Coils General

Our offer is based upon coils being single piece in the AHU width for removal from one side of the unit only.

Coil selections are based on the following: -

	Face Vel. M/sec	Water P. Drop Kpa
Heating Coils:	2.8 m/sec	15Kpa
Cooling Coils:	2.8 m/sec	30Kpa

In the event of an order being placed with Dalair, our contracts department will advise actual water pressure drops.

Coils are pressure tested with 16 bar dry compressed air under water.

Where our offer includes for flanged coil connections these are not fitted as part of the coil. Flanges for both coil connections are supplied screwed, unfixed and are fitted in reverse to the coil connections for site fixing and assembly by others.

4. DAMPERS

Dampers shall be incorporated where indicated on our technical data sheets for isolation purposes. Dampers will be suitable for motorisation (motors by others).

Dampers will be manufactured from single skin galvanised steel fully interlocking opposed blades operated by electroplated mild steel spindle running in nylatron bearings.

5. WEATHERPROOFING

Air handling units selected for external location are provided with a weatherproof pitch roof, which would be manufactured from colour coated EGP coated galvanised steel.

6. WEATHER LOUVRES

Powder coated aluminium fixed blade weather louvre shall be fitted to all externally mounted equipment having fresh air inlet or exhaust air outlet

7. RECUPERATORS

Air to air recuperator manufactured with aluminium plates and complete with **face / by pass dampers** suitable for motorisation (motors by other). A stainless steel drain tray is fitted on the exhaust air leaving side of the recuperator only.

The recuperator shall be tested and certified in accordance with Eurovent Standard.

8. NOISE DATA

We have not allowed for any attenuators as we assume that these will be mounted within the ductwork by others, as this design is far more cost effective and flexible.

The noise data stated in our schedules are fan discharge / in duct sound power levels and do not, unless otherwise stated, include for any reductions for unit casework, components, silencers or acoustic louvres, etc.

A correction of 4db has been added to the fan noise spectrum to allow for the effects of mounting the fan within an AHU section.

9. PACKING

We have included for all air handling unit sections to be shrink wrapped in heavy gauge polythene sheet prior to despatch.

We have not included for resealing of open ends after site assembly and recommend that if units are not being connected to ductwork or are to remain out of operation for any length of time that the open ends are sealed to prevent ingress of dirt, water etc.

We assume all/any site protection will be installed and fitted by others.

10. WIREWAYS/CONDUIT/CONTROL FITTING ETC

We have not included for wireways, fitting of free issue controls, wiring etc.

The AHU's are supplied in sections and therefore it makes it totally unpractical to fit conduit or wireways. This is best supplied and installed by the Electrical Contractor.

We are unable to fit "Free Issue" control items as damage etc could occur and Dalair would be unable to cover the cost of replacement.

CLARIFICATIONS

1. All drawings, specification, dimensions, weights, noise levels and power ratings issued by Dalair at tendering stage are intended to give a basic indication only of the product and as such shall not form part of the contract. Upon acceptance of a tender full-certified technical data and drawings will be provided.

2. Coils would be one-piece construction and would require the air handling unit width dimensions to one side of the unit for coil withdrawal.

3. Please check our unit dimensions for site suitability.

4. We have included fan performance based on your given external static pressure and assumed that approach and discharge ducts are designed in accordance with good practice such that the fan is enabled to achieve performance. Our fan selection does not include for inlet / discharge losses to and from unit.

5. Air Handling Units are manufactured and assembled to recognised industry standards and will normally achieve the air leakage test classification specified when carried out in accordance to the HVCA Specification Guides DW143 and DW144.

   However, due to the stresses, strains and forces imposed during loading, transportation, off-loading and site positioning, Air Handling Unit structures will move and panel seals will not always remain fully intact. It is therefore likely that re-sealing of panels and joints will have to be carried out on site if units are to achieve the required leakage classification.

WARRANTIES/SERVICE & MAINTENANCE

We are pleased to confirm that Dalair Ltd. operate an "In-House" Service and Maintenance Division, established specifically to ensure that the equipment operates throughout its working life at optimum efficiency and therefore its most cost effective.

This Maintenance Division has recently become part of our accreditation under BS EN ISO 9001:2000, as part of the Product Realisation process.

Dalair equipment carries a standard **12-month warranty** against faulty workmanship and components from the date of delivery and is subject to full and documented evidence that maintenance has been carried out by competent engineers or preferably Dalair Service Engineers.

Dalair do not accept responsibility for repair costs and remedial work to AHU structures or components caused through damage during off-loading, craneage and installation, the lack of or in-correct maintenance, incorrect operation, system dampers closing/failing allowing full fan pressures to be exerted on the unit structure, malicious damage or incorrect wiring/piping of components.

Tender For Air Handling Equipment

EXCLUSIONS

1. Off loading, craneage, site positioning and assembly of equipment.
2. Starting gear, sequence operating & temperature controls.
3. Supply or fix of any pipe work or valves.
4. Works and site testing, and commissioning of equipment.
5. Fixing of control stats and filter gauges (our price includes for supplying filter gauges as a loose item for fitting onsite by others).
6. Terminal boxes and associated wiring.
7. Drain traps from drain trays and the raising of unit height to accommodate traps.
8. Any disinfection, which may be required.
9. Supply or fitting of damper actuators / mounting brackets.
10. Fan drive/inlet guards. (Door Guards are offered)
11. Silencers.
12. Bulkhead lights or viewports.
13. Any other items not specifically mentioned.

Reference	CAA
AHU Reference	AHU 1
Unit Dimensions	1650W x 2325H x 5300L (mm) including 125 base & 100roof

The overall unit height shown above includes the base and roof, if fitted. However, overall unit dimensions exclude any externally fitted components such as spigots, dampers, louvres or cowls.

BASIC UNIT INFORMATION

Model Ref	MA50/3/S
Quantity	1
Location	External.

SUPPLY SIDE

Volume	2.6 m³/s
External static	350 Pa

EXTRACT SIDE

Volume	2.6 m³/s
External static	300 Pa

COMPONENTS (In direction of airflow)

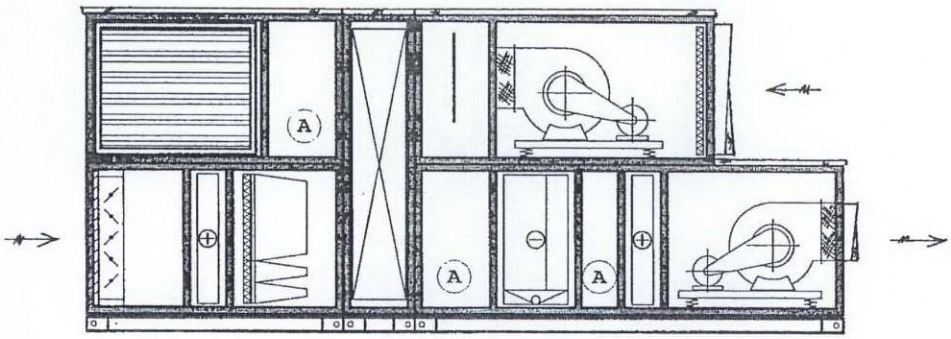
SUPPLY SIDE

- Supply Air Inlet
- LPHW Frost Heater
- Panel Filters
- Bag Filters
- HeatWheel
- Service Access Section
- CW Cooler
- Visual Inspection Section
- LPHW Heater
- Supply Fan

EXTRACT SIDE

- Panel Filters
- Extract Fan
- Diffuser
- HeatWheel
- Service Access Section
- Extract Air Outlet

UNIT SKETCH - Elevation



TECHNICAL DATA

Note:- The following information is provided as a guide only and must be checked at time of order

Supply Air Inlet

Louvre & Damper	(Damper Seals:- None)
Air Volume	2.6 m³/s

Continued ...

LPHW Frost Heater

Volume	2.6 m³/s
Air On Coil Db	-3 °C
Air Off Coil Db	5 °C
Duty	25.2 kW
Face velocity	2.71 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	70 °C
Flow Rate	0.616 l/s
Water Pd	9 KPa
Rows/Fins	1R/4F
No of Sections	1
Construction	Copper/Aluminium

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	2.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

Bag Filters

Type	Bag
Efficiency	F7
Arrangement	2.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

HeatWheel

Type	Non-Hygroscopic
Supply Air On	5 °C
Supply Air Off	16.6 °C
Extract Air On Db	21 °C
Extract Air On RH	50 %
Efficiency (Sup)	73 %
Heat Recovered	41.5 kW
Special Features	Speed control

CW Cooler

Volume	2.6 m³/s
Air On Coil Db	30 °C
Air On Coil Wb	20 °C
Air On RH	40 %
Air Off Coil Db	16 °C
Air Off Coil Wb	13.6 °C
Duty	58.9 kW
Face velocity	2.71 m/s
Medium	Water/Ethylene glycol mix
Glycol	10 %
Flow Temp	6 °C
Return Temp	12 °C
Flow Rate	2.403 l/s
Water Pd	22 KPa
Rows/Fins	5R/9F
No of Sections	1
Construction	Copper/Aluminium
Eliminators	YES
Drain Pan	Fixed

LPHW Heater

Volume	2.6 m³/s
Air On Coil Db	5 °C
Air Off Coil Db	21 °C
Duty	50.4 kW
Face velocity	2.77 m/s
Medium	LTHW
Flow Temp	80 °C
Return Temp	70 °C
Flow Rate	1.233 l/s
Water Pd	5 KPa
Rows/Fins	1R/11F
No of Sections	1
Construction	Copper/Aluminium

Continued ...

Supply Fan

Volume	2.6 m³/s
External static	350 Pa
Total static	994 Pa
Absorbed power	3.44 kW
Motor power	5.5 kW (EFF1)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	2110 RPM
Outlet velocity	10.24 m/s
Total fan efficiency	80.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	97	91	88	87	84	80	75	67

Includes +4dB fan in casework adjustment

Door guard fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	NO
Standby motor fitted?	NO
Thermistors fitted?	NO

Panel Filters

Type	Panel
Efficiency	G4
Arrangement	2.5W x 1.5H
Withdrawal	Side
Manometer	Inclined

Extract Fan

Volume	2.6 m³/s
External static	300 Pa
Total static	782 Pa
Absorbed power	2.82 kW
Motor power	4 kW (EFF1)
Motor type	Standard/Single Speed
Motor position	Face on
Fan type	DIDW / Backward curved / Belt driven
Fan speed	1964 RPM
Outlet velocity	10.24 m/s
Total fan efficiency	78.0 %
Electrical Supply	400V-3Ph-50Hz

Fan discharge SWL levels	63	125	250	500	1000	2000	4000	8000 (Hz)
(to BS848)	96	90	87	86	83	79	74	66

Includes +4dB fan in casework adjustment

Door guard fitted?	YES
Suitable for inverters?	YES
Isolator fitted?	NO
Standby motor fitted?	NO
Thermistors fitted?	NO

HeatWheel

Extract Air Outlet

Louvre & Damper	(Damper Seals:- None)
Air Volume	2.6 m³/s

Approximate weight of unit 3689 kg

1 GENERAL

1.1 THE BUILDING

One Kemble Street comprises a 15 storey circular building of office accommodation. Whilst this project is contained within One Kemble Street it is connected to a 7-storey office block facing Kingsway called CAA House. The two structures are connected by a link bridge and share a Building Management system and a low temperature hot water heating system.

One Kemble Street and CAA House was constructed in the early sixties and is of a steel construction with block and panel elevation.

1.2 THE WORKS

The works shall comprise the installation and setting to work a new Air Handling Unit and associated equipment, ductwork etc to the raised services platform on the roof of One Kemble Street. This to provide supply and extract to the 13th floor services which have been installed by others. The new ductwork shall terminate in new fire dampers at the point of entry to the building. Final connection to the existing services shall be by others. The ductwork route to the 13th floor is across the roof and down an open lightwell.

The new Air Handling Unit shall be provided with LTHW heating, chilled water, power and controls from the existing systems as indicated on the drawings and within this specification.

The existing services platform shall be modified to accommodate the new Air Handling Unit as indicated on the drawings and within this specification.

The safe access route and staircases to the raised platform along with minor works to existing safety barriers shall be modified / repositioned as indicated on the drawings and within this specification.

1.3 LIMITATIONS / OBLIGATIONS

The premises will be fully occupied for the duration of the works.

Out of hours work will only be allowed by prior arrangement. All works are to be conducted out of hours / during normal working hours.
Hours of working

All disruption to services must be fully planned by the contractor and approved by the client / Contract Administrator prior to the commencement of the works.

A limited storage area will be made available to the contractor

The contractor will have use of a designated lift for transporting materials between the hours of ??????. The contractor will however be responsible for ensuring the lift is adequately protected.

On completion of the works the contractor shall allow for providing 1 days training in the operation of the new works to the clients maintenance engineers.

The controls element of the works as scheduled in clause 3.6 is to be carried out by a named sub contractor BMSi Ltd. Contact: Mr Mark Olding. Tel: 01753 821012

2 ASBESTOS

Asbestos is not known to be present within the areas of work but is present within the building. The contractor shall fully familiarise himself with the asbestos register prior to commencement of the works.

The asbestos register can be viewed via Mr Steve Shearman:

Tel: - 020 7453 6604

- Builders work in association.
- Arrange with the client for any reconnection of any fire protection equipment
- Final commissioning of system and controls.
- Client demonstration

3.3 **WORKING AT ROOF LEVEL / CRANE / SCAFFOLDING**

General access to the roof shall be by a nominated lift to the 15th floor then stairs to the roof level. The Contractor where he utilises the lift shall provide adequate protection to the internal finishes and ensure that it is not overloaded. Items shall be broken down to easily manageable components that can reasonably fit within the lift and be escorted by at least one operative. All deliveries shall be fully co-ordinated with the client. Deliveries may need to be out of hours and lift used only during off peak periods. All necessary protection to the lift lobbies and staircase to the roof shall be provided.

The AHU shall either be delivered in one piece and craned directly into place or supplied in component form taken to the roof via the lift and staircase and assembled on site. The contractor shall price for delivering in one piece but provide an alternative cost for manhandling the unit via the lift.

Should a crane be used the contractor shall be responsible for all road closures and all associated costs. Both Kemble Street and Wild street have been used in the past as locations for cranes to lift equipment to the roof of 1 Kemble Street. The contractor shall determine the most suitable location whilst minimising disruption to residents. Should all the equipment be taken to the roof by means of the lift the contractor shall allow for all necessary equipments such as stair walkers, local hoists and protection of the building etc

It is anticipated that all steelwork modifications are carried out prior to installing the new AHU.

The new ductwork to the lightwell area is to be installed from a scaffolding arrangement providing a safe working platform and crash deck protection to the lower floors. The scaffolding is to be built up internally from the first floor level. The contractor shall fully familiarise himself with the access route to this area. The Contractor shall allow for the removal and reinstatement of all existing bird netting etc necessary to carry out and protect the works.

It is expected that during tender the contractors proposed scaffolding sub contractor visits site.

The Contractor shall also return with his tender any alternative proposals for the safe installation of the ductwork and associated equipment which he considers feasible and practical.

The Contractor shall submit with his tender his proposed method statement and risk assessments for the installation of all new equipment on the roof.

There is existing equipment on the roof which is fragile or which has restricted access. The contractor shall liase with the facilities management team to ensure safe working areas are maintained.

All hoisting, lifting, temporary working platforms and edge protection shall be included by the Contractor who shall have visited site prior to tender to satisfy himself

Extract Air Fan Run / Trip / Auto
Cooling Pump1 Run / Trip / Auto
Cooling Pump1 Run / Trip / Auto
Fresh air bag filter clean / dirty
Fresh air panel filter clean / dirty
Return air panel filter clean / dirty
Fire Alarm Live Indicator / Alarm

An emergency stop lock button shall be provided external to the AHU

Refer to electrical section for power supply to panel.

Building Management System

The panel shall be connected to the existing BMS system within the 15th floor plant room. All necessary software shall be included together with additional graphics added to the existing BMS central supervisor.

Components to be monitored by BMS are as follows:

Inlet Air Damper Fail to Open
Exhaust Air Damper Fail to Open
Thermal Wheel Fail
Supply Air Fan Flow Fail
Extract Air Fan Flow Fail
Frost Coil temperature sensor (frost condition)
Frost coil immersion temperature (frost condition)
Low supply air temperature
Cooling Pumps Flow Fail
Fresh air bag filter dirty
Fresh air panel filter dirty
Return air panel filter dirty
Fire Alarm
Fireman's Switch in extract mode
Communications failure

The BMS works as listed above shall be carried out as a package by the client's controls contractor. Namely BMSi Ltd. Contact: Mr Mark Olding. Tel: 01753 821012

Fire Alarm Interface

The panel shall also monitor a Fire Alarm healthy signal and a Fireman's Switch normal and extract positions. All actions shall be hardwired and then copied in software.

A fire alarm lamp on the control panel shall indicate that there is a "Fire Alarm" or that the Fireman's switch is not in the "Normal Position"

The BMS shall monitor "Fire Alarm Normal" signal and the Fireman's Switch "Extract" signal. The AHU will not restart after a Fire Alarm condition until a "software flag" at the existing Central Supervisor has been reset.

The existing fireman's switches located on the ground floor shall be modified and relabelled to include for the 13th floor AHU. Contractor to submit proposals for the re labelling prior ordering. To be similar to existing.

Frost Control

There shall be 2 modes of local frost control associated with the AHU

Firstly, a capillary temperature sensor, located downstream of the frost coil will modulate the 3-port control valve to maintain an off coil temperature of 4 deg C (adjustable) If the off-coil temperature sensor drops below 1 deg C (adjustable) then the AHU will go to a frost condition, see table below, and generate an alarm at the BMS supervisor.

The AHU will not come out of frost until the off coil temperature is above 2 deg C (adjustable) and a "software flag" at the Central Supervisor has been reset.

Secondly, an immersion sensor located in the return pipework from the frost coil will sense the leaving temperature from the coil. Once the control valve has been requested to open more than 10% (adjustable) for at least 30 seconds (adjustable) then if the above immersion temperature sensor measures less than 50% (adjustable) the AHU will go to a frost condition and generate an alarm at the Central Supervisor

Item	Healthy Condition	Frost Condition
Inlet Air Damper	Open	Shut
Exhaust Air Damper	Open	Shut
Thermal Wheel	Auto	Stopped
Supply Air Fan	On	Off
Extract Air fan	On	Off
Cooling Pumps	Auto	On
Frost Coil	Auto	100% Open
Cooling Coil	Auto	50% Open
Heating Coil	Auto	50% Open

AHU Temperature Control

The supply air temperature from the AHU shall be scheduled against the outside air temperature

Outside Air Temperature	Supply Air Temperature
10 deg C (adjustable)	18 deg C (adjustable)
19 deg C (adjustable)	16 deg C (adjustable)

A duct mounted supply air temperature sensor will sequence control the thermal wheel operation and modulation of the heating and cooling valves to maintain the required setpoint.

Cooling Pumps

The duty cooling pump is commanded on when the cooling valve is open more than 5% (adjustable) or if there is a frost condition. The pump shall shut down when there is no cooling demand.

A differential pressure switch mounted across the pump set shall monitor pump status and provide indication to the BMS. Should duty pump fail there shall be auto changeover to the standby pump. The pump set shall also be provided with duty sharing.

AHU Filters

Differential pressure switches shall be mounted across the fresh air bag filter, fresh air panel filter and the return air panel filter and set for dirty filter condition (adjustable locally)

In the event that they go into a dirty condition then a lamp will be illuminated on the control panel facia and a signal sent to the BMS

3.7 PIPEWORK SERVICES

The Contractor shall supply and install new chilled water and Low Temperature Hot Water pipework to serve the new AHU generally as identified on the drawings. The new pipework shall generally be located under the upper services platform. All valves required for the heater batteries and cooling coils shall be located above the platform. The new chilled water pump and associated valves shall be located above the platform.
The new chilled water pipework shall connect to existing valved / blank connections.

The new LTHW pipework shall require cutting into existing pipework and installing new isolating valves generally as identified on the drawings. This work will require the temporary shut down of the LTHW pipework serving the existing AHU's and shall be carried out of hours.
The Contractor shall liase fully with the facilities management team and agree a suitable time for these works.

The Contractor shall supply a new chilled water pump set as indicated on the drawings and in the equipment schedule. Pump set to come complete with all isolating valves, flex connections, anti vibration pads, drain point etc.
New pump set to be enclosed in purpose made GRP enclosure. (Refer equipment schedule)
Enclosure to be secured to existing platform

3.8 CHEMICAL DOSING / WATER TREATMENT

Prior to re-instatement of the chilled water and LTHW systems the contractor shall carry out flushing and cleaning via an external pumping facility. This shall include chemical cleaning and water sampling. The Contractor shall agree the flushing and chemical treatment regime required to suit the existing installation with the facilities management team.

3.9 INSULATION

The contractor shall insulate all ductwork, pipework, valves, pumps etc in compliance with the standard specification. Where existing services are being extended the insulation shall be installed to match existing.

Insulation shall not be applied before pressure and heat tests have been completed. All equipment, plant etc shall be protected at all times when insulation work is being carried out. On completion all surfaces shall be thoroughly cleaned.

Identification colour coded bands and labels to BS1710 shall be fixed to all pipework and ductwork services at the recommended locations.