louvre to minimise pressure loss through the filter bank.<br><br>Filter banks will be sized the same dimensions as the intake weather louvre. |
| FBH/XX | Filter Banks | | Galvanised steel filter bank with access doors and mounts for filters.<br><br>Sized to be 100mm larger than the ductwork into which it is installed. Will have 45° transitions either side to connect to ductwork. | Triple filter bank.<br>The filter banks shall comprise of one bag filter, one pleated filter and one HEPA filter that can be removed and washed.<br><br>The filters will be installed in housings such that should the filters be removed, the gap in the ductwork can be closed so the system can keep running.<br><br>Filter banks will be installed inside the intake louvre and will be same size as the intake louvre to minimise pressure loss through the filter bank. |

### 1.7 Grilles Diffusers and Louvres

| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Requirements and Notes |
|---|---|---|---|---|
| DG/01 | Door Grille | | 200x200mm | Non-vision door grilles<br>Aluminium<br>Installed in door<br>Where door grille installed in a fire door – grille will be painted using intumescent paint to provide fire protection<br>All visible surfaces of the whole unit (plenum, grille, louvre, spigots, etc.) is to be powered coated to Architects required colour |
| DG/02 | Door Grille | | 300x300mm | |
| DG/03 | Door Grille | | 500x400mm | |
| SAD/01 | Supply Air Diffuser<br>Swirl | | 600x600 panel<br>With plenum | Aluminium<br>Square plate diffuser with circular supply outlet (Swirl Diffuser)<br>Diffusers to be suitable for mounting in accessible ceiling grid.<br>Unit to have approx. 400 high 600x600 plenum with 300Ø spigot on one side.<br>Plenum to have built in VCD for accurate flow control.<br>All visible surfaces of the whole unit (plenum, grille, louvre, spigots, etc.) is to be powered coated to Architects required colour |

| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Requirements and Notes |
|---|---|---|---|---|
| SAD/02 | Supply Air Diffuser<br>4 Way | | 600x600 panel<br>With plenum | Aluminium<br>Square 4 way diffuser<br>Diffusers to be suitable for mounting in solid ceiling grid and areas without ceiling.<br>Unit to have approx. 400 high 600x600 plenum with 250Ø spigot on one side.<br>Plenum to have built in VCD for accurate flow control.<br>All visible surfaces of the whole unit (plenum, grille, louvre, spigots, etc.) is to be powered coated to Architects required colour |
| SAD/03 | Supply Air Diffuser<br>4 Way | | 600x600 panel<br>With plenum | Aluminium<br>Square 4 way diffuser<br>Diffusers to be suitable for mounting in solid ceiling grid and areas without ceiling.<br>Unit to have approx. 400 high 600x600 plenum with 300Ø spigot on one side.<br>Plenum to have built in VCD for accurate flow control.<br>All visible surfaces of the whole unit (plenum, grille, louvre, spigots, etc.) is to be powered coated to Architects required colour |
| LSD/01 | Linear Supply Diffuser | | 1500 long x 200 wide Linear slot diffuser<br>2 slot unit with end pieces<br>Double Spigot plenum | Aluminium plate with 2 slots.<br>Complete with Galvanised steel plenum with dual 200Ø spigots. Plenum to have diffusion plate for consistent air supply<br>Each slot equipped with longitudinal deflector<br>Diffuser and plenum to be suitable for mounting in areas without ceilings<br>Plenum to have built in VCD for accurate flow control.<br>All visible surfaces of the whole unit (plenum, grille, louvre, spigots, etc.) is to be powered coated to Architects required colour |
| RAD/01 | Return Air Diffuser for hideaway units | | 600x600 panel<br>with filter and plenum | Aluminium Grille<br>Rectangular Grille with fixed blades. Grille to be removable from frame from below.<br>Grille to have inlay filter that is easily replaced from below through the grille without tools<br>c/w 600x600x500 plenum with 400Ø spigot for side entry.<br>Plenum to have built in VCD for accurate flow control.<br>All visible surfaces of the whole unit (plenum, grille, louvre, spigots, etc.) is to be powered coated to Architects required colour |
| RAD/02 | Return Air Diffuser for hideaway units | | 1200x600 panel<br>with filter and plenum | Aluminium Grille<br>Rectangular Grille with fixed blades. Grille to be removable from frame from below.<br>Grille to have inlay filter that is easily replaced from below through the grille without tools<br>c/w 1200x600x500 plenum with 400Ø spigot for side entry.<br>Plenum to have built in VCD for accurate flow control.<br>All visible surfaces of the whole unit (plenum, grille, louvre, spigots, etc.) is to be powered coated to Architects required colour |
| RAD/03 | Return Air Diffuser for hideaway units | | 1200x600 panel<br>with filter and plenum | Aluminium<br>Rectangular Grille with fixed blades. Grille to be removable from frame from below.<br>Grille to have inlay filter that is easily replaced from below through the grille without tools<br>c/w 1200x600x200 plenum with 2no. 500Ø spigots for top entry.<br>All visible surfaces of the whole unit (plenum, grille, louvre, spigots, etc.) is to be powered coated to Architects required colour |
| RAD/04 | Air Diffuser for makeup air | | 1200x600 panel | Aluminium<br>Rectangular Grille with fixed blades. Grille to be removable from frame from below.<br>Grille to have inlay filter that is easily replaced from below through the grille without tools<br>All visible surfaces of the whole unit (plenum, grille, louvre, spigots, etc.) is to be powered coated to Architects required colour |

| Ref | Description | Manufacturer / Ref [1] | Size / Capacity | Requirements and Notes |
|---|---|---|---|---|
| EAV/01 | Extract Disc Valves | | 200Ø<br>150Ø connection | The combination of fixing collar with bayonet catch and sealing tape provides an optimal seal.<br>To be RAL colour<br>Installed in flush ceiling |
| EAV/02 | Extract Disc Valves | | 250Ø<br>200Ø connection | |
| EAV/03 | Extract Disc Valves | | 300Ø<br>250Ø connection | |
| WL/01 | Weather Louvre –for exhaust air in monitors connected to fans | | 1000 x 1000 | Vertical, weather, dust-proof louvres<br>Anodised Aluminium<br>To be supplied with insect mesh on rear<br>To be single blade type<br>To have 35% free area with maximum of 40% |
| WL/02 | Weather Louvre –for intake air at low level | | 2000x1000 | Vertical, weather, dust-proof louvres<br>Anodised Aluminium<br>To have 35% free area with maximum of 40%<br>Inclusive of a 24 V DC actuator (to be controlled by the respective fan installation control panel).<br>Each respective low-level louver shall be equipped with an aluminium frame and gasket, including washable filters, all to be sealed for a dust proof environment. |
| WL/XX | Weather Louvre | | Size indicated as per layouts or BOQ | Anodised Aluminium to RAL colour<br>To be supplied with insect mesh on rear<br>To be single blade type<br>To have 35% free area with maximum of 40% |

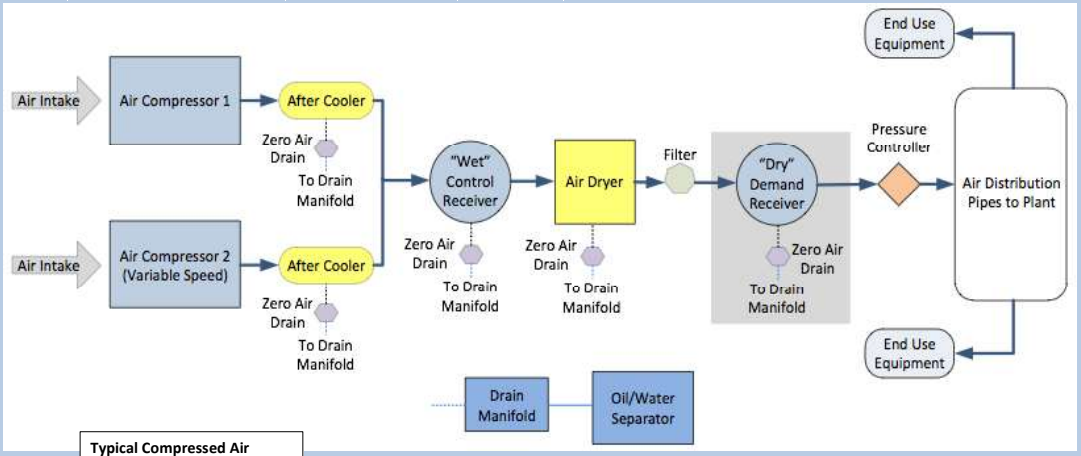
### 1.8 Control Panels

| Ref | Description | Manufacturer / Ref [1] | Spec | Notes |
|---|---|---|---|---|
| FCP/01 | Fan Control Panel<br><br>For smoke and vent fans in Lifting Shop | By Fan supplier / Control Panel manufacturer | The control panel will comprise an IP55 mild steel enclosure with orange powder coated finish. | The control panel will have the following indication equipment for each of the fans;<br>• Power ON Indicator<br>• Fire Incident Indicator<br>• System Fault Indicator<br><br>The control panel will be fitted with manual and automatic selector switches. The manual selector shall be used to override the system and run the fans at full speed.<br>The automatic selector shall operate the fans via a thermostat.<br><br>The fans are to be switched off in the event of a fire, via a fire signal from the early warning detection and alarm and sprinkler systems. The fire department will then override the system if needed<br><br>In the event of a fire, the Fire Department shall be able to operate the smoke extraction system. |

| Ref | Description | Manufacturer / Ref [1] | Spec | Notes |
|---|---|---|---|---|
| FCP/02 | Fan Control Panel<br><br>for Hazardous Store | By Fan supplier / Control Panel manufacturer | The control panel will comprise an IP55 mild steel enclosure with orange powder coated finish. | The control panel will have the following indication equipment for each of the fans;<br>• Power ON Indicator<br>• Fire Incident Indicator<br>• System Fault Indicator<br><br>The control panel will be fitted with manual and automatic selector switches. The manual selector shall be used to override the system and run the fans at full speed.<br>The automatic selector shall operate the fans via a thermostat and CO2 sensor.<br><br>The fans are to be switched off in the event of a fire, via a fire signal from the early warning detection and alarm and sprinkler systems.<br><br>The panel will be supplied with enough points to control each fan as required |
| SMCP/01 | Smoke master control panel | | | The master control panel will be fitted with manual selector switches, and positioned within the sprinkler installation's ICV chamber, including a schematic of the site layout. The manual selector switches shall be labelled in accordance with the schematic of the site layout, so as the Fire Department are able to operate the system accordingly.<br><br>The smoke ventilation louvers shall remain closed at all times, and once the Fire Department are on site in the event of a fire, they shall be able to operate the smoke extraction system, including the automatic lower level louvers, helping exhaust the smoke build-up, and allowing the Fire Department to enter the building where desired.<br><br>The installation is to include temperature rated cabling to the necessary SABS / EN54 and SANS 10142 standards, and the entire smoke ventilation system shall be in accordance with SANS 10400 and the relevant parts of EN12101. |

## 1.9 Compressed Air Systems

| Ref | Description | Manufacturer / Ref [1] | Spec | Electrical | Requirements and Notes |
|---|---|---|---|---|---|
| CAS/01 | Compressed air system to deliver 10 bar to primary air distribution system | As per existing on site or equal and approved | 10 Bar<br><br>Flow rate as existing plus 30% | | System to comprise at a minimum the following:<br>Air intake filters<br>Compressors – screw compressors – variable speed drives to improve efficiency<br>Refrigerated Air dryer<br>c/w Primary Receiver, Oil Filters, Dust filters, Pressure controller<br>Connection to primary air distribution system<br>Drain Manifold<br>Oil/Water separator<br><br>System to have two new compressors. |
| CAP/01 | Compressed Air Pipework – Aluminium | As per existing on site or equal and approved | | | D20, D25, D40, D50, D63, D80, D100, D158, D200 sizes<br>Fittings – Push to Fit (20, 25, 40, 50)<br>Fittings - Torque to grip (63, 80)<br>Fittings - Bolt Clamp (100, 158)<br>Burst Pressure of 64 Bar (safety factor of 4 for all diameters)<br>Max 16 Bar working pressure<br>Working temperature -20 to 80°C |




**Typical Compressed Air Supply System**

## *Item Specification for all of the above as required*

**ALL EQUIPMENT IS EQUAL OR APPROVED**

### 1.1 Pipework

| Ref | Description | Manufacturer / Ref [1] | Spec | Requirements and Notes |
|---|---|---|---|---|
| WPIP/01 | Water Reticulation Pipework | | Multi-layered water pipework | **MEPLA or equivalent will be used**<br><br>These pipes comprise multiple layers of HDPE, Aluminium and PEX-Xb. These pipes and fittings shall be manufactured in accordance with SANS and EN ISO 21003. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws.<br><br>The pipes and fittings shall be jointed by agreed and manufacturers recommended connection to suit the pipework material and/or the fitting being connected to. |
| WPIP/02 | Water Reticulation Pipework | | Galvanised Steel | Galvanised steel pipework will be used for potable water and fire water where stated.<br><br>Galvanised Steel pipes and fittings shall be manufactured in accordance with SANS. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws.<br><br>The pipes and fittings shall be jointed by screw fit or flanged connection to suit the pipework material and/or the fitting being connected to. Generally connections will be flanged for all pipes 50mm in diameter or greater with screwed connections for smaller pipes. |
| WPIP/03 | Water Reticulation Pipework | | HDPE Pressure Pipe | HDPE water pipes will be used for all water pipework installed below ground.<br><br>Pipes 50Ø or smaller must run in the ground inside a smooth bore sleeve of appropriate size to ensure pipe can be replaced.<br><br>HDPE pipes and fittings shall be manufactured in accordance with SANS. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws. The pipes and fittings shall be jointed by screw fit or flanged connection to suit the pipework material and/or the fitting being connected to. |
| WPIP/04 | Water Reticulation Pipework | | UPVC Pressure Pipe | uPVC water pipes will be used for all water pipework installed below ground.<br><br>Pipes 50Ø or smaller must run in the ground inside a smooth bore sleeve of appropriate size to ensure pipe can be replaced.<br><br>Pipes and fittings shall be manufactured in accordance with SANS. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws. The pipes and fittings shall be jointed by screw fit or flanged connection to suit the pipework material and/or the fitting being connected to. |
| WPIP/05 | Water Reticulation Pipework | | Copper | Copper pipes and fittings shall be manufactured in accordance with SANS 6059. The tubes shall be straight, smooth, of true cylindrical bore and free from all flaws.<br><br>The pipes and fittings shall be jointed by welding, soldering or by a compression type mechanical coupling to suit the pipework material and/or the fitting being connected to. |
| PIPR/01 | Refrigerant Pipework | Copper | Class as required by manufacturer | All refrigerant pipework will be copper |

### 1.2 Ductwork

| Ref | Description | Manufacturer / Ref | Spec | Notes |
|---|---|---|---|---|
| DUCT/01 | Galvanised Steel ductwork for normal operation | | Rectangular and Circular ductwork | Low pressure galvanised steel ductwork<br><br>All Ductwork will be insulated as per DINS/01<br><br>All ductwork (exposed and visible surfaces) installed in areas where there is no or minimal celling will be powder coated / painted as per the architect finishing schedule. |
| DUCT/02 | Flexible Ductwork | | | Flexible duct insulation shall be 25 mm nominal thickness fibreglass of 24 kg/m$^3$ density. The insulation shall encase the flexible duct and shall be sheathed with a moisture barrier having a permeability of not over 0.02 perm.<br><br>Flexible circular ductwork will be used for the final 1m only (to the valve/grille) of the installation and this distance should be reduced where possible.<br><br>All ductwork (exposed and visible surfaces) installed in areas where there is no or minimal celling will be powder coated / painted as per the architect finishing schedule. |

### 1.3 Insulation

| Ref | Description | Manufacturer / Ref [1] | Requirements and Notes |
|---|---|---|---|
| PINS/01 | Hot and cold water pipework Insulation | Foil Faced Rockwool/ Mineral Wool | Various Pipe sizes<br>Thickness 25-50mm<br>Limit operation Temp 850°C<br>ODP of zero required<br><br>Thickness to be selected to achieve a Thermal Conductivity that will be less than 0.034W/mK<br><br>To be installed snugly onto the pipework.<br>To be wrapped in aluminium foil tape to protect the insulation<br>To be installed as per manufacturers best practice requirements.<br><br>All Valves, fittings and other equipment to be insulated as well using insulation boxes or insulation specifically designed fdor that unit, application.<br><br>All Joints, Bends, offset, etc to be insulated, including the entire of a flange should that be a connection type.<br><br>Installation installed on pipework in exposed/external/high risk area will require galvanised steel sheet cladding over all insulation. |

| Ref | Description | Manufacturer / Ref [1] | Requirements and Notes |
|---|---|---|---|
| DINS/02 | Ductwork Insulation | Foil Faced Rockwool/ Mineral Wool<br><br>24 kg/m$^3$ density mineral wool insulation<br><br>ODP 0<br><br>Thickness 25-50mm<br>Limit operation Temp 850°C | Thickness to be selected to achieve a Thermal Conductivity that will be less than 0.034W/mK<br><br>The insulation shall be glued to the ducting and sealed along all longitudinal and transverse overlapping joints with approved adhesive to provide a vapour seal. The overlapping joints shall be approximately 75 mm wide. The edges of overlaps are to be taped down with self-adhesive aluminium tape no less than 50 mm wide.<br><br>The insulation shall be strapped with nylon straps at intervals of more than one metre apart. Where necessary, especially at bends, transformation pieces, branches, etc. insulation is to be glued, taped and strapped to ensure that the joints are vapour sealed.<br><br>All insulation installed externally and in Plant Rooms shall be protected with 0.4 mm thick galvanised steel sheet metal cladding, which shall be applied directly over the insulation vapour barrier.<br><br>The cladding shall be secured by means of removable and re-usable stainless steel bands every 330 mm. Self-tapping screws will not be accepted. No dents or damage to the sheet metal cladding will be accepted.<br><br>All insulation (exposed and visible surfaces) installed in areas where there is no or minimal celling will be powder coated / painted as per the architect finishing schedule. |
| ACINS/03 | Refrigerant Pipework Insulation | Nitrile Rubber insulation<br><br>Class O, dust-free, fibre-free and CFC free<br><br>ODP of zero | Thickness 12mm to 25mm<br>Preformed Pipe Section to suit pipework diameter.<br><br>DO NOT COMPRESS THE INSULATION WHEN FIXING TO PIPEWORK<br>DO NOT USE CABLE TIES TO FIX INSULATION. Use recommended vapour barrier tape (50mm wide minimum) and ensure tape overlaps joints sufficiently for a good seal.<br><br>Use good quality tools—in particular, fresh adhesive, good adhesive brushes, and sharp knives.<br>Apply insulation only when the pipes are clean, dry, and unheated or uncooled. The surface to be insulated must be free of rust.<br><br>Never stretch insulation when sealing the joints. It is better to compress it slightly. Use pieces of insulation that are at least as long as the section of pipe to be insulated.<br>Always use the insulation that is properly sized for the pipe it is to cover. Do not stretch it over the pipe and don't install oversized insulation.<br><br>Do not crowd insulation-covered pipes. Space pipes far enough apart to allow for the free circulation of air.<br><br>Ensure all piping insulation is properly sealed to minimize heat loss and control condensation.<br><br>When installed outdoors, paint with a recommended finish. Follow the manufacturer's instructions regarding the type of finish, the number of coats required, etc. Allow proper drying times between coats.<br><br>In double layer work, apply insulation with the side and end joints staggered.<br><br>Do not compress piping insulation at joists, studs, columns, ducts, hangers, etc. This is important because the insulation will lose thermal efficiency where it is compressed.<br><br>All insulation (exposed and visible surfaces) installed in areas where there is no or minimal celling will be powder coated / painted as per the architect finishing schedule. The finish must not flake or be prone to being easily removed. |