Weatherite Manufacturing Limited
Weatherite House, Credenda Road, West Bromwich,
West Midlands, B70 7JE, United Kingdom,
Tel: 0121 665 22 66 Fax: 0121 665 22 77
email@weatherite-manufacturing.com
www.weatherite-group.com

Air Conditioning & Air Handling Equipment Manufacturers

Quotation No: MF/211497RB
Date: Monday 22nd August, 2011

For the attention of: Mr. D. Janes

Dear Sirs,

Project reference: Air Conditioning Equipment – Marks and Spencer, Buxton Refit

We thank you for your enquiry for the above project concerning the supply of air conditioning equipment. We are pleased to submit our quotation for your consideration. The quotation is based on information readily available to us at the time of your enquiry. It is not intended to be legally binding and is subject to the subsequent conclusion of mutually agreeable terms.

Prices are valid for 30 days from the date of this quotation. Thereafter equipment will be invoiced at the prices ruling on the date of despatch.

All prices quoted are subject to Weatherite Manufacturing Limited standard terms and conditions of sale, exclusive of VAT and are subject to contract

We trust that we have interpreted your requirements correctly and the enclosed details meet with your approval. However, should you require any additional information please do not hesitate to contact the under signed.

Yours faithfully,
Weatherite Manufacturing Limited

M. Fryer
Sales & Applications Engineer

Paul Ludlow Tel: 07713 512576
Key Account Executive

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REV A: Updated costs, now includes attenuation to inlet and outlet.
REV B: Updated Technical information

ESTIMATE: Please find below our price for the supply and delivery to site of the equipment as per the attached specification comments, exclusions and technical schedule:-

Qty	Unit Reference	Description	Price (each)	Total Prices
1	MRLTFD070L2120	External Packaged Free Cool AHU	£51,289.00	£51,289.00
1	Software	Software Engineering		£235.00
1	Commissioning	On Site Commissioning of Trend Controls Software		£735.00
1	Commissioning	On Site Commissioning of DX cooling		£735.00
1	Delivery	Delivery of units to site (Out of normal working hours)		£500.00
			Grand Total	**£53,494.00**
(Fifty Three Thousand, Four Hundred and Ninety Four Pounds Sterling)				

TERMS: 45 Days Bill of Exchange - subject to Weatherite Manufacturing Ltd standard terms & conditions.

DISCOUNTS: The prices quoted within this quotation are nett and no discounts will be available.

DELIVERY: Would be effected to site within 8 to 10 working weeks from receipt of a formal instruction, full and final information and full approval of our general arrangement drawing(s).
This is based on stocks and factory production availability on the date of the quotation but subject to confirmation at the time of ordering.

WARRANTY: All equipment includes a twelve months parts and labour only warranty.

SITE COMMISSIONING: The price for site commissioning is subject to the following conditions being met prior to commissioning:-

1. All wiring is complete and a permanent power supply available
2. All pipework complete, metering, purging of system and gas supply available.
3. All test certification for points 1 & 2 above and testing points (i.e. Binders) are available.
4. Air volumes, control and fire dampers are balanced.
5. Water flow rates balanced.

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SPECIFICATION COMMENTS AND EXCLUSIONS

Please find enclosed any comments, clarification or deviations from the project specification.

Construction/Design

The packaged air handling unit would be suitable for mounting in an external location, constructed as per the attached specification and would incorporate the following components:-

1. Outside air, recirculation and exhaust air mixing chamber.
2. Flat form panel filter bank, rated at G4 when measured in accordance with B.S. EN 779 test standard.
3. Copper tube, pre- painted aluminium fin direct expansion cooling coil.
4. Copper tube, aluminium fin low temperature hot water re- heat coil.
5. Supply and extract air fan section each consisting of a backward curved double inlet, double width centrifugal fan with run only single speed belted drive motor.
6. Diffuser section.
7. Condenser section incorporating fully hermetic scroll type compressor, copper tube pre- painted aluminium fin condenser coil and axial type condenser fan.

We have based our prices on our standard method of construction which is for a casework constructed from a series of inter- locking 25mm thick double skin bonded panels.

Owing to the unknown air volumes and external static pressures we have reviewed the existing unit on site and based our calculations on the information available from the existing unit components (information is unavailable on the unit nameplate), calculations/assumptions as stated below:

a. Fan and motor sizes matched to the size of the existing components.
b. Cooling duties based on the model of the existing compressor. If performance data for these is not readily available then a typical Marks and Spencer condition has been used.

The unit is designed to current standard Marks and Spencer/Weatherite Manufacturing Limited specifications and not those ruling at the time of supply of the original unit. The packaged air handling unit would not be suitable for operation in a project designed around the displacement principle.

Please note that our unit construction and internally mounted components will not be suitable for removal of “hot smoke” (smoke rated at 40.0°C or higher).

Testing

The quotation does not include for any leakage, air volume, balancing, acoustic, performance or witness tests either at our factory or on- site.

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Controls & Electrical

We have included within our quotation for a control panel of the backplate type complete with all necessary sensors, frequency inverters, damper actuators, water control valves and controls. Also included are for all internal electrical components to be wired back to said control panel. At present the control scheme as been designed using Trend controls from their "IQ3Xcite" range supplied and fitted on the unit backplate by ourselves at our factory, however the scheme can be modified to use another controls package should you require at an additional cost.

We would like to point out that while the programmable controllers supplied by ourselves within our units will be "BACnet" compatible that integration with the overall store control scheme, including the supply and fitting of all items required for compliance, will be the responsibility of the nominated site controls specialist.

No indication lights are supplied.

As per Marks and Spencer requirements the access sections do not include for any inspection portholes or bulkhead lighting.

We have currently shown an additional price for Weatherite Manufacturing Limited to provide for our units only the software engineering and on- site controls commissioning that will be required. Please note that this is based on the assumption that Weatherite supply the unit controls and that the controls are Trend.

The quotation does not include for the supply and installation of air quality sensors, room sensors, "head end centralised BMS systems" or any starters, contractors and control items for remote fans and equipment.

We have not included for the supply or installation of any new fuses or breakers associated to the unit store side such as those for the mains supply, please check our units full load current against the store side fuses and breakers and the interconnecting field wiring.

The quotation includes for the supply and installation of high efficiency (EFF 1) motors and associated frequency inverters, which are applicable to the Enhanced Capital Allowance claim scheme.

Water Pipework

Our price also includes for a set of water pipework complete with 3 way water control valve and associated water valves and devices for the unit mounted LTHW heating coil.

Refrigeration

Note: At present the unit as been designed to utilise R407c refrigerant.

We have included in our quotation for a full set of refrigeration pipework between the compressor, condenser coil and associated direct expansion cooling coil. The price includes for a factory pre-commissioning and full on-site commissioning of the refrigeration circuit only. We have not included for any air volume tests etc.

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Attenuation

Our quotation includes for attenuation to the inlet and outlet to achieve a noise level of 48 dBA @ 10 metres.

Project Services

The quotation includes for the on- site commissioning of the unit mounted refrigeration and controls systems, these prices are based on the works being undertaken during normal working hours (Monday to Friday 09.00 to 17.00 excluding Bank Holidays).

Our quotation does not include for Weatherite Manufacturing Limited to off- load and position the packaged air conditioning unit on- site. All equipment will be delivered in one section only and on flat bed transportation.

We have not included for the craning off, decommissioning or disposal of any existing packaged air conditioning unit.

Our quotation does not include for Weatherite Manufacturing Limited to disconnect, reconnect or modify any of the unit's services concerning mechanical, e.g. ductwork and gas or LTHW pipework, also electrical concerning the mains supply and controls wiring.

We would like to highlight that at least one section of the supply and return air ductwork closest to the air conditioning unit will be required to be moved. These can be replaced with new sections to ensure a good and precise connection. These new transformation sections and all other ductwork modifications that will be required are to be supplied and fitted by the mechanical contractor.

Our quotation does not presently include for any on- site maintenance by Weatherite Group personnel, however, we can do so upon request.

For physical and performance data, please refer to the enclosed technical schedules.

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EXCLUSIONS:

Off- loading, Craneage and positioning of units.
Craning off and disposing of existing units/redundant equipment.
Decanting of any existing R22 equipment.
Mains electrical supply disconnection and reconnection.
Controls electrical wiring disconnection and reconnection.
LTHW pipework disconnection and reconnection.
Ductwork disconnection and reconnection.
Ductwork transformation sections.
All builders and plumbers work.
All field electrical controls and main supply wiring.
Condensate drain pipework, pumps and traps.
Starters, contactors and control items for remote fans and equipment.
Control panel indication and warning lights (run/trip etc.), “head end” centralised BMS system.
All water pipework together with associated valves, gauges and controls, unless otherwise specified.
Mains isolators and fuses.
Condenser coil fin guards.
Fan inlet and shaft/drive guards.
All air- conditioning controls, unless otherwise specified.
All items required to allow for communication of our units with store control scheme.
Interconnecting power and control wiring.
Inspection portholes and bulkhead lights.
Supply and fitting of water pumps.
On site assembly, if required.
Weatherskirts, if required.
Spares.
All testing and commissioning of Air Handling Units.
Balancing setting up and commissioning of air volumes.
Witness testing.
Anti- vibration matting.
Water flow balancing.
Any other items not specifically mentioned.

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WEATHERITE "MRLTFD" SERIES PACKAGED HEATING AND COOLING UNIT WITH FREECOOLING CAPABILITY SPECIFICATION

CASEWORK CONSTRUCTION

The air handling unit assembly would comprise of one section only.

The unit casework comprises of a series of double skin panels. Each panel would be constructed of an outer skin of 20 gauge plastic coated zintec sheet steel and an inner skin of 20 gauge plain galvanised sheet steel.

The inner and outer skins would be formed into 23mm thick trays and bonded to a CFC free vacuum extruded polystyrene insulation, insulation would not be class “O” rated. Fixed panels would be secured to the main casework by means of self tapping screws and sealed with a mastic sealant. Access panels would be held in positions on compressible seals using "quick release" type fasteners with externally mounted hinges.

Panel static insertion losses would be as below:

63	125	250	500	1K	2K	4K	8K
20	20	26	31	34	37	35	62

Units intended for external use would include for a flat weatherproof roof.

Each unit would be complete with a prefabricated steel channel baseframe.

The external colour of the unit will be BS 4800:10A05 Goosewing Grey.

FAN SECTION

Each fan and motor assembly will be mounted directly to the unit casework.

The fans shaft and impellers will be supported by "sealed for life" bearings. The fan will be driven via Vee belts and pulleys by a cage induction motor, suitable for 400 voltage, 3 phase, 50 hertz electrical supply. Run only motors would be provided.

The motor fitted will be EFF1 energy efficiency standard and will be a totally enclosed, fan ventilated type, manufactured in accordance with DIN EN/IEC 60034. The motor will be insulated to Class 'F' standard and designed to operate within Class 'B' limits. The motor enclosure will provide protection in accordance with IP54. Motors will be foot mounted and fitted on an adjustable slide base to enable adjustment of the belt tension with a single tensioning bolt. Thermistors would not be fitted.

The fan and motor drive set will be protected by a plastic coated wire mesh drive guard.

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MIXING BOX SECTION

Mixing box sections will consist of a casing incorporating outside air, recirculation and exhaust air dampers of the opposed blade type. The dampers will be constructed with 165mm wide aerofoil section galvanised steel blades with aluminium connecting gears mounted external to the case. The blades are fitted with 12mm stub axles running in brass bearings with dust caps for thorough duct air tightness. Frames would be 1.2mm galvanised steel 185mm deep with 38mm flanges. The dampers are fitted with external covers to provide a sealed compartment for operating gears.

FILTER SECTION

Filters will be arranged for front withdrawal. Access to the filter bank for general maintenance and inspection is included.

COIL SECTION

Coils will be mounted within the casing by means of slide tracks to enable easy removal.

Cooling coil sections will be fitted with fixed condensate trays constructed from heavy gauge galvanised sheet steel having a depth of not less than 35mm and provide adequate drain connections for moisture removal.

Coils will be constructed from solid drawn primary copper tubes, expanded into pre- painted aluminium fins and will be fitted with BSP screwed male connections. The coil casing will be manufactured from heavy gauge galvanised sheet steel.

All coils will be subject to an air pressure test of 7 Bar.

COMPRESSOR

The compressor would be of the "Fully hermetic" tandem scroll type, 100% gas cooled and would incorporate an internal over- heat Klixon crankcase heater, oil level sight glass suction and discharge rotalock valves. The compressor is seated on rubber anti- vibration mounts and mounted within the condenser section.

CONDENSER COIL

Two condenser coils would be provided. The condenser coil will be constructed from cross grooved primary copper tubes, expanded into pre-painted flat aluminium fins, pressure tested to 7 Bar.

CONDENSER FAN

Two fans would be provided for the each condenser coil, each incorporating asymmetrically spaced aluminium aerofoil blades which would be diaphragm mounted, complete with mild steel support arms and isolated by means of rubber type anti- vibration mounts. The fan impellers would be protected by a plastic coated wire mesh fan guard.

CONDENSER FAN MOTOR

Each fan would be direct coupled to a totally enclosed, squirrel cage, three phase induction electric motor. The motor carcass would be constructed from extruded aluminium with end covers manufactured in die- cast aluminium giving protection to IP55 and insulation to Class F. Each motor would have performance ratings in compliance with B.S. 5000 Part 99 (1973) and IEC 34-1.

REFRIGERATION PIPEWORK

The unit would be supplied with a complete installation of refrigerant pipework between direct expansion cooling coil, compressor and condenser coil.

The refrigerant circuit would be fitted with a thermostatic expansion valve. A liquid line drier and sight glass/ moisture indicator would be installed in the main liquid line from the condenser.

The complete refrigeration installation would be installed and tested utilising best quality materials an triple evacuation/ pressure testing procedures to provide a highly reliable system.

WATER PIPEWORK

The heating coil within the unit will be supplied complete with the following water side valves/ devices:-

a. 2- off Isolating valves.
b. 1- off Double regulating valve.
c. 1- off Metering station.
d. 1- off 3 way water control valve as manufactured by Siemens, Landis and Staefa.
e. 2- off Drain cocks.
f. 2- off Binder type test points.
g. 1- off Vent to low level.

In each case, all the above will be pre- piped, utilising mild steel pipe, and pressure tested. All insulated with Class ‘O’ closed cell armaflex. A flanged connection will be supplied to allow connection to the pipework from the underside of the unit.

Flow indication labels are provided.

ELECTRICAL INSTALLATION

One main control panel would be provided and installed out of the air stream. All unit motors and controls would be wired to the panel using a combination of plastic conduit and/or trunking runs within the air handling unit.

The control section would include the following items:

a. Control panel backplate.
b. Mains incoming isolator.
c. Inspection light.
d. Condenser fan speed controllers.
e. Supply and return air fan motor frequency inverters.

The control panel shall be supplied complete with the following features:

a. All necessary mini circuit breakers for motors and control items.
b. Motor starters and overloads.
c. Trend IQ3Xcite programmable controller.
d. 13 Amp 240V power socket complete with RCD protection.
e. All terminations number and crimped. Toggle switches for fan “hand/off/auto” switches.
f. Compressor cycle guard timers and winter start timers.
g. No other switches or indication lamps.
h. Fire alarm interlock.

An externally mounted mains isolator will be fitted to the unit.

The control panel backplate would provide control interlocks and power supplies to the following:

a. 1- off Mains incoming isolator.
b. 1- off Smoke sensor.
c. 1- off Outside air temperature sensor.
d. 1- off AHU supply air temperature sensor.
e. 3- off Volume control damper actuators.
f. 1- off Filter DP Switch.
g. 1- off Supply fan DP switch.
h. 1- off Supply fan motor.
i. 1- off Supply fan motor frequency inverter.
j. 1- off Return fan DP switch.
k. 1- off Return fan motor.
l. 1- off Return fan motor frequency inverter.
m. 1- off 3 way water control valve.
n. 1- off Tandem compressor.
o. 2- off Condenser fans.
p. 1- off Condenser fan speed controller.
q. 1- off High pressure transducer.
r. 2- off Compressor crankcase heaters

ELECTRICAL TESTING

All control panels are subject to an insulation resistance, phase, earth continuity and flash test at 2,500 volts for 1 minute. Upon completion of the unit, prior to energisation and pre-commissioning all final safety checks as prescribed in the latest “Electricity at Work Regulations” and wiring regulations are carried out and an individual unit completion certificate issued detailing responsibility for design, construction and testing.

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LABELLING

Self adhesive plastic indication and warning labels with black lettering on a white background complying with the latest directives.

PRE-COMMISSIONING

A detailed factory pre-commission is undertaken on each unit prior to despatch. On completion of all external services, we would provide skilled labour in conjunction with the mechanical and electrical sub- contractor to ensure that the units refrigerant circuit was thoroughly tested and commissioned. A detailed commissioning sheet would be produced and provided as part of the handover documents. This would also be kept as part of the ISO 9001 project documentation.

PROTECTION

All sections will be supplied with a polythene shrink wrap to protect against minor damage during transit and installation on site.

All condenser coils are protected using corrugated plastic sheet during manufacture and transit to prevent damage to exposed fins. This protection will be removed when commissioning commences on site.

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EQUIPMENT TECHNICAL SCHEDULE

PROJECT REFERENCE:	Marks and Spencer - Buxton
AREA REFERENCE:	Sales Area Replacement
MODEL:	MRLTFD070L2120
LOCATION:	External
QUANTITY:	1- off
ARRANGEMENT:	Horizontal, In Line
	Return air fan and motor, Outside, recirculation and exhaust air mixing chamber, Flat form panel filter bank, DX cooling coil, LTHW heating coil, Supply air fan and motor.

FAN SECTION	**SUPPLY FAN**	**EXTRACT FAN**
Air Volume:	7.0 m^3/s	7.0 m^3/s
External Resistance:	350 Pascals (Assumed)	250 Pascals (Assumed)
Type:	DIDW, Belt drive, Backward Curved	DIDW, Belt drive, Backward Curved
Speed:	1,234 RPM	1073 RPM
Motor Absorbed Power:	7.014 kW	4.75 kW
Motor Fitted Size:	11.0 kW	7.5 kW
Running Current:	21.0 Amps	15.3 Amps
Starting Current:	Inverter controlled	Inverter controlled
Motor Type:	4- pole, TEFC, Foot mounted	4- pole, TEFC, Foot mounted
Fan Efficiency:	79 %	70 %
Outlet Velocity:	10.9 m/s	10.9 m/s
Electric Supply:	400V/ 3Ph / 50Hz	400V / 3Ph / 50Hz
Specific Fan Power:	1.179 kW/m3/s	0.796 kW/m3/s

COOLING COIL	
Duty:	116.53 kW
On Coil:	24.5ºC dB/ 17.0ºC wB
Off Coil:	12.4ºC dB/ 11.8ºC wB
Medium:	R407c, Evaporating Temperature of 9.5ºC
Type:	Copper tube, Pre- painted Aluminium fin
Circuits:	Two, Total of four stages of 29.13kW per stage
Face Velocity:	2.04 m/s
Eliminator:	Not Fitted

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COMPRESSOR

No Off:	Two
Type:	Fully hermetic, tandem scroll
Duty:	116.53 kW
Saturated Suction Temp	9.5ºC
Power Input:	33.63 kW
Running Current:	2 x 17.8 Amps
Starting Current:	89.0 Amps per compressor
Electric Supply:	400V / 3Ph / 50Hz

CONDENSER COIL/FAN

No Off:	Four- off, Two-off per condenser oil
Total Airflow	10.8 m^3/s Total
Type:	Copper tube, Pre- painted Aluminium fin
Ambient Air Temp	32.0ºC
Fan Speed	940 rpm
Running Current	2.5 amps
Starting Current:	Inverter controlled
Electric Supply:	400V / 3Ph / 50Hz

RE-HEAT COIL

Duty:	162.83 kW
Air On:	10.0ºC
Air Off:	30.0ºC
Type:	Copper tubes, Aluminium fins
Medium:	Low temperature hot water, 82.0ºC Flow/ 71.0ºC Return
Water Flow:	3.62 L/s
Coil Pressure Drop:	19.0 KPa
System Pressure Drop:	51.42 KPa

PRE – FILTER

Type:	Disposable Panels
Efficiency:	Rated at G4 efficiency when measured in accordance with B.S. EN 779 Test standard
Gauge:	Not Fitted

UNIT ELECTRICAL DETAILS

Unit Full load current:	112.7 Amps
Unit Max inrush current:	166.1 Amps
Unit Voltage:	400V/ 3ph/ 50Hz

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SOUND POWER LEVELS

Reference: 10^{-12} Watts at fan outlet

Octave Band Frequency	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**
Supply (Inlet):	90	88	90	83	80	76	70	65
Supply (Outlet):	98	92	91	88	85	78	71	65
Extract (Inlet):	89	90	86	80	79	72	66	61
Extract (Outlet):	97	93	88	86	82	75	68	62
Condenser Fan (Per fan):	76	66	65	64	66	66	61	54

DIMENSIONS & WEIGHTS

DIMENSIONS: 7,600 mm Long x 2,400 mm (+1100 mm for inlet and outlet attenuation) Wide x 2,093 mm High
(Height includes 150 mm P.F.C. Baseframe and Weatherproof Roof)

Condenser fans will add 180 mm to the height of the unit

Ductwork connections: Supply Air Base of unit
Return Air Base of unit

TOTAL WEIGHT: 4,500 Kg (Approximate)

Access: 1,500 mm is required for condenser airflow on return fan end of unit
1,200 mm is required for access on both “long” sides.
2,000 mm is required for the removal of major components